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# ISO/IEC JTC 1/SC 23 N 1520

DATE: 2008-07-29

**ISO/IEC JTC 1/SC 23**  
**Digitally Recorded Media for Information Interchange and**  
**Storage**  
**Secretariat: [Japan \(JISC\)](#)**

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<b>SOURCE</b>	National Body of Japan	
<b>PROJECT</b>		
<b>STATUS</b>	This document is circulated to the SC 23 members for a 3-month NP ballot. Please submit your vote via the ISO e-balloting system. A working draft is attached to this ballot. Comments on the draft are welcome.	
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## G3 New Work Item Proposal

### PROPOSAL FOR A NEW WORK ITEM

Date of presentation of proposal: 2008-07-29	Proposer: Japan
Secretariat: JISC	ISO/IEC JTC 1 N XXXX ISO/IEC JTC 1/SC 23 N 1520

**A proposal for a new work item** shall be submitted to the secretariat of the ISO/IEC joint technical committee concerned with a copy to the ISO Central Secretariat.

**Presentation of the proposal** - to be completed by the proposer Guidelines for proposing and justifying a new work item are given in ISO Guide 26.

<p><b>Title</b> Information Versatile Disk for Removable usage (iVDR) cartridge</p>
<p><b>Scope</b> This proposal specifies of Information Versatile Disk for Removable usage (iVDR) cartridge which is portable data storage for data interchange equipped with a connector. Hard Disk Drive technology can be used for the storage media in the iVDR cartridge. This proposal specifies dimensional characteristics including connector dimension, its pin assignment and signal format. The upper layer specifications such as interface, file-system and application layers will be proposed as international standard later.</p>
<p><b>Purpose and justification</b> – Digitalization of information such as video, music, and pictures has become a part of our everyday lives through the rapid spread of broad band networks, drop in price of high performance personal computers, the penetration of Digital Still Cameras, and Video Camcorders into the house hold as well as digitalization of broadcast services. We have now entered a new era that surpasses traditional categories of information devices and home appliances as seen in devices that handle information including personal computers capable of recording TV programs, and televisions and mobile phones that can access the internet.</p> <p>In Today's field of AV devices, 3.5 inch fixed hard disk drives have begun to be used in devices that record large volumes of information. However the use of such fixed hard disk drives in AV devices that have a relatively long life span prevents the consumer from enjoying the benefits from the rapid advancement in high-density technology of hard disk drives that occur on a yearly basis. Meanwhile through recent improvement in high-density technology, are entering an era in which large amounts of information can be stored on hard disk drives of 2.5 inches and under. A removable disk that can be used by all types of devices would result in the spread of future mobile applications increasing consumer demand for removable hard disk drives. In order to stimulate demand for this type of removable hard disk drive establishing standard technology specifications is essential.</p>
<p><b>Programme of work</b></p> <p>If the proposed new work item is approved , which of the following document(s) is (are) expected to be developed?</p> <p><input checked="" type="checkbox"/> a single International Standard</p> <p><input type="checkbox"/> more than one International Standard (expected number: ..... )</p> <p><input type="checkbox"/> a multi-part International Standard consisting of ..... parts</p> <p><input type="checkbox"/> an amendment or amendments to the following International Standard(s) .....</p> <p><input type="checkbox"/> a technical report , type .....</p> <p>And which standard development track is recommended for the approved new work item?</p> <p><input type="checkbox"/> a. Default Timeframe</p> <p><input checked="" type="checkbox"/> b. Accelerated Timeframe</p> <p><input type="checkbox"/> c. Extended Timeframe</p>
<p><b>Relevant documents to be considered</b></p>

<b>Cooperation and liaison</b> None
<b>Preparatory work offered with target date(s)</b> IS publication target date is Oct. 31, 2010.
<b>Signature:</b> Kei YAMASHITA
<p>Will the service of a maintenance agency or registration authority be required? .....NO.....</p> <p>- If yes, have you identified a potential candidate? .....</p> <p>- If yes, indicate name .....</p> <p>Are there any known requirements for coding? ..... NO.....</p> <p>-If yes, please specify on a separate page</p> <p>Does the proposed standard concern known patented items? ..... NO.....</p> <p>- If yes, please provide full information in an annex</p> <p>Are there any known accessibility requirements and/or dependencies (see: <a href="http://www.jtc1access.org">http://www.jtc1access.org</a>)? ..... NO.....</p> <p>-If yes, please specify on a separate page</p> <p>Are there any known requirements for cultural and linguistic adaptability? ..... NO.....</p> <p>-If yes, please specify on a separate page</p>

