ecma INTERNATIONAL

Standard ECMA-375

1st Edition / December 2006

Case for 120 mm HVD-ROM disk

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Introduction

In October 2004 a group of Companies, known as the HVD Alliance, proposed to Ecma to develop a standard for the first member of a family of holographic media. Ecma adopted this project and Ecma Technical Committee TC44 was established for the standardization of holographic media.

This Standard ECMA-375 is the first standard for a read-only holographic disk case.

This Ecma Standard has been adopted by the General Assembly of December 2006.

Table of contents

Section 1 - General

1 Scope

This Ecma Standard specifies the characteristics of a case for use with a Read-only Holographic Versatile Disc (HVD-ROM).

This Ecma Standard specifies

- the environments in which the case is to be operated and stored;
- the dimensional and mechanical characteristics of the case, so as to provide mechanical interchangeability between data processing systems.

This Ecma Standard provides for mechanical interchange between holographic disk drives. Together with a standard for 120 mm HVD-ROM disk and a standard for volume and file structure, it provides for full data interchange between data processing systems.

2 Conformance

A disk case shall be in conformance with this Ecma Standard if it meets all mandatory requirements specified therein.

3 References

The following standards contain provisions, which through reference in this text, constitute provisions of this Ecma Standard. At the time of publication, the editions indicated were valid. All standards are subjected to revision, and parties to agreements based on this Ecma Standard are encouraged to investigate the possibility of applying the most recent editions of the following standards.

ECMA-287 (2002) Safety of electronic equipment

ECMA-328 (2001) Detection and measurement of chemical emissions from electronic equipment

4 Definitions

For the purpose of this Ecma Standard the following definitions apply.

4.1 cartridge

A device consisting of a case containing a disk.

4.2 case

The housing that protects the disk and facilitates disk interchange.

4.3 case reference plane

A plane to which the dimensions of the case are referred.

4.4 holographic disk

A disk that will accept and retain information in a holographic storage layer.

4.5 Holographic Disk Cartridge (HDC)

A device consisting of a case containing a holographic disk.

4.6 Read Only Memory (ROM) disk

A disk which can be only read.

4.7 spindle

The part of the disk drive that contacts the disk.

5 Conventions and notations

5.1 Representation of numbers

A measured value is rounded off to the least significant digit of the corresponding specified value. For instance, it implies that a specified value of 1,26 with a positive tolerance of + 0,01 and a negative tolerance of - 0,02 allows a range of measured values from 1,235 to 1,275.

5.2 Names

The names of entities, e.g. specific surfaces, areas, etc. are given a capital initial.

6 Acronyms

HDC	Holographic Disk Cartridge
HVD	Holographic Versatile Disc
HVD-ROM	Holographic Versatile Disc Read Only Memory
MO	Magneto Optical
UDO	Ultra Density Optical
WO	Write Once

7 General description

The case, which is the subject of this Ecma Standard, is a protective enclosure for a disk. It has access windows on each side covered by a shutter. The windows are automatically uncovered by the drive when the case is inserted into it.

8 General requirement

8.1.1 Operating environment

The case conforming to the present standard containing a HVD-ROM disk, shall constitute a cartridge that shall meet the requirements of this clause.

The cartridge shall provide for mechanical and data interchange in the following operating environment, defined as the environment of air immediately surrounding the cartridge:

Temperature	35 °C ± 2 °C
Atmospheric pressure	60 kPa to 106 kPa
Relative humidity	20 % to 80 %
Absolute humidity	25 g/m^3 max.
Air cleanliness	Office environment (see Annex D)

No condensation on or in the cartridge shall occur. If the cartridge has been exposed to conditions outside those specified in this clause, it shall be acclimatized in the operating environment for a time at least equal to the period during which it has been out of the operating environment, up to a maximum of 24 h.

8.1.2 Storage environment

The case used as a cartridge, without any protective enclosure, shall not be stored in an environment outside the range allowed for storage.

The storage environment, defined as an environment where the air is immediately surrounding the cartridge, shall have the following properties for a cartridge containing a HVD-ROM disk:

Temperature	16 °C to 32 °C
Atmospheric pressure	60 kPa to 106 kPa
Relative humidity	20 % to 80 %
Absolute air humidity	25g/m^3 max.

No condensation on or in the cartridge shall occur.

8.1.3 Transportation

This Ecma Standard does not specify requirements for transportation. Guidance for transportation is given in Annex E.

8.2 Temperature shock

The case used as a cartridge shall withstand a temperature shock of up to 10 °C when inserted into, or removed from, the drive.

8.3 Safety requirements

The case shall satisfy the safety requirements of Standards ECMA-287 and ECMA-328, when used in the intended manner or in any foreseeable use in an information processing system.

8.4 Flammability

The case and its components shall be made from materials that comply with the flammability class for HB materials, or better, as specified in Standard ECMA-287.

Section 2 - Mechanical and physical characteristics

9 Dimensional, mechanical, and physical characteristics of the case

9.1 General description of the case

The case (see Figure 1) is a protective container of rectangular shape. It has windows on each side to allow the spindle of the drive to clamp the disk by its centre hole and to allow the head to access the disk. A shutter uncovers the windows upon insertion into the drive, and automatically covers them upon removal from the drive. The case has media identification, write-inhibit, mis-insertion features, detent for autoloading, gripper slots for an autochanger, label areas, and side identification inscriptions.

9.2 Reference axes and case reference plane

There is a Case Reference Plane P on side A of the case. The Case Reference Plane P contains two orthogonal axes X and Y to which the dimensions of the case are referred. The intersection of the X and Y axes defines the centre of the location hole. The X-axis extends through the centre of the alignment hole.

9.3 Case drawings

The case is represented schematically by the following drawings.

Figure 1 shows a composite drawing of Side A of the case in isometric form, with the major features identified from this side.

Figure 2 shows the envelope of the case with respect to a location hole at the intersection of the X and Y axes of Case Reference Plane P.

Figure 3 shows the surfaces S1, S2, S3 and S4 that establish the Case Reference Plane P located on side A.

Figure 3a shows the details of surface S3.

Figure 4 shows the details of the insertion slots and detents.

Figure 5 shows the gripper slots, used for automatic handling.

Figure 6 shows the write-inhibit hole.

Figure 7 shows the media identification sensor areas.

Figure 8 shows the head and motor windows.

Figure 9 shows the shutter opening features.

Figure 9a shows the locked/unlocked shutter levers configurations.

Figure 9b shows the shutter slider.

Figures 10a and 10b show the user label areas.

9.4 Dimensions of the case

9.4.1 Overall dimensions

The total length of the case (see Figure 2) shall be

L_1 = 153,0 mm ± 0,4 mm

The distance from the top of the case to the reference axis X shall be

L_2 = 127,0 mm ± 0,3 mm

The distance from the bottom of the case to the reference axis X shall be

L_3 = 26,0 mm ± 0,3 mm

The total width of the case shall be

$L_4 = 135{,}0\ \text{mm}\ {}^{+\ 0{,}0\ \text{mm}}_{-\ 0{,}6\ \text{mm}}$

The distance from the left-hand side of the case to the reference axis Y shall be

$L_5 = 128{,}5\ \text{mm}\ {}^{+\ 0{,}0\ \text{mm}}_{-\ 0{,}5\ \text{mm}}$

The distance from the right-hand side of the case to the reference axis Y shall be

L_6 = 6,5 mm ± 0,2 mm

The width shall be reduced on the top by the radius

$R_1 = L_4$

originating from a point defined by L_5 and

L_7 = 101,0 mm ± 0,3 mm

The two corners of the top shall be rounded with a radius

R_2 = 1,0 mm ± 0,5 mm

and the two corners at the bottom with a radius

R_3 = 3,0 mm ± 0,5 mm

The thickness of the case shall be

L_8 = 11,00 mm ± 0,30 mm

The eight long edges of the case shall be rounded with a radius

R_4 = 1,0 mm max.

9.4.2 Location hole

The centre of the location hole (see Figure 2) shall coincide with the intersection of the reference axes X and Y. It shall have a square form with a side length of

$L_9 = 4{,}10\ ^{+\ 0{,}00\ \text{mm}}_{-\ 0{,}06\ \text{mm}}$

held to a depth of

L_{10} = 2,4 mm ± 0,2 mm

The lead-in edges shall be rounded with a radius

R_5 = 0,5 mm max.

9.4.3 Alignment hole

The centre of the alignment hole (see Figure 2) shall lie on reference axis X at a distance of

L_{11} = 122,0 mm ± 0,2 mm

from the reference axis Y.

The dimensions of the hole shall be

$L_{12} = 4{,}10\ ^{+\ 0{,}00\ \text{mm}}_{-\ 0{,}06\ \text{mm}}$

and

$L_{13} = 5{,}0\ ^{+\ 0{,}2\ \text{mm}}_{-\ 0{,}0\ \text{mm}}$

held to a depth of L_{10}.

The lead-in edges shall be rounded with radius R_5.

9.4.4 Surfaces on Case Reference Plane P

The Case Reference Plane P (see Figure 3) located on Side A of the case shall contain four surfaces (S1, S2, S3 and S4) on that side of the case, specified as follows:

- Two circular surfaces S1 and S2:

  Surface S1 shall be a circular area centred on the square location hole and have a diameter of

  D_1 = 9,0 mm min.

  Surface S2 shall be a circular area centred on the rectangular alignment hole and have a diameter of

  D_2 = 9,0 mm min.

- Two elongated surfaces S3 and S4 that follow the contour of the case:

  Surfaces S3 and S4 are shaped symmetrically on the two top sides of the case.

  Surface S3 (see also Figure 3a) on the right hand side shall extend from a height defined by distance L_7 from the reference axis X to

  L_{14} = 26,0 mm ± 0,3 mm

with a width of

L_{15} =1,35 mm ± 0,2 mm

and a right hand side boundary with radius

R_6 = 132,65 mm

The top surface of the case shall not be higher than the Reference Plane on a width

L_{16} = 4,15 mm min.

located at the left hand boundary of S3.

9.4.5 Insertion slots and detent features

The case shall have two insertion slots with embedded detent features (see Figure 4). These slots shall be symmetrical relatively to the two long edges of the case.

The slots shall have a length of

L_{17} = 44,0 mm ± 0,3 mm

a width of

$L_{18} = 6{,}0\ ^{+\ 0{,}3\ \text{mm}}_{-\ 0{,}0\ \text{mm}}$

and a depth of

L_{19} = 3,0 mm ± 0,1 mm

located

L_{20} = 2,5 mm ± 0,2 mm

from Case Reference Plane P.

The slots shall have a lead-in chamfer given by

L_{21} = 0,5 mm max.

L_{22} = 5,0 mm max.

The detent notch shall be a semi-circle of radius

R_7 = 3,0 mm ± 0,2 mm

with the origin given by

L_{23} = 13,0 mm ± 0,3 mm

L_{24} = 2,0 mm ± 0,1 mm

L_{25} = 114,0 mm ± 0,3 mm

The dimensions L_2, L_{23}, and L_{25} are interrelated; their values shall be such so that they are all three within specification.

9.4.6 Gripper slots

The case shall have two symmetrical gripper slots (see Figure 5) with a depth of

L_{26} = 5,0 mm ± 0,3 mm

from the edge of the case and a width of

L_{27} = 6,0 mm ± 0,3 mm

The upper edge of a slot shall be

L_{28} = 12,0 mm ± 0,3 mm

above the bottom of the case.