**Comments and recommendations of the JTC 1 Secretariat** - attach a separate page as an annex, if necessary

**Comments with respect to the proposal in general, and recommendations thereon:**

It is proposed to assign this new item to JTC 1/SC 23

**Voting on the proposal** - Each P-member of the ISO/IEC joint technical committee has an obligation to vote within the time limits laid down (normally three months after the date of circulation).

<b>Date of circulation:</b> 2008-07-29	<b>Closing date for voting:</b> 2008-10-29	<b>Signature of Secretary:</b> Ayuko NAGASAWA
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<b>NEW WORK ITEM PROPOSAL - PROJECT ACCEPTANCE CRITERIA</b>		
<b>Criterion</b>	<b>Validity</b>	<b>Explanation</b>
<b>A Business Requirement</b>		
A.1 Market Requirement	Essential <u> X </u> Desirable <u>    </u> Supportive <u>    </u>	"iVDR" has been already available in Consumer Electronics, such as Flat panel TV, and PC peripheral market and so on.
A.2 Regulatory Context	Essential <u>    </u> Desirable <u>    </u> Supportive <u>    </u> Not Relevant <u> X </u>	
<b>B. Related Work</b>		

B.1 Completion/Maintenance of current standards	Yes ____ No <u>X</u>	
B.2 Commitment to other organization	Yes ____ No <u>X</u>	
B.3 Other Source of standards	Yes ____ No <u>X</u>	
<b>C. Technical Status</b>		
C.1 Mature Technology	Yes <u>X</u> No ____	“iVDR” has been already available in the market and the technology is matured.
C.2 Prospective Technology	Yes <u>X</u> No ____	Consumer Electronics and PC market is expanding. Removable storage is prospective accordingly.
C.3 Models/Tools	Yes ____ No <u>X</u>	
<b>D. Conformity Assessment and Interoperability</b>		
D.1 Conformity Assessment	Yes ____ No <u>X</u>	
D.2 Interoperability	Yes ____ No <u>X</u>	
<b>E. Adaptability to Culture, Language, Human Functioning and Context of Use</b>		
E.1 Cultural and Linguistic Adaptability	Yes ____ No <u>X</u>	
E.2 Adaptability to Human Functioning and Context of Use	Yes ____ No <u>X</u>	
<b>F. Other Justification</b>		

## **Notes to Proforma**

**A. Business Relevance.** That which identifies market place relevance in terms of what problem is being solved and or need being addressed.

A.1. Market Requirement. When submitting a NP, the proposer shall identify the nature of the Market Requirement, assessing the extent to which it is essential, desirable or merely supportive of some other project.

A.2 Technical Regulation. If a Regulatory requirement is deemed to exist - e.g. for an area of public concern e.g. Information Security, Data protection, potentially leading to regulatory/public interest action based on the use of this voluntary international standard - the proposer shall identify this here.

**B. Related Work.** Aspects of the relationship of this NP to other areas of standardization work shall be identified in this section.

B.1 Competition/Maintenance. If this NP is concerned with completing or maintaining existing standards, those concerned shall be identified here.

B.2 External Commitment. Groups, bodies, or fora external to JTC 1 to which a commitment has been made by JTC for cooperation and or collaboration on this NP shall be identified here.

B.3 External Std/Specification. If other activities creating standards or specifications in this topic area are known to exist or be planned, and which might be available to JTC 1 as PAS, they shall be identified here.

**C. Technical Status.** The proposer shall indicate here an assessment of the extent to which the proposed standard is supported by current technology.

C.1 Mature Technology. Indicate here the extent to which the technology is reasonably stable and ripe for standardization.

C.2 Prospective Technology. If the NP is anticipatory in nature based on expected or forecasted need, this shall be indicated here.

C.3 Models/Tools. If the NP relates to the creation of supportive reference models or tools, this shall be indicated here.