9.4.7 Write-inhibit hole

The case shall have a write-inhibit hole (see Figure 6). The case shall include a device for opening and closing this hole.

When writing on the disk is not allowed, the write-inhibit hole shall be open all through the case. It shall have a diameter

D_3 = 4,0 mm min.

Its centre shall be specified by

L_{29} = 8,0 mm ± 0,2 mm

L_{30} = 111,0 mm ± 0,3 mm

on Side A of the case.

When writing is allowed on the disk, the write-inhibit hole shall be closed, at a depth of typically L_{10}, i.e. the wall thickness of the case. In this state, the opposite side of the hole, at Side B of the case, shall be closed and not recessed from the external surface of this side by more than

L_{31} = 0,4 mm max.

9.4.8 Media identification sensor areas

Four media identifications sensor areas having close/open centred holes are used for identification of holographic cases/cartridges.

These identification areas (see Figure 7) shall be located on Side A of the case with a diameter

$$D_4 = 4{,}0 \text{ mm} \begin{matrix} +\ 0{,}3 \text{ mm} \\ -\ 0{,}0 \text{ mm} \end{matrix}$$

and centres specified by

L_{32} = 19,5 mm ± 0,2 mm and L_{30}

L_{33} = 105,0 mm ± 0,3 mm

L_{34} = 17,0 mm ± 0,2 mm

L_{35} = 11,0 mm ± 0,2 mm

A hole centred in one of these identification areas shall be deemed open if it extends through the case with a diameter D_4.

A hole is deemed to be closed, when the identification area surface is not deviating from Case Reference Plane P by more than 0,3 mm.

The case specified in this Ecma Standard shall have one open hole located in the sensor area specified by L_{32} and L_{35}.

9.4.9 Head and motor windows

The case shall have a window on each side to allow the spindle of the drive to clamp the disk by its centre hole and to allow the head to access the disk (see Figure 8). The dimensions are referenced to a centreline, located at a distance of

L_{36} = 61,0 mm ± 0,2 mm

to the left of reference axis Y.

The width of the head access shall be defined by

L_{37} = 16,0 mm min.

L_{38} = 16,0 mm min.

and its height shall extend to

L_{39} = 113,2 mm min.

The two inside corners shall be rounded with a radius of

R_8 = 3,0 mm max.

The motor spindle access shall have a diameter of

D_5 = 32,0 mm min.

and its centre shall be defined by L_{36} and

L_{40} = 43,0 mm ± 0,2 mm

9.4.10 Shutter

The case shall have one spring-loaded, unidirectional shutter (see Figure 1 and Figure 9), designed to completely cover the head and motor windows when closed. In the closed position the shutter shall be locked.

A shutter movement of 38,7 mm $^{+1,4\ mm}_{-0,7\ mm}$ shall ensure that the head and motor windows are opened to the minimum size specified in 9.4.9.

When unlocked, the shutter shall be free to slide in a recessed area of the case in such a way as to ensure that the overall thickness of the case and shutter shall not exceed L_8.

The top surface of the shutter shall not be over the top edge of the case.

9.4.11 Shutter unlocking levers

Unlocking of the shutter shall be only obtained by a combined action on two spring-loaded levers configured as shown on Figures 9 and 9a.The levers shall be designed to be operated by a mechanism of the drive. The first lever shall be displaced by a defined distance (L_{46}) to unlock the second lever, which shall be then displaced by another defined distance (L_{57}) to unlock the shutter, which can then be pushed open.

The locked and unlocked configurations of the levers shall be as shown on Figure 9a.

The first lever shall be located on the right hand edge of Side A of the case.

When the shutter is locked in its closed position, the distances from the extremity of the first lever to references axes X and Y shall be

L_{41} = 103,6mm ± 0,3 mm

L_{42} = 6,0 mm ± 0,2 mm

The height of the first lever shall be

L_{43} = 5,6mm ± 0,2 mm

Its centre shall be

L_{44} = 5,5 mm± 0,2 mm

from the Case Reference Plane P of the case, and its width shall be

L_{45} = 4,0 mm ± 0,2 mm

The first lever displacement to unlock the second lever shall be

L_{46} = 2,0 $^{+1,2\ mm}_{-0,5\ mm}$

A rectangular sub-slot shall be located in the insertion slot on each side of the lever (see Figure 9a)

The sub-slot shall have a length of

L_{47} = 38,0 mm ± 0,3 mm

with a width of

L_{48} = 2,80 mm ± 0,15 mm

A symmetrical sub-slot shall be located in the left-hand side insertion slot.

The distance from the bottom of the right-hand side sub-slot to reference axis Y shall be

$$L_{49} = 2{,}8\ \text{mm}\ ^{+\ 0\ \text{mm}}_{-\ 0{,}2\ \text{mm}}$$

and the distance from the bottom of the left-hand side sub-slot to the reference axis Y shall be

$$L_{50} = 124{,}8\ \text{mm}\ ^{+\ 0\ \text{mm}}_{-0{,}4\ \text{mm}}$$

The second lever shall be located on side A of the case.

This lever shall be moved by its rectangular hole.

The distances from the centre of the rectangular hole to the reference axes X and Y shall be

L_{51} = 117,7 mm ± 0,3 mm

L_{52} = 11,3 mm ± 0,3 mm

The length of the rectangular hole shall be

L_{53} = 4,2mm ± 0,2 mm

The width of the rectangular hole shall be

L_{54} = 4,1mm ± 0,2 mm

The distance from the top of the rectangular hole to the Case Reference Plane P shall be

L_{55} = 2,5 mm± 0,2 mm

The thickness of the second lever shall be

L_{56} = 6,0 mm± 0,2 mm

The second lever displacement to unlock the shutter shall be

$$L_{57} = 2{,}2\text{mm}\ ^{+1{,}3\ \text{mm}}_{-0{,}5\ \text{mm}}$$

9.4.12 Slider for shutter opener

The shutter shall have one slider (see Figures 9 and 9b) that can be operated by the shutter opener of the drive to open the shutter, after unlocking by the two levers. The slider shall be dimensioned as follows:

When the shutter is closed, the right-hand of projection of the slider used to push the shutter open shall be located at a distance of

L_{58} = 3,5 mm ± 0,3 mm

from reference axis Y.

The width of the projection of the slider shall be

L_{59} = 2,0 mm ± 0,2 mm

The height of the projection of the slider shall be

L_{60} = 3,2 mm ± 0,2 mm

The centre of the projection of the slider from the Case Reference Plane P of the case shall be

L_{61} = 5,5 mm ± 0,2 mm

The length of the projection of the slider shall be

L_{62} = 3,5 mm max.

The top of the projection of the slider shall be at a distance L_2 of the reference axis X.

9.4.13 Feature to prevent insertion into UDO, MO and WO drives

The top edge side of the shutter shall have no slot (see Figures 1 and 9) so as to prevent from insertion into UDO, MO, WO drives using cartridges conforming to Standards ECMA-322, ECMA-350, ECMA-280, ECMA-238, ECMA-195, ECMA-184, ECMA-183 and ECMA-153.

9.4.14 User label areas

The case shall have the following minimum areas for user labels (see Figures 10a and 10b):

on Sides A and B: 25 mm x 79 mm

on the bottom side: 7,0 mm x 115,0 mm

These areas shall be recessed by 0,2 mm min. Their positions are specified by the following dimensions and relations between dimensions.

L_{63} = 14,5 mm min.

$L_{64} – L_{63}$ = 79 mm min.

$L_{66} – L_{65}$ = 25 mm min.

$L_4 – L_{67} – L_{68}$ = 115,0 mm min.

$L_8 – L_{69} – L_{70}$ = 7,0 mm min.

9.5 Mechanical characteristics

All requirements of this clause shall be met in the operating environment.

9.5.1 Materials

The case shall be constructed from any suitable materials such that it meets the requirements of this Ecma Standard.

9.5.2 Mass

The mass of the case shall not exceed 200 g.

9.5.3 Edge distortion

The case shall be such that the cartridge shall meet the requirement of the edge distortion test defined in Annex A.

9.5.4 Compliance

The case shall be such that the cartridge shall meet the requirement of the compliance test defined in Annex B. The requirement guarantees that a cartridge can be constrained in the proper plane of operation within the drive.

9.5.5 Shutter opening force

The spring force on the shutter shall be such that the force required to open the shutter does not exceed 2 N. It shall be sufficiently strong to close a free-sliding shutter, irrespective of the orientation of the case.

9.5.6 Levers unlocking forces

The spring forces on the levers shall be sufficiently strong to maintain the shutter locked in any orientations of the case, and such that the force exerted on each lever to unlock the shutter does not exceed 1N.

9.6 Drop test

The case shall be such that the Holographic Disk Cartridge shall withstand dropping on each surface and on each corner from a height of 0,75 m onto a concrete floor covered with a vinyl layer 2 mm thick. The cartridge shall withstand all such impacts without any functional failure.

The write-inhibit switch shall not move to change the state (open or closed) of the write-inhibit hole during the drop test.

9.7 Electro-static discharge test

The case shall meet the electro-static discharge requirements specified in Annex C.

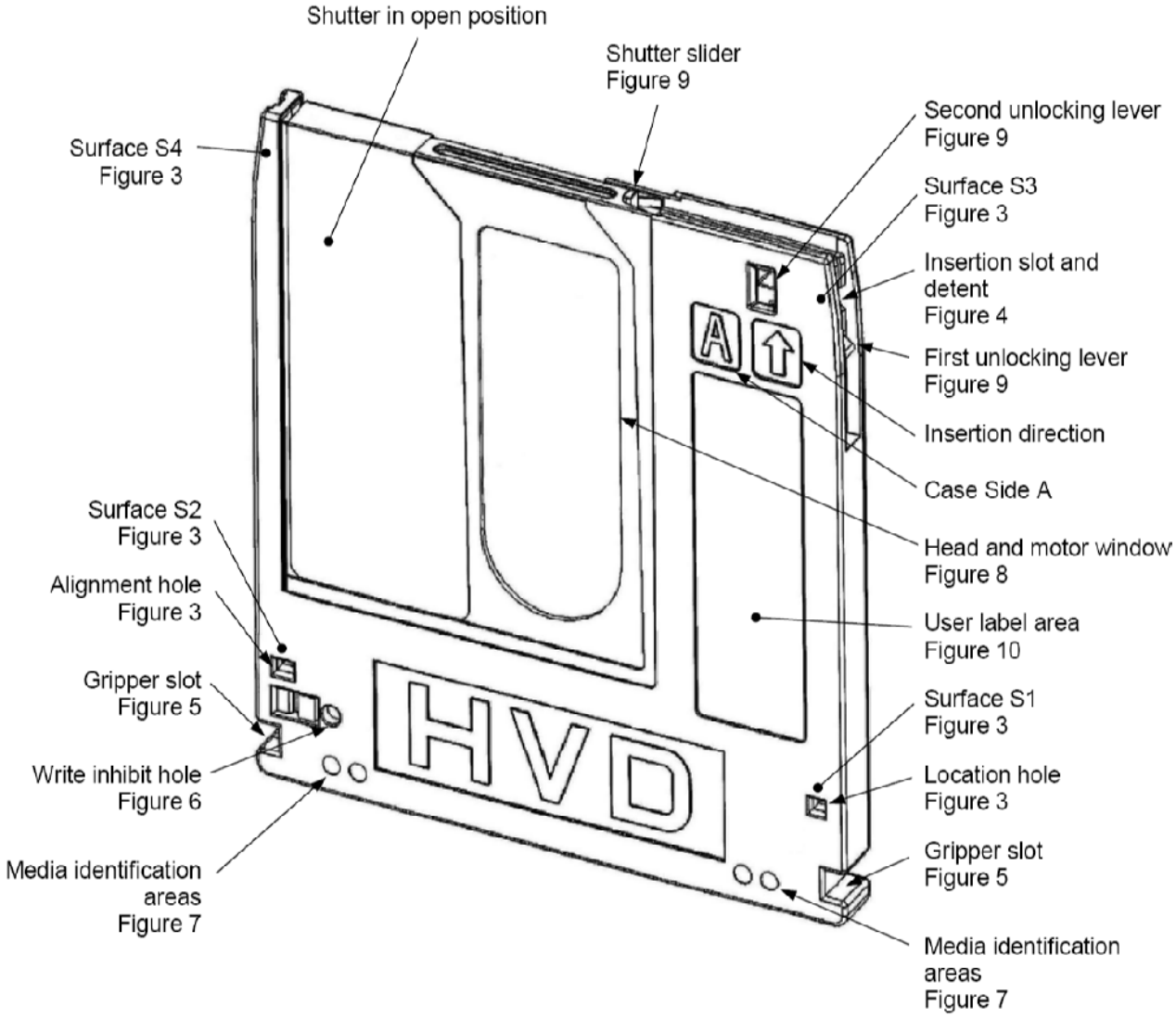

Figure 1 – Case seen from Side A

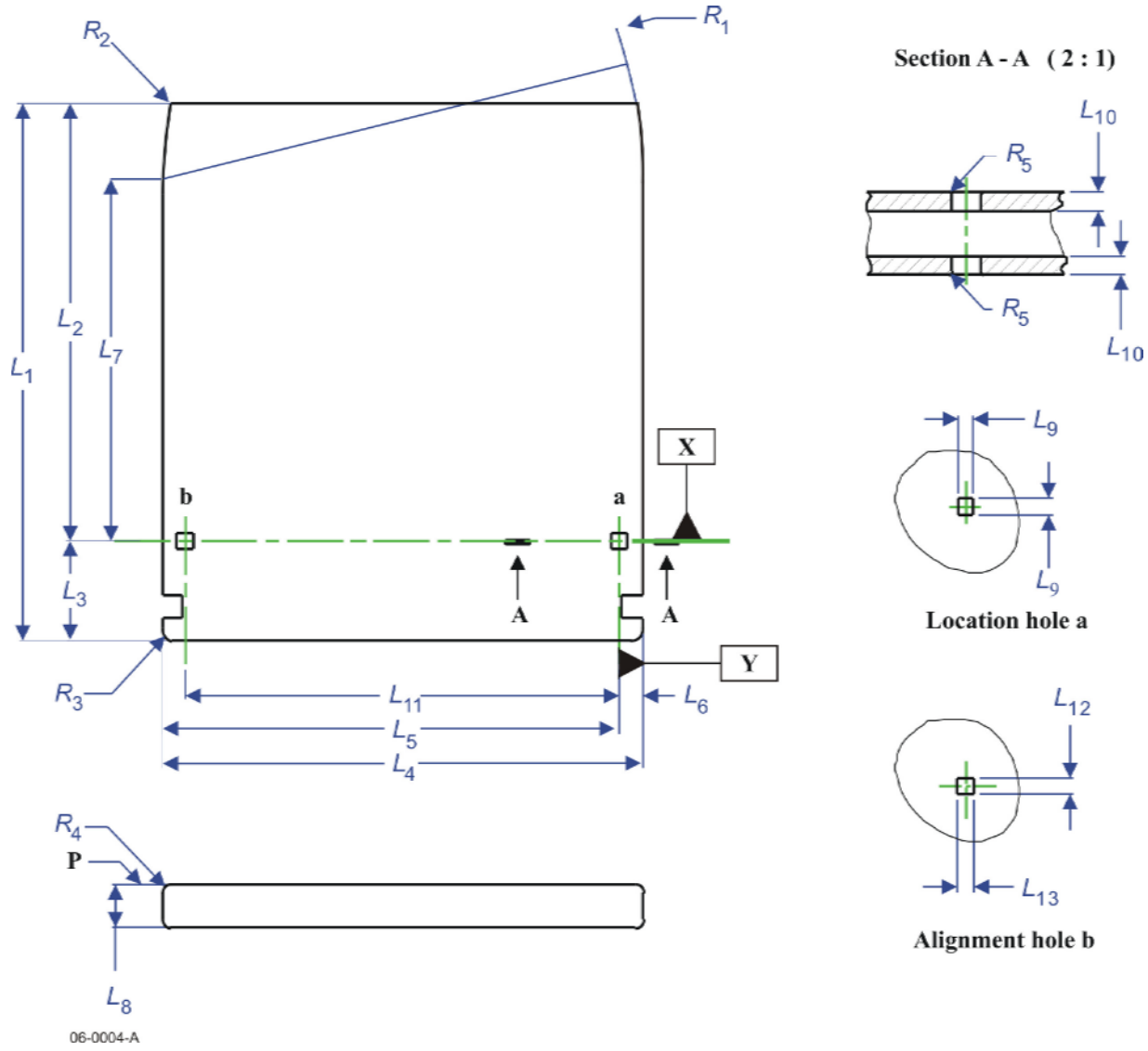

Figure 2 – Overall dimensions and reference axes seen from Side A

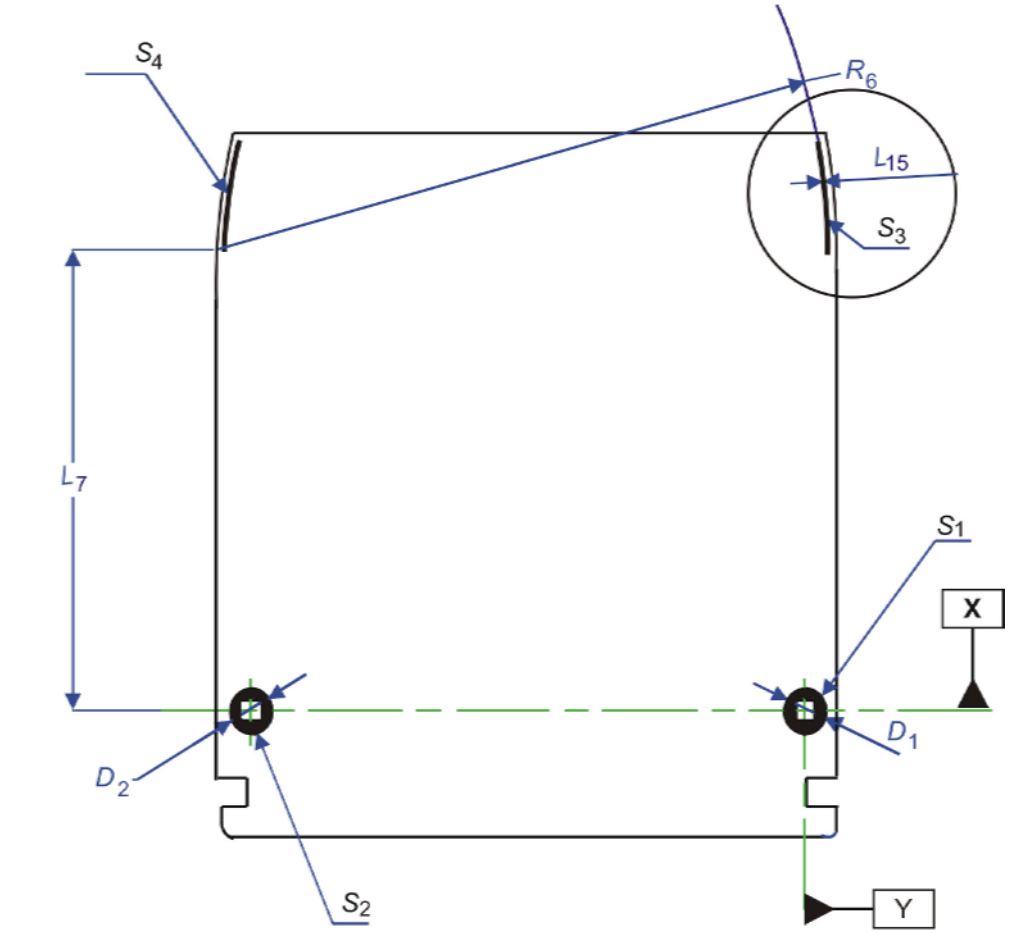

Figure 3 – Surfaces S1, S2, S3 and S4 of the Case Reference Plane P on Side A

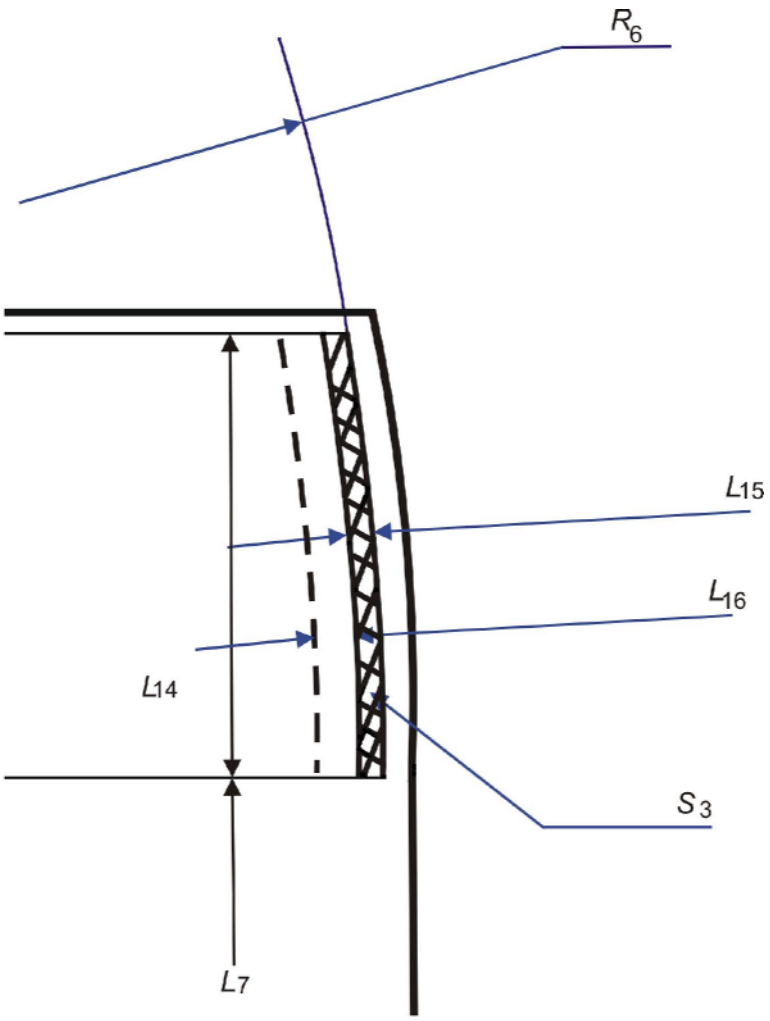

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Figure 3a – Details of surface S3