D. Any other aspects of background information justifying this NP shall be indicated here.

## **D. Conformity Assessment and Interoperability**

D.1 Indicate here if Conformity Assessment is relevant to your project. If so, indicate how it is addressed in your project plan.

D.2 Indicate here if Interoperability is relevant to your project. If so, indicate how it is addressed in your project plan.

## **E. Adaptability to Culture, Language, Human Functioning and Context of Use**

NOTE: The following criteria do not mandate any feature for adaptability to culture,

language, human functioning or context of use. The following criteria require that if any features are provided for adapting to culture, language, human functioning or context of use by the new Work Item proposal, then the proposer is required to identify these features.

E.1 Cultural and Linguistic Adaptability. Indicate here if cultural and natural language adaptability is applicable to your project. If so, indicate how it is addressed in your project plan.

ISO/IEC TR 19764 (Guidelines, methodology, and reference criteria for cultural and linguistic adaptability in information technology products) now defines it in a simplified way:

“ability for a product, while keeping its portability and interoperability properties, to:

- be internationalized, that is, be adapted to the special characteristics of natural languages and the commonly accepted rules for their use, or of cultures in a given geographical region;
- take into account the usual needs of any category of users, with the exception of specific needs related to physical constraints”

Examples of characteristics of natural languages are: national characters and associated elements (such as hyphens, dashes, and punctuation marks), writing systems, correct transformation of characters, dates and measures, sorting and searching rules, coding of national entities (such as country and currency codes), presentation of telephone numbers and keyboard layouts. Related terms are localization, jurisdiction and multilingualism.

E.2 Adaptability to Human Functioning and Context of Use. Indicate here whether the proposed standard takes into account diverse human functioning and diverse contexts of use. If so, indicate how it is addressed in your project plan.

NOTE:

1. Human functioning is defined by the World Health Organization at <http://www3.who.int/icf/beginners/bg.pdf> as:  
<<In ICF (International Classification of Functioning, Disability and Health), the term functioning refers to all body functions, activities and participation.>>
2. Content of use is defined in ISO 9241-11:1998 (Ergonomic requirements for office work with visual display terminals (VDTs) – Part 11: Guidance on usability) as:  
<<Users, tasks, equipment (hardware, software and materials), and the physical and societal environments in which a product is used.>>
3. Guidance for Standard Developers to address the needs of older persons and persons with disabilities).

**F. Other Justification** Any other aspects of background information justifying this NP shall be indicated here

**ISO/IEC JTC 1/SC 23**

Date: 2008-xx-xx

**ISO/IEC xxxxx:2008(E)**

ISO/IEC JTC 1/SC 23/WG

Secretariat:

**Information technology —  
Digitally recorded removable storage for information interchange —  
Information Versatile Disk for Removable usage (iVDR) cartridge**

*Élément introductif — Élément central — Élément complémentaire*

**Rev. 0.48**

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.



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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

## Introduction

This International Standard specifies the mechanical and physical characteristics of the Information Versatile Disk for Removable usage (iVDR) cartridge. The original iVDR specification was developed by the "iVDR Hard Disk Drive Consortium", (<http://www.ivdr.org>), to enable information interchange for digitally recorded Audio-Video (A/V) content with a removable storage cartridge.

# **Information technology — Digitally recorded removable storage for data interchange — Information Versatile Disk for Removable usage (iVDR) cartridge**

## **Section 1 – General**

### **1 Scope**

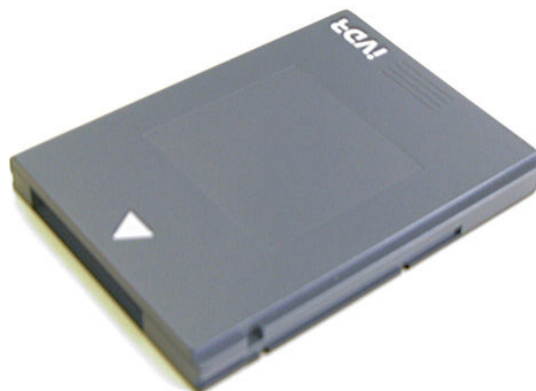
This International Standard specifies the mechanical and physical characteristics of an iVDR cartridge. Hard disk drive technologies can be used in the cartridge. The iVDR cartridge employs a connector to enable data interchange.

This International Standard specifies:

- the environments in which the cartridges are to be operated and stored.
- the mechanical, physical and dimensional characteristics of the cartridge to enable mechanical interchangeability between data processing systems;
- the connector dimensions and its pin assignments;
- the signal format;

This International Standard provides for data interchange with iVDR cartridges by specifying the connector dimensions, its pin assignments and signal format.

An external view of an iVDR cartridge is shown in Figure 1.



**Figure 1— External view of iVDR cartridge**

## 2 Conformance

An iVDR cartridge shall be in conformance with this International Standard if it meets the mandatory requirements specified herein.

## 3 Normative references

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

IEC 60950-1:2001, *Information Technology Equipment –Safety– part1: General requirements*

ANSI INCITS 397-2005 (1532D):2004, *Information Technology – AT Attachment with Packet Interface –7 Volume3*

## 4 Definitions

For the purpose of this International standard the following definitions apply:

iVDR

Guide rail

Gap

Lock system

Load area

Eject area

Clamp area

Insertion direction mark area

Label area

Plug connector

Receptacle connector

System

Additional definitions, descriptions and definitions' ordering will be examined and added more, later. (Those are preliminary and tentative)



## 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.

Numbers in decimal notations are represented by the digits 0 to 9.

Numbers in hexadecimal notation are represented by the hexadecimal digits 0 to 9 and A to F in parentheses.

The setting of bits is denoted by ZERO and ONE.

Numbers in binary notations and bit patterns are represented by strings of digits 0 and 1.

### 5.2 Names

The names of entities, e.g. specific sides, etc. are given a capital initial, except for iVDR.

## 6 Acronyms

ID: Identification

GND: Ground

PWR: Power

IF: Interface

Acronyms will be described of description and added more, later. (Those are preliminary and tentative)

## 7 Environment and safety

The conditions specified below refer to the environment where air immediately surrounding the iVDR cartridge has the following properties.

## 7.1 Testing environment

Unless stated otherwise, tests and measurements made on the iVDR cartridge to check conformance with this International Standard shall be carried out under the following conditions:

- Temperature:  $20\text{ °C} \pm 3\text{ °C}$
- Relative humidity:  $(50 \pm 20)\%$
- Condition before testing: 24h min.

The iVDR cartridge shall not be exposed to magnetic fields greater than  $0,001\text{ 5Wb/m}^2$ . No condensation on or in the iVDR cartridge shall occur.

## 7.2 Operating environment

The operating environment is the environment where air immediately surrounding the iVDR cartridge has the following properties:

- Temperature:  $5\text{ °C}$  to  $50\text{ °C}$
- Relative humidity: 8% to 90%
- Wet bulb temperature:  $29,4\text{ °C}$  max.
- Temperature gradient:  $20\text{ °C/h}$  max.
- Atmospheric pressure: 714hPa to 1 050hPa

The iVDR cartridge surface temperature in operating mode shall be below  $55\text{ °C}$ .

No condensation on or in the iVDR cartridge shall occur. The iVDR cartridge shall not be exposed to magnetic fields greater than  $0,001\text{ 5Wb/m}^2$ . If an iVDR cartridge has been exposed during storage and/or transportation to a condition outside the above values, before use, the cartridge shall be conditioned 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.

The iVDR cartridge shall be operated under the following electrical conditions:

- Power supply voltage:  $(+5 \pm 0,25)\text{ V}$
- Maximum peak to peak ripple noise: 100 mV

Frequency range of the ripple noise of power supply voltage is from 0 MHz to 1MHz.

- Power supply current: 2A max.

Maximum duration time of the incident peak current is 3 seconds.

### 7.3 Storage environment

The iVDR cartridge shall be stored under the following conditions:

- Temperature: -40 °C to 65 °C
- Relative humidity: 5% to 95%
- Wet bulb temperature: 40 °C max.
- Temperature gradient: 20°C/h max.
- Atmospheric pressure: 282hPa to 1 050hPa

The iVDR cartridge shall not be exposed to magnetic fields greater than 0,001 5Wb/m<sup>2</sup>. No condensation on or in the iVDR cartridge shall occur.