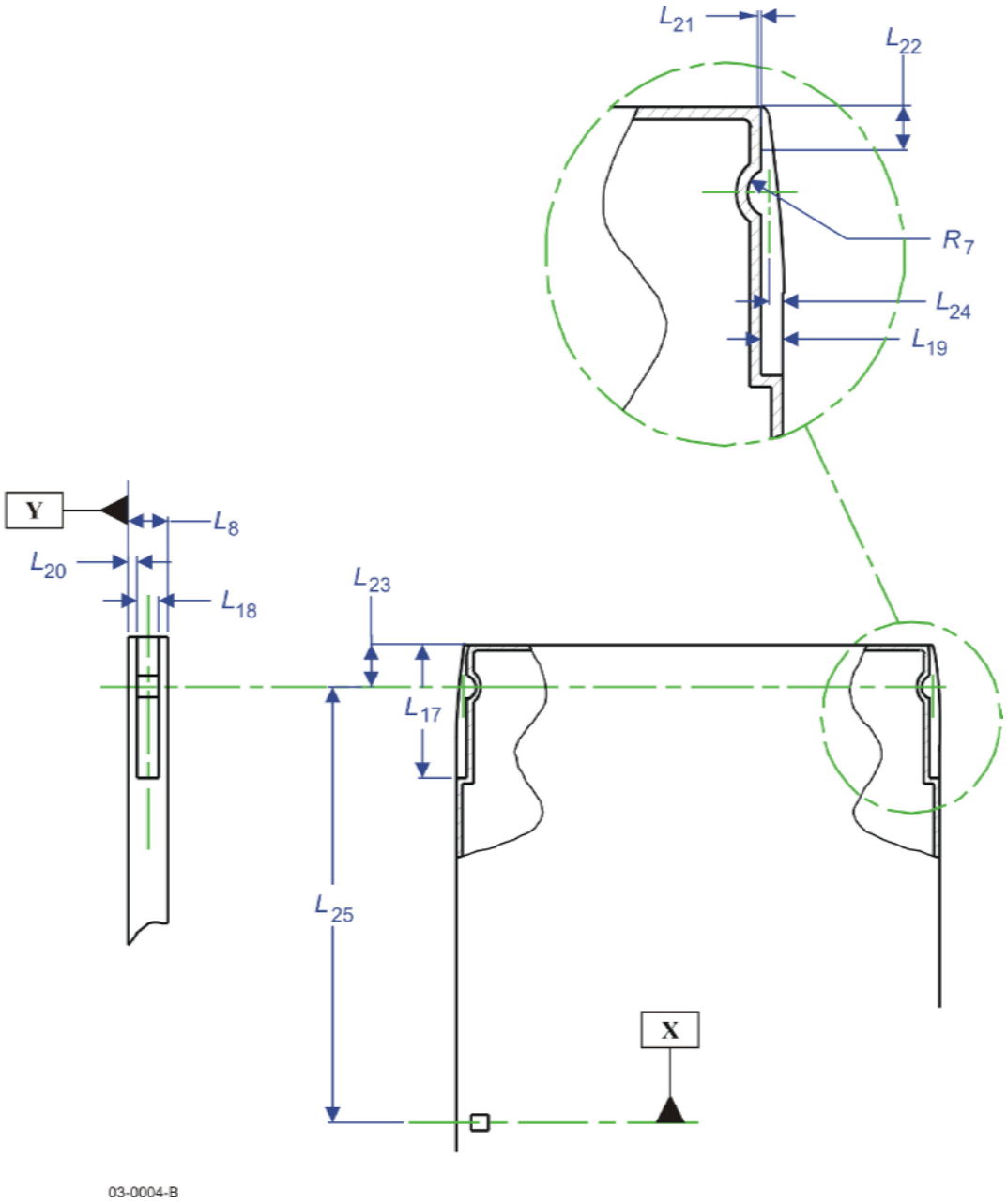


Figure 4 – Insertion slots and detents

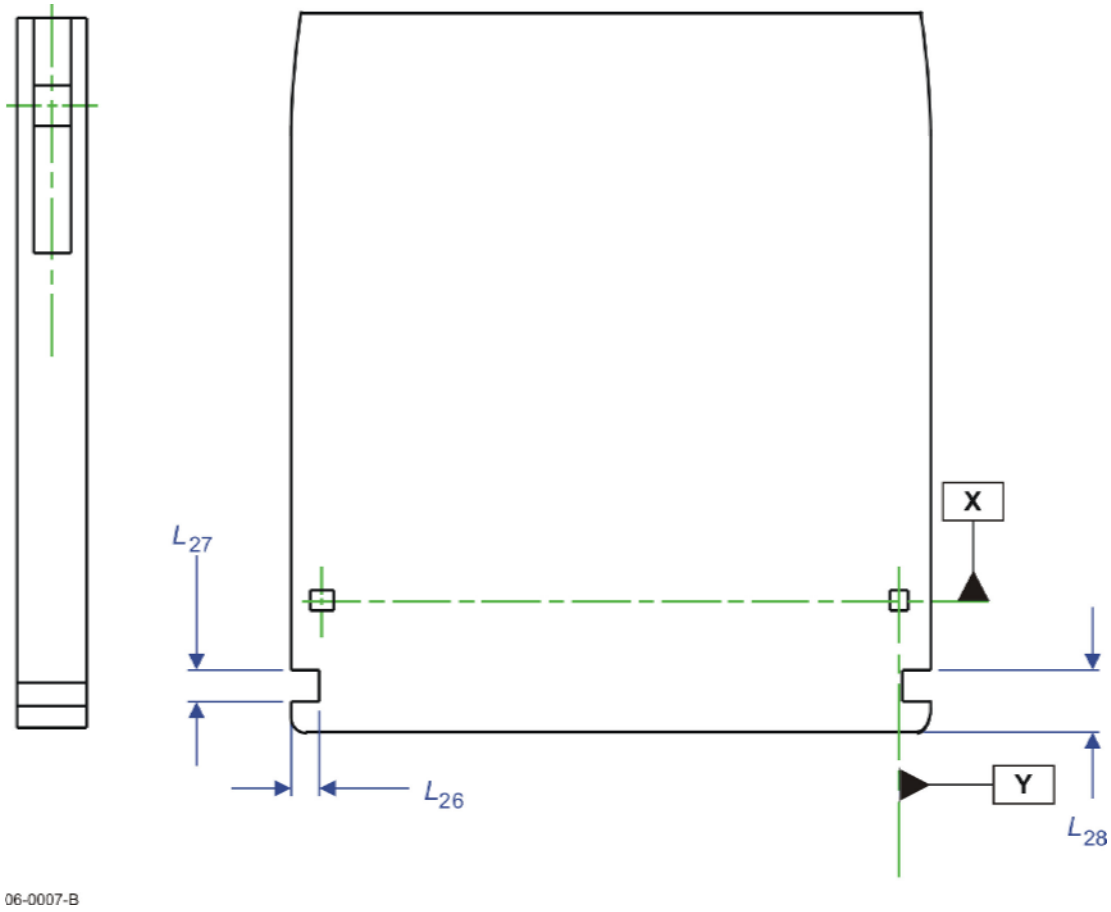


Figure 5 – Gripper slots

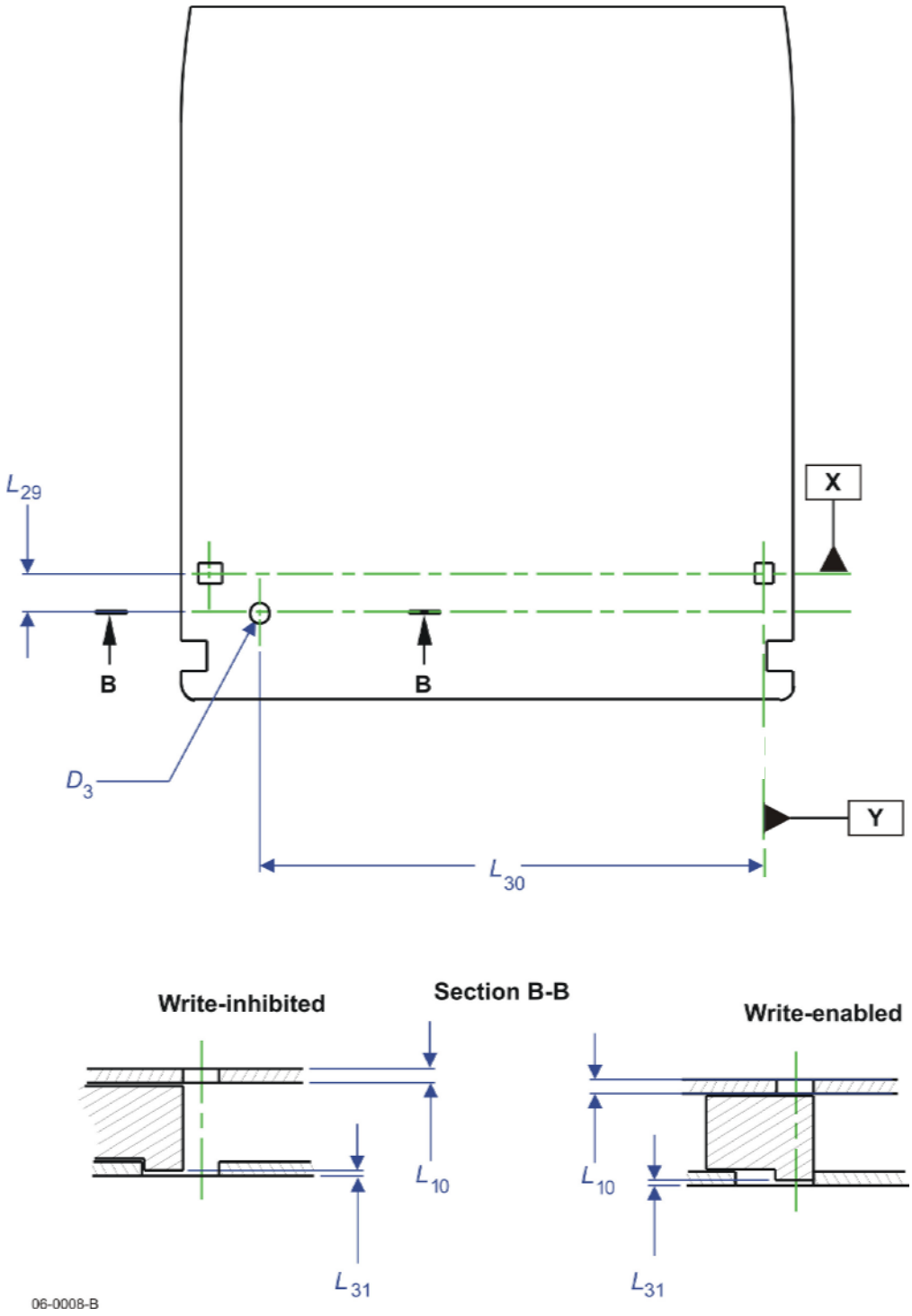


Figure 6 – Write-inhibit hole seen from Side A