### 7.4 Safety

The iVDR cartridge assembly shall satisfy the requirements of IEC 60950-1 when used in the intended manner or in any foreseeable use in a system.

### 7.5 Flammability

The iVDR cartridge assembly shall be constructed such that, if ignited it does not continue to burn in a still carbon dioxide atmosphere.

### 7.6 Transportation

Recommended limits for the environment to which an iVDR cartridge may be subjected during transportation, and the precautions to be taken to minimise the possibility of damage, are provided in Annex C.

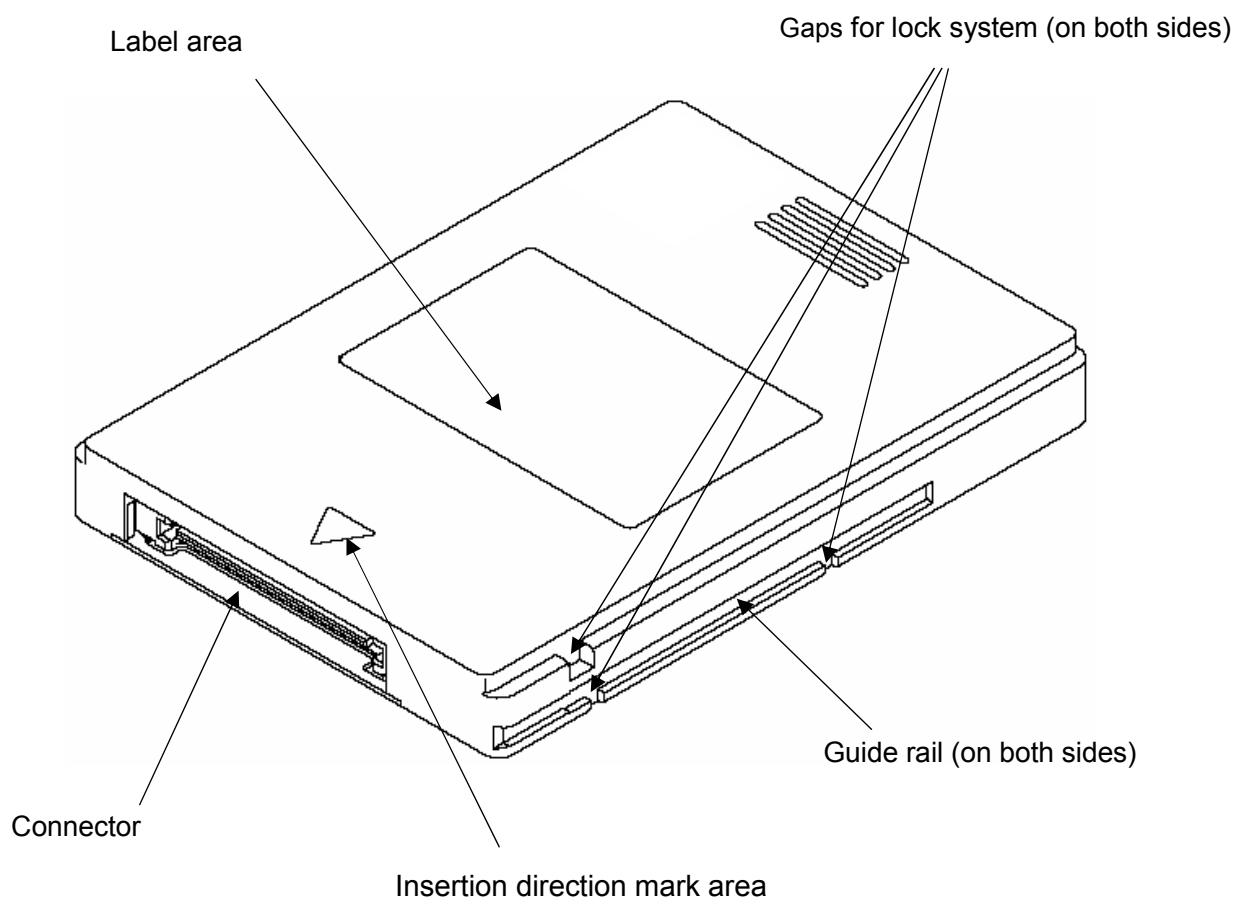
## Section 2 – Mechanical and physical characteristics of the iVDR cartridge

### 8 Dimensional, mechanical, and physical characteristics of the iVDR cartridge

#### 8.1 General description of the iVDR cartridge

The iVDR cartridge (see Figure 2) is a container of rectangular shape. It features guide rails on both sides to facilitate proper connector insertion. It has gaps for a locking system and has areas for a label and insertion direction mark.