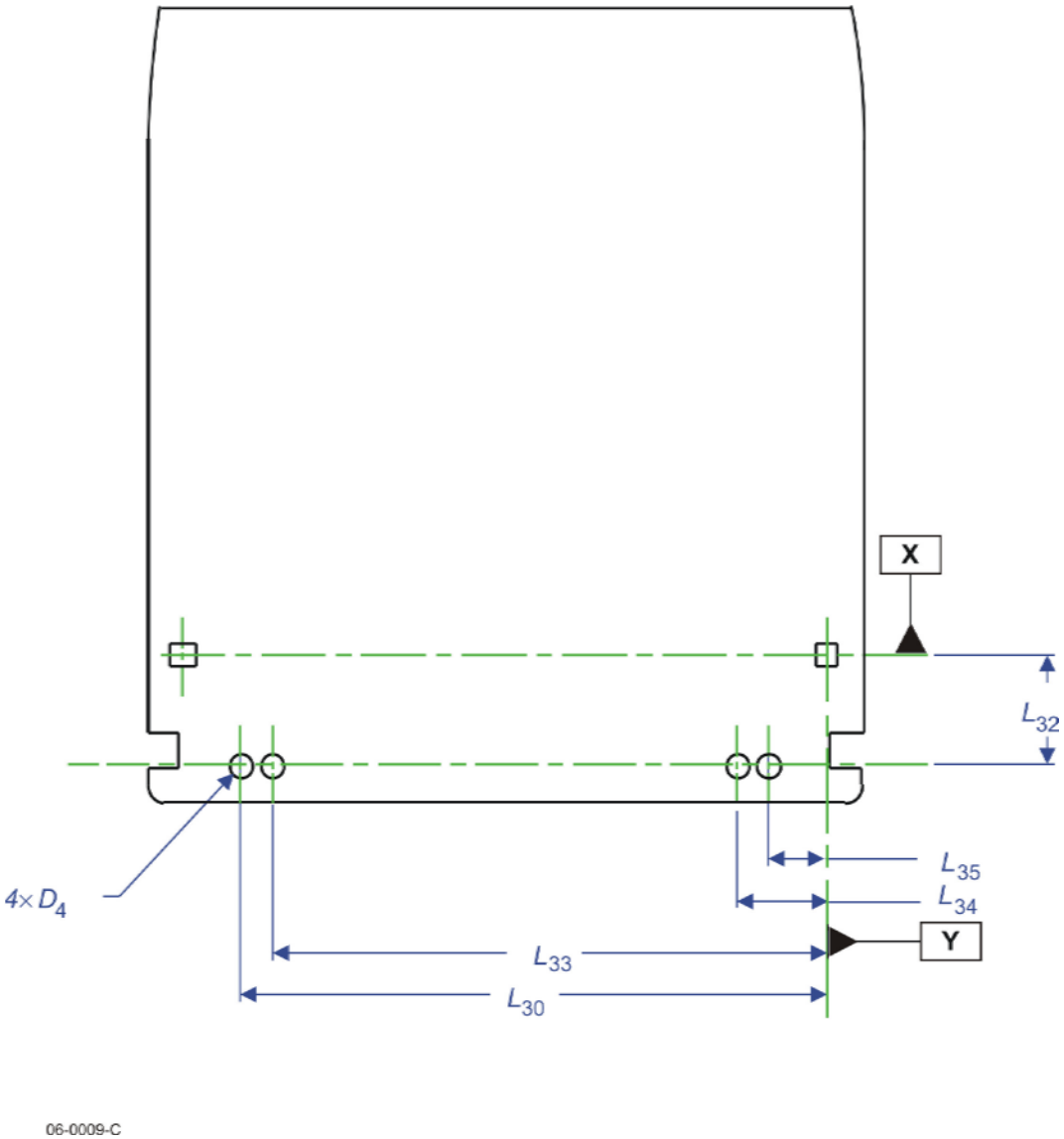


Figure 7 – Media identification sensor areas on Side A

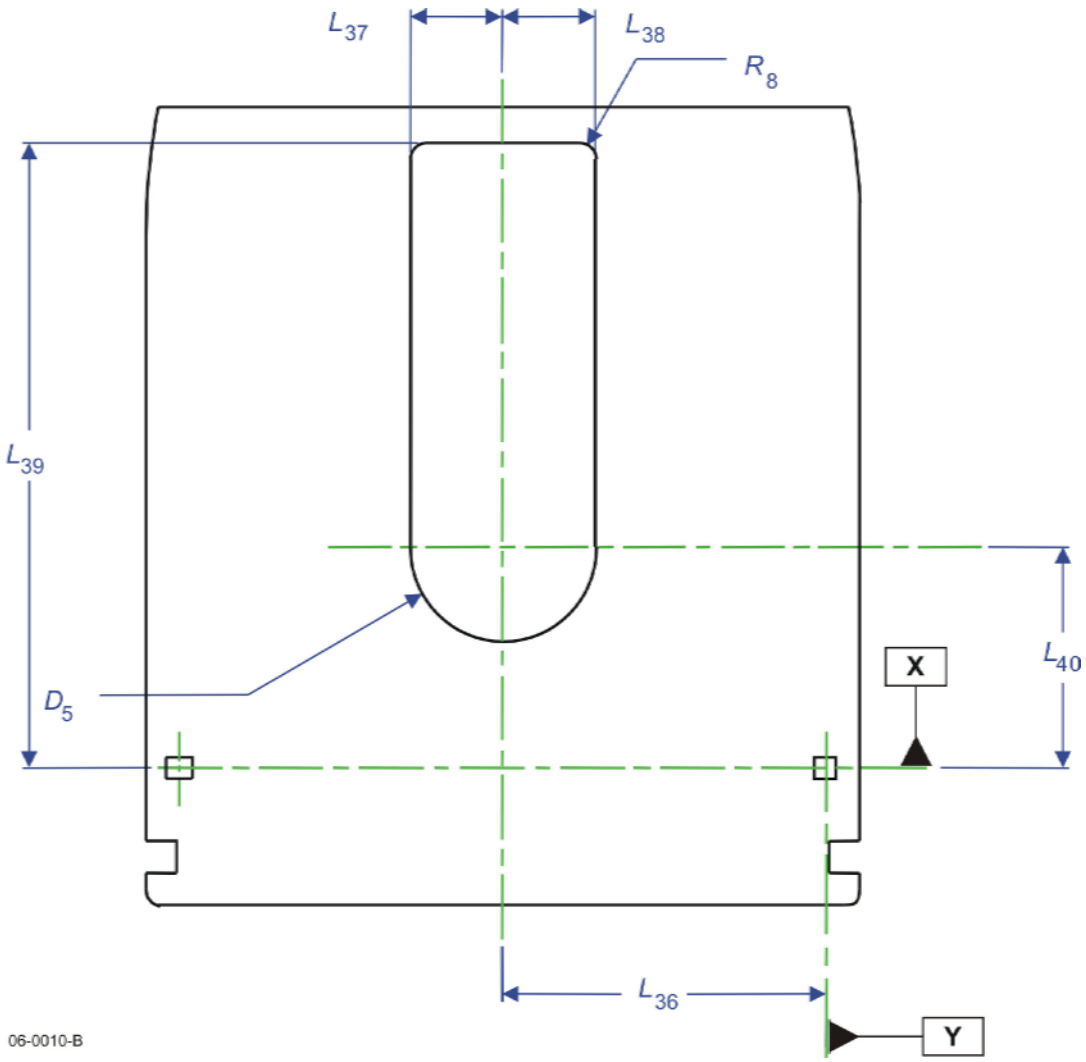


Figure 8 – Head and motor windows on Side A

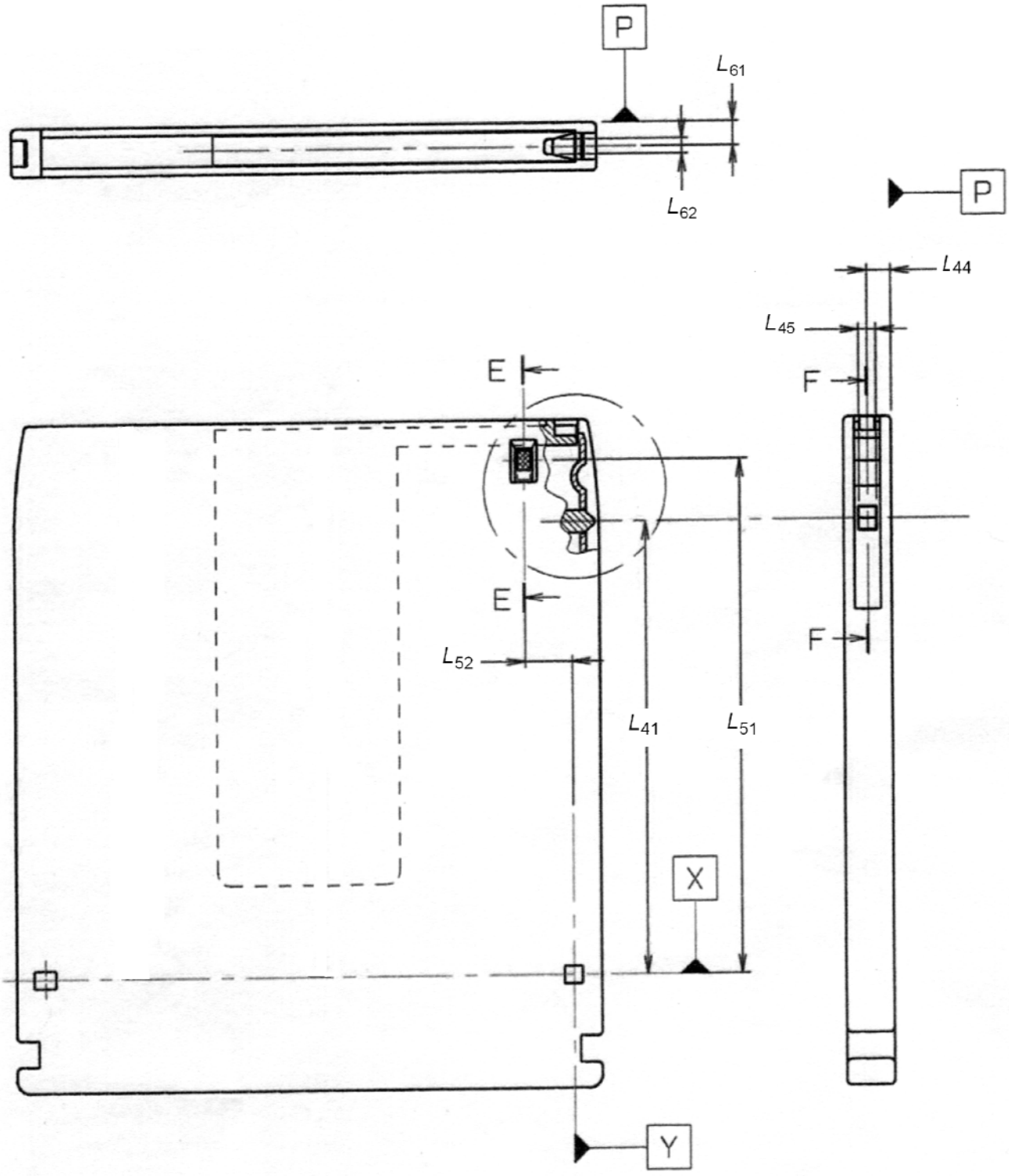
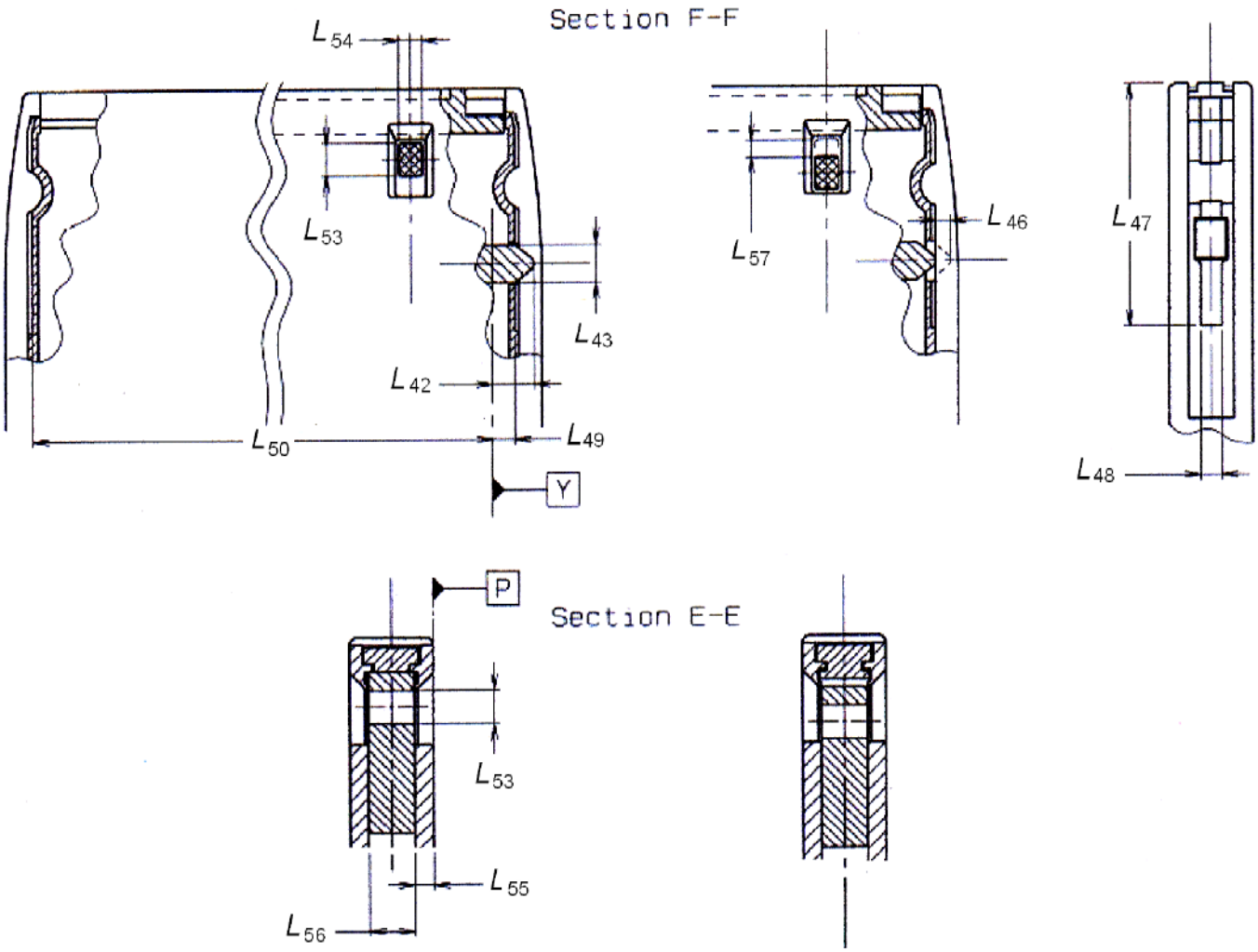


Figure 9 – Shutter opening features seen from Side A



Shutter closed and locked

Shutter closed and unlocked

Figure 9a – Locked/unlocked shutter levers configurations

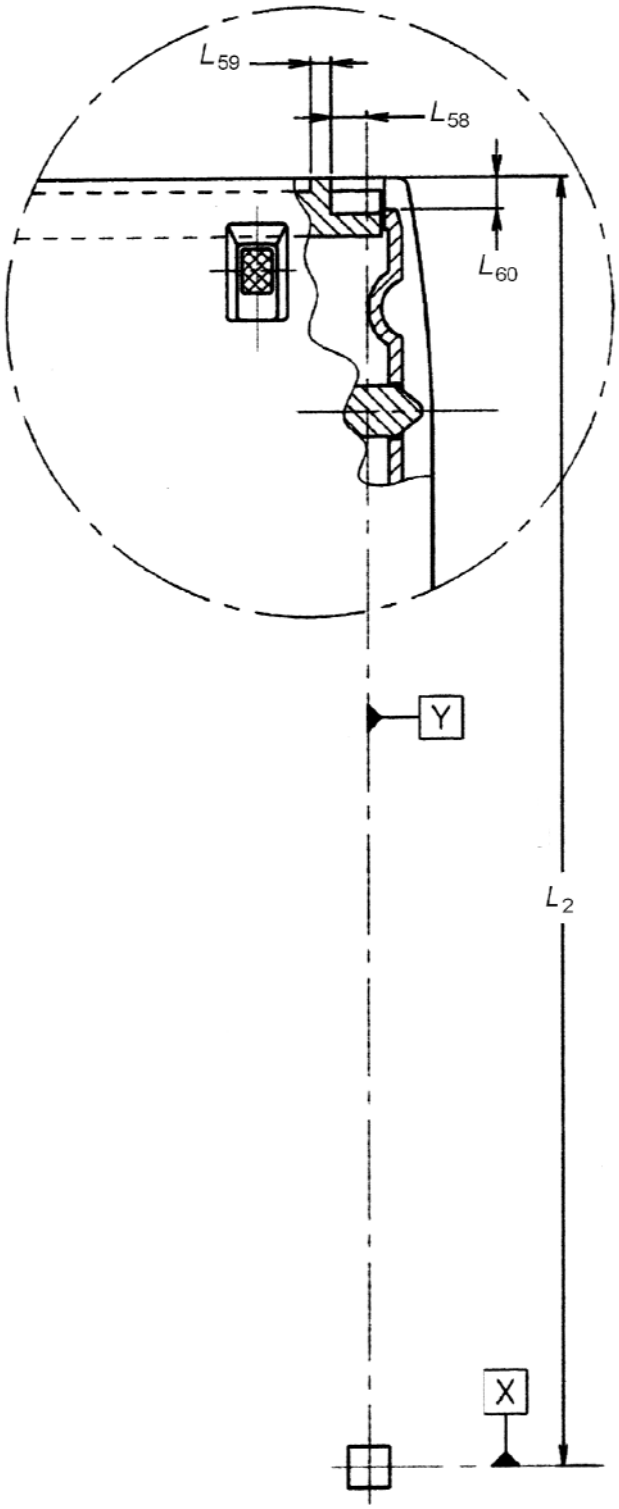


Figure 9b – Shutter slider seen from Side A

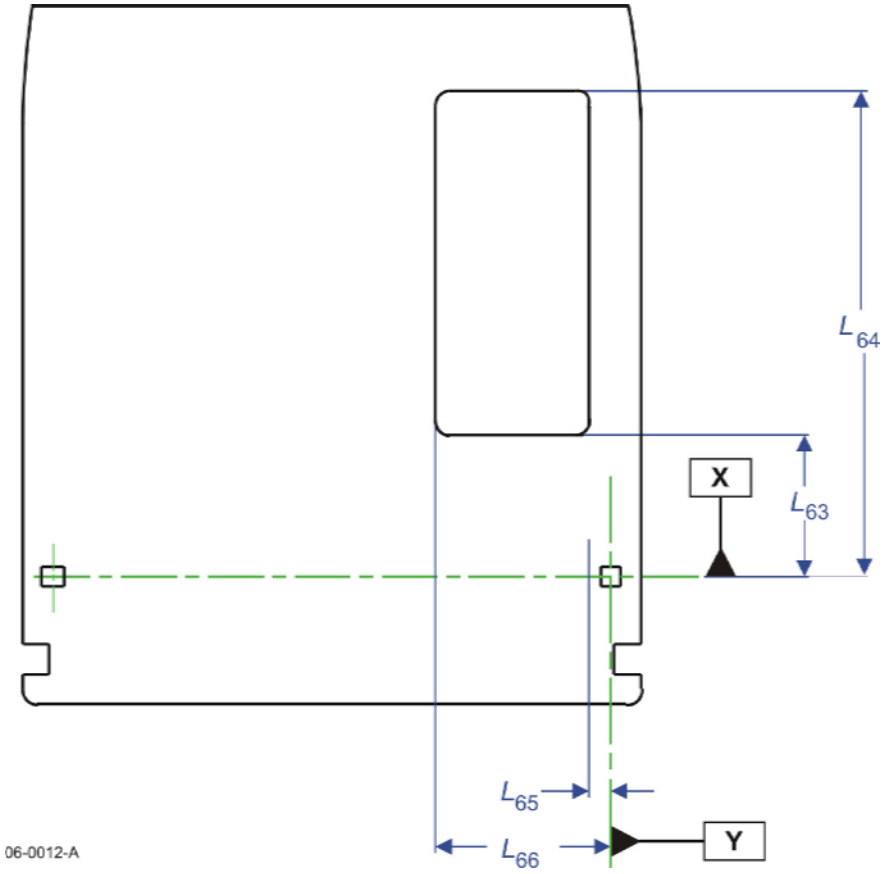


Figure 10a – User label area on Side A

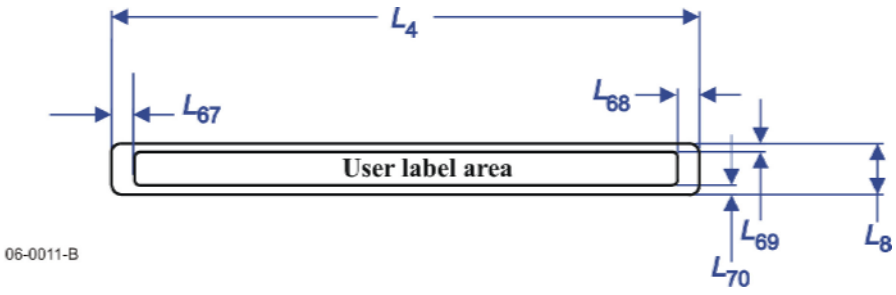


Figure10b – User label area on bottom surface

10 Interface between the case used as cartridge and a drive

10.1 Capture cylinder

The capture cylinder (see Figure 11) is defined as the volume in which the spindle can expect the centre of the external side of the hole of the disk to be, just prior to capture. The size of the cylinder limits the allowable play of the disk inside its cavity in the case. This cylinder is referred to perfectly located and perfectly sized alignment and location pins in the drive, and includes tolerances of dimensions of the case and the disk between the pins mentioned and the said centre of the hole of the disk. The bottom of the cylinder is parallel to the Case Reference Plane P, and shall be located at a distance of

L_{71} = 2,45 mm min.

above the Case Reference Plane P of the case. The top of the cylinder shall be located at a distance of

L_{72} = 6,45 mm max.

above the Case Reference Plane P. The diameter of the cylinder shall be

D_6 = 2,8 mm max.

Its centre shall be defined by the nominal values of L_{36} and L_{40} (see 9.4.9).

10.2 Disk position in operating condition

The case shall be such that when the disk in the case is in the operating condition within the drive (see Figure 11), it shall not contact the case when the axis of rotation is within a circle of diameter

D_7 = 0,2 mm max.

and a centre given by the nominal values of L_{36} and L_{40} (see 9.4.9),

and the position of the pit layer shall be

L_{73} = 4,8 mm ± 0,15 mm

above the Case Reference Plane P of the case.

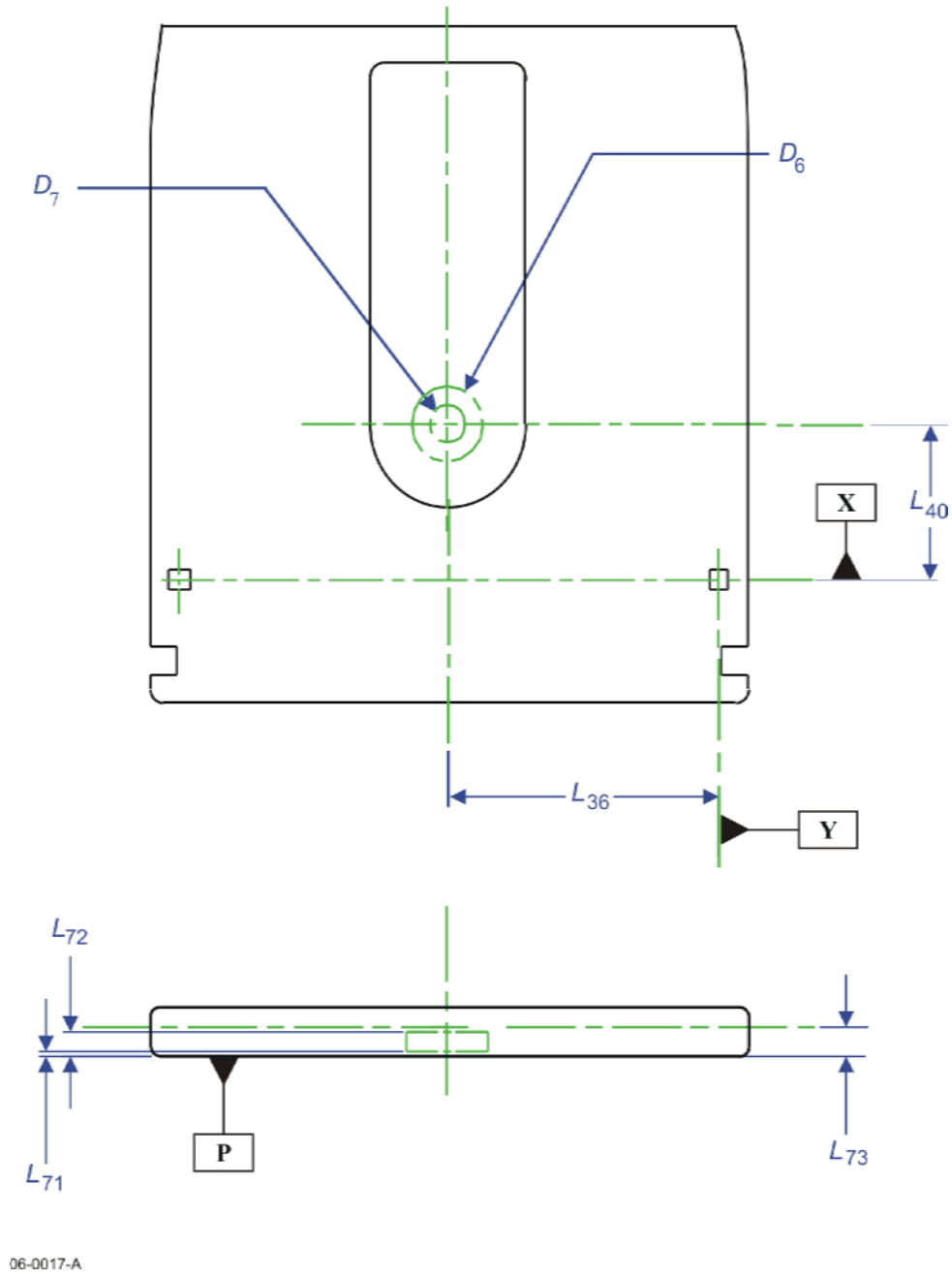


Figure 11 – Capture cylinder

Annex A
(normative)

Edge distortion test

A.1 Purpose

The distortion test checks if the case is free from unacceptable distortion and protrusions along its edges. The test is made by causing the cartridge to pass through the vertical slot of a gauge while applying a specified force in addition to the gravitational pull.

A.2 Distortion gauge construction

The gauge shall be made of a suitable material, e.g. of chrome-plated carbon steel. The inner surfaces shall be polished to a surface finish of 5 µm peak-to-peak.

A.3 Distortion gauge dimensions

The dimensions shall be as follows (see Figure A.1):

A = 155,0 mm

B = 136,0 mm ± 0,1 mm

C = 10,0 mm ± 0,1 mm

D = 11,40 mm ± 0,01 mm

E = 11,60 mm min.

A.4 Requirement

When the cartridge is inserted vertically into the gauge, a vertical downward force F of 2,7 N maximum, applied to the centre of the top edge of the cartridge, shall cause the cartridge to pass through the gauge.

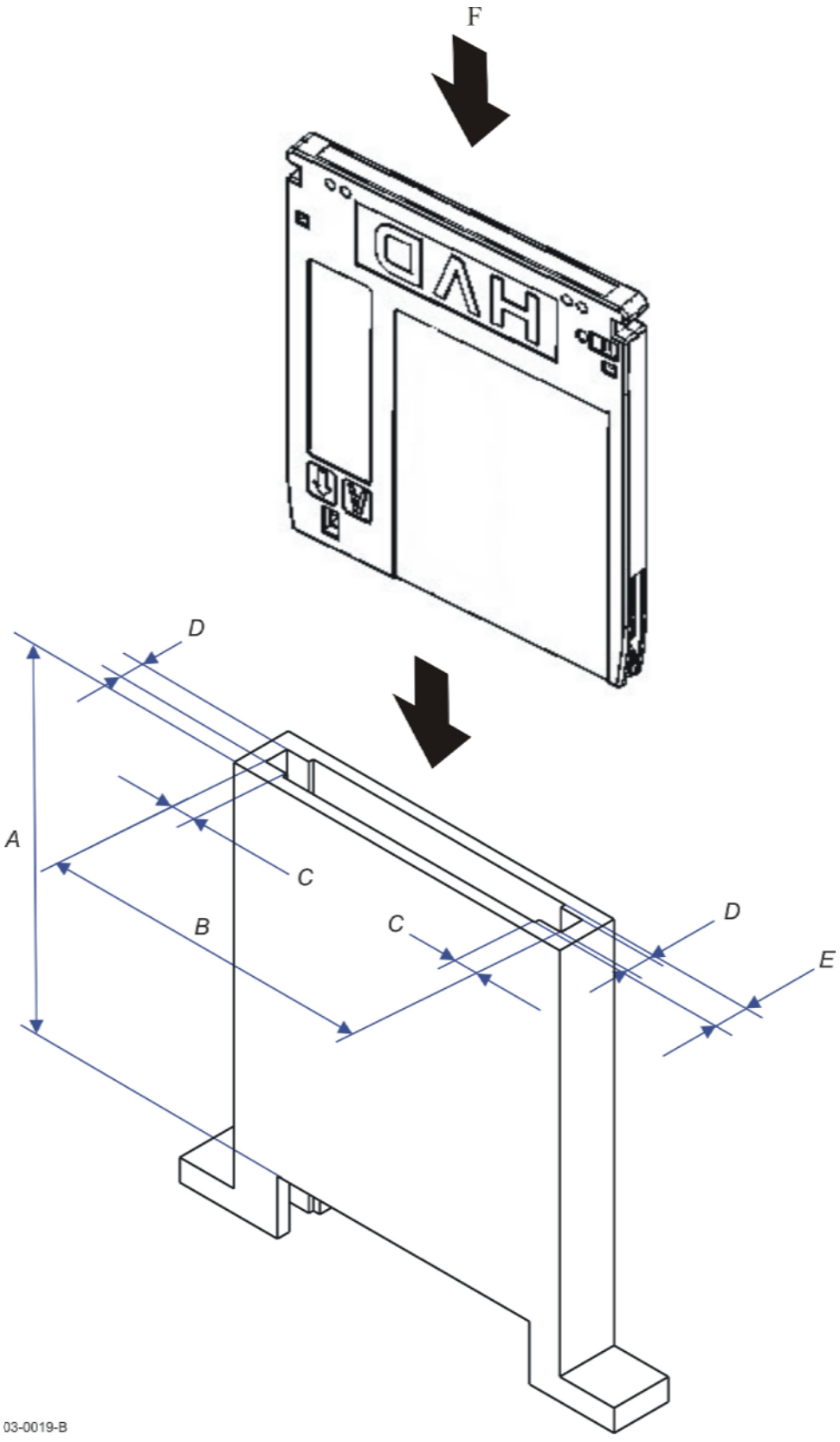


Figure B.1 – Distortion gauge

Annex B
(normative)

Compliance test

B.1 Purpose

The compliance test checks the flatness and flexibility of the case by forcing the four reference surfaces of the cartridge into a plane.

B.2 Reference surfaces

The location of the four reference surfaces S1, S2, S3, and S4 is defined in 9.4.4 and Figure 3.

B.3 Compliance gauge

The test gauge consists of a base plate on which four posts P1, P2, P3, and P4 are fixed so as to correspond to the surfaces S1, S2, S3, and S4 respectively (see Figure B.1). The dimensions are as follows (see Figures B.2 and B.3):

L_a = 122,0 mm ± 0,2 mm

L_b = 130,0 mm ± 0,5 mm

L_c = 101,0 mm ± 0,5 mm

D_a = 6,50 mm ± 0,01 mm

$D_b = 4{,}00\ ^{+\ 0{,}00\ \text{mm}}_{-\ 0{,}02\ \text{mm}}$

D_c = 5,50 mm ± 0,01 mm

H_a = 1,0 mm ± 0,1 mm

H_b = 2,0 mm max.

After assembly, the upper annular surfaces of the four posts shall lie between two horizontal planes spaced 0,01 mm apart.

B.4 Test conditions

The cartridge shall be placed with its reference surfaces onto the posts of the horizontal gauge. A vertical down force F of 0,4 N shall be exerted on the cartridge opposite each of the four posts.

B.5 Requirement

Under the conditions of B.4, any three of the four surfaces S1 to S4 shall be in contact with the annular surface of respective posts. Any gap between the remaining surface S and the annular surface of its post shall not exceed 0,1 mm.

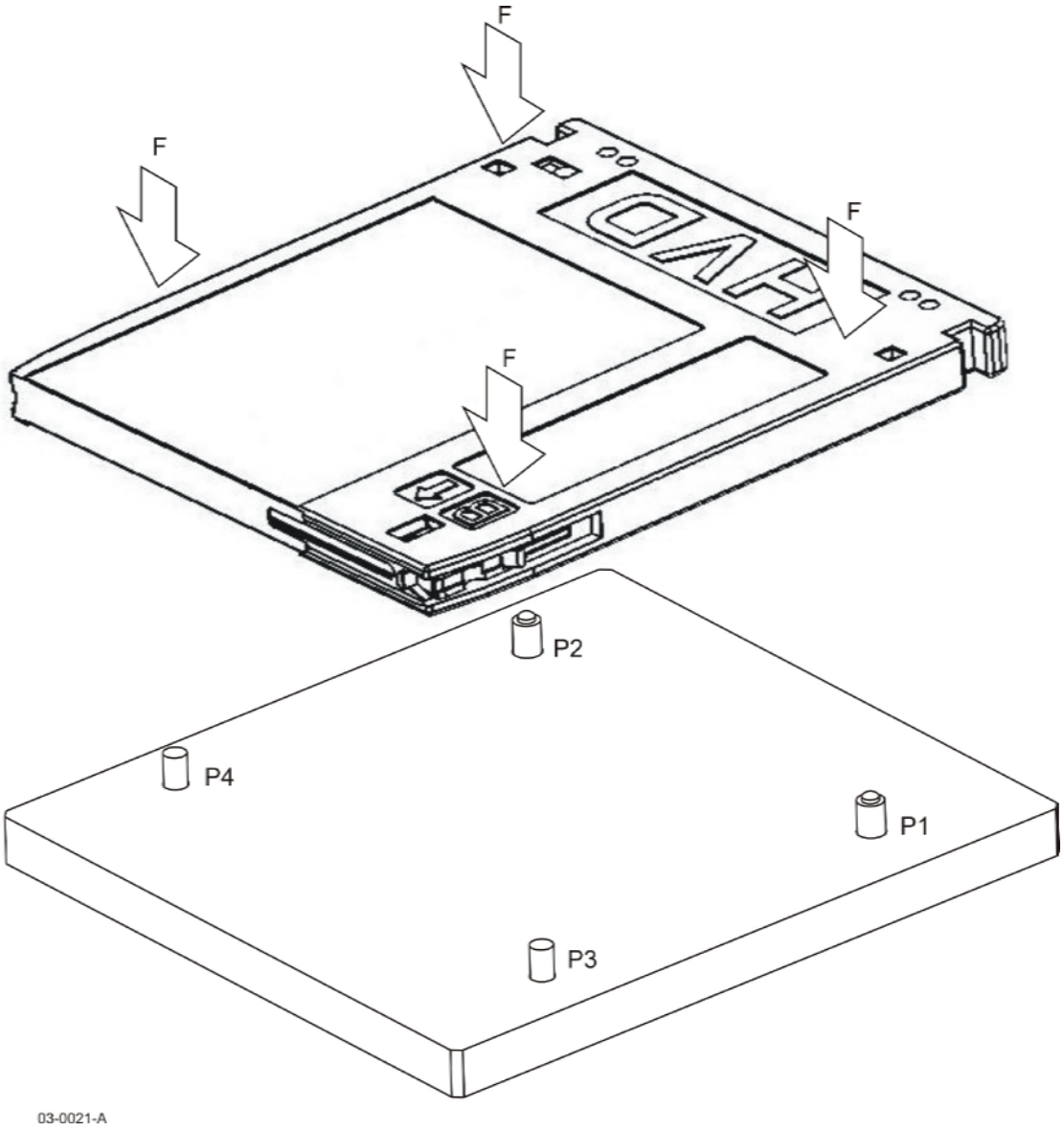


Figure B.1 – Compliance gauge

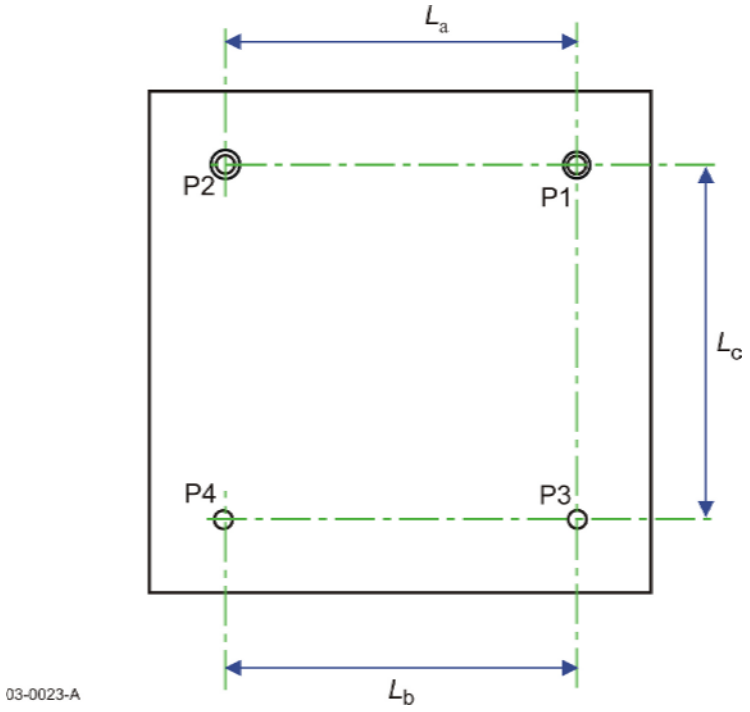


Figure B.2 – Location of the posts

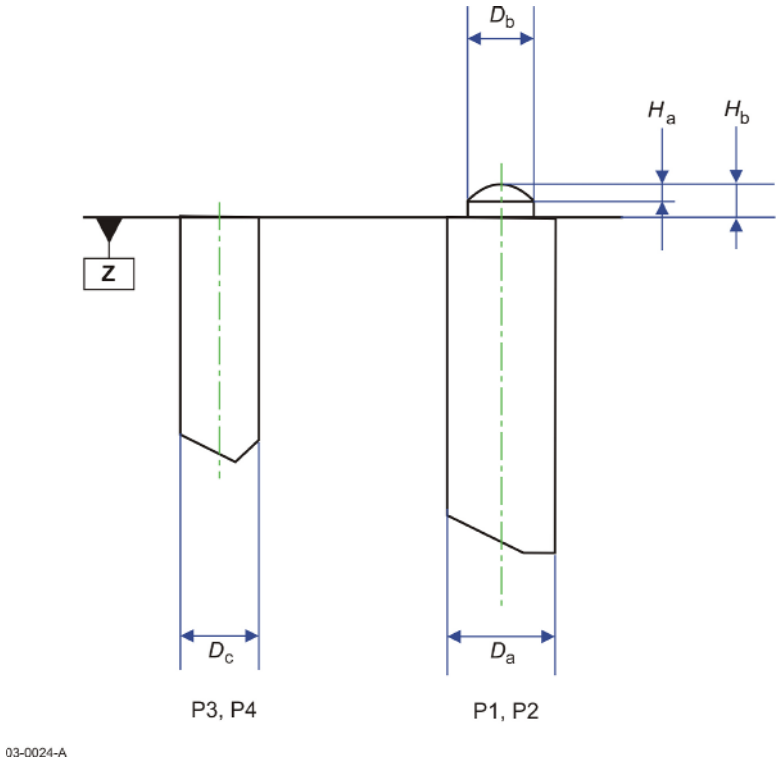


Figure B.3 – Detail of the posts

Annex C
(normative)

Electro-static discharge test

C.1 Test procedure

The test procedure shall use the following steps:

1 Acclimate test case at 10 % relative humidity for at least 12 hours before testing.

2 Remove all charge from the test case using ionized air.

3 Mount the case in the fixture shown in Figure C.1.

4 Apply 1,00 kV to the charge plate.

5 10 seconds ± 1 second after applying 1,00 kV, remove the voltage source (charge plate is floating).

6 Measure the decay time defined as the time required for the charged plate voltage to decay 5 % to 950 V.

Prior to testing a case, ensure there is a non-ionizing environment by performing steps 4 – 6 above with no case present. Decay time with no case shall be larger than 100 seconds.

C.2 Specification

The decay time shall be smaller than 30 seconds at 10 % relative humidity and 25 °C.

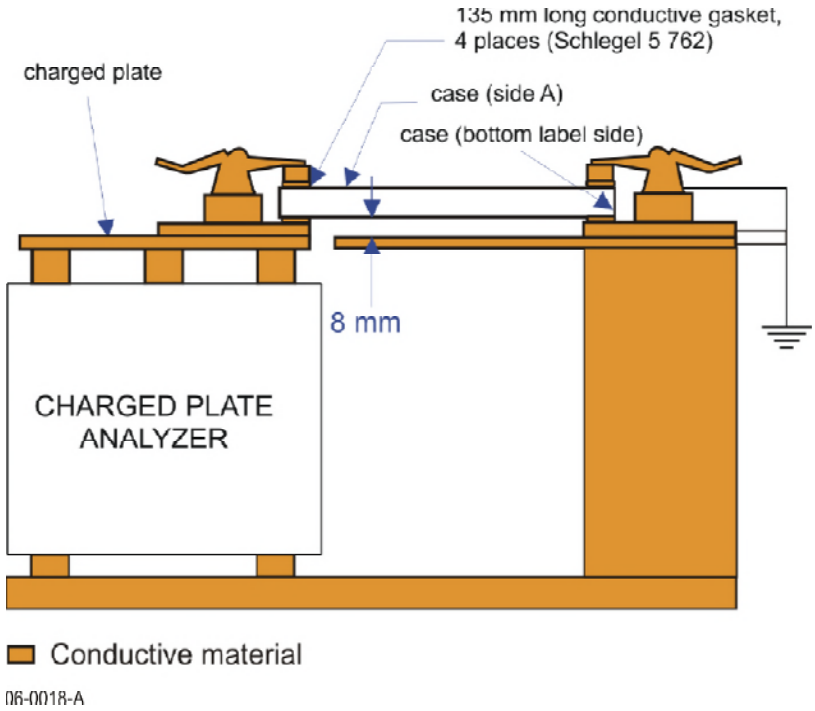


Figure C.1 – Case electro-static discharge test fixture

Annex D
(informative)

Office environment

D.1 Air cleanliness

Due to their construction and mode of operation, Holographic Disk Cartridges have considerable resistance to the effects of dust particles around and inside the disk drive. Consequently, it is not generally necessary to take special precautions to maintain a sufficiently low concentration of dust particles.

Operation in heavy concentrations of dust should be avoided, e.g. in a machine shop or on a building site.

Office environment implies an environment in which personnel may spend a full working day without protection and without suffering temporary or permanent discomfort.

Annex E
(informative)

Transportation

E.1 General

As transportation occurs under a wide range of temperature and humidity variations, for different periods, by many methods of transport and in all parts of the world it is not possible to specify conditions for transportation or for packaging.

The following gives recommendations.

E.2 Packaging

The form of packaging should be agreed between sender and recipient or, in the absence of such agreement, is the responsibility of the sender. It should take account of the following hazards.

E.2.1 Temperature and humidity

Insulation and wrapping should be designed to maintain the following conditions during transportation.

Temperature	5°C to 32°C
Relative Humidity	5% to 80%
Absolute air humidity	25 g/m^3 max.

No condensation in or on the case or cartridge.

E.2.2 Impact loads and vibration

Avoid mechanical loads that would distort the shape of the case or cartridge.

Avoid dropping the case or cartridge.

Cases or cartridges should be packed in a rigid box containing adequate shock absorbent material.

The final box should have a clean interior and a construction that provides sealing to prevent the ingress of dirt and moisture.