Figure 2 shows a drawing of the iVDR cartridge in isometric form, with major features identified.



**Figure 2 —iVDR cartridge Outline**

## 8.2 Outer dimensions

Figure 3 shows an outline drawing of the iVDR cartridge. A more detailed drawing can be found in Figure 4.

The total length of the iVDR shall be

$$l_1 = 110,0 \text{ mm} \begin{matrix} +0,0 \text{ mm} \\ -0,3 \text{ mm} \end{matrix}$$

The total width shall be

$$l_2 = 80,0 \text{ mm} \begin{matrix} +0,0 \text{ mm} \\ -0,3 \text{ mm} \end{matrix}$$

The total thickness shall be

$$l_3 = 12,7 \text{ mm} \begin{matrix} +0,0 \text{ mm} \\ -0,3 \text{ mm} \end{matrix}$$

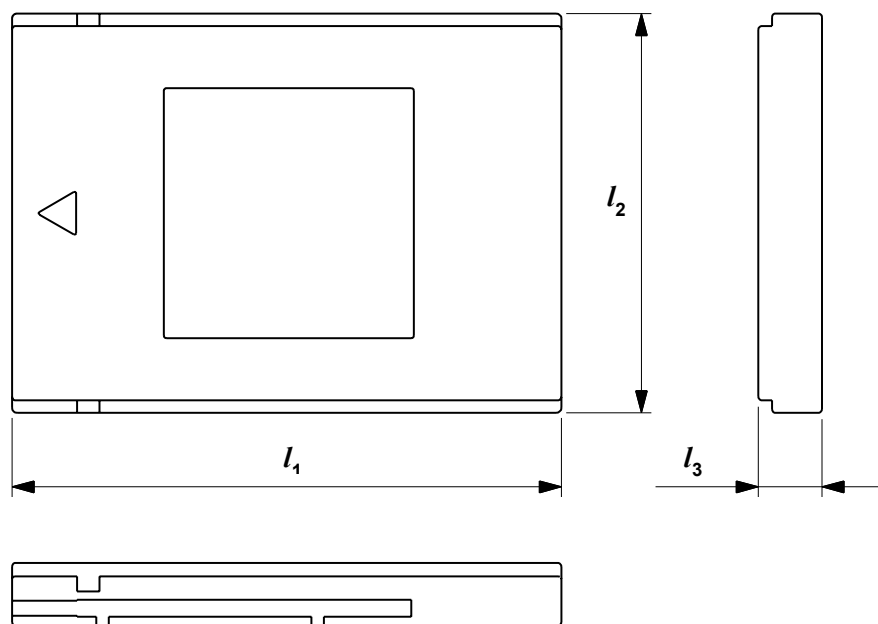


Figure 3 — Outline drawing of the iVDR cartridge

## 8.3 Mass

The maximum mass of the iVDR cartridge shall be TBD.

## 8.4 Detailed mechanical specifications

### 8.4.1 Dimensions

Dimensions of iVDR cartridge shall be as listed below. (Refer to Figure 4)

$$l_{50} = 2,5 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{51} = 10,0 \text{ mm} \begin{matrix} +0,0 \text{ mm} \\ -0,3 \text{ mm} \end{matrix}$$

$$l_{52} = 48,2 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{53} = 11,025 \text{ mm} \pm 0,100 \text{ mm}$$

$$l_{54} = 1,2 \text{ mm} \begin{matrix} +0,1 \text{ mm} \\ -0,7 \text{ mm} \end{matrix}$$

$$l_{55} = 7,55 \text{ mm} \begin{matrix} +0,70 \text{ mm} \\ -0,10 \text{ mm} \end{matrix}$$

$$l_{56} = 1,2 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{57} = 60,00 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{58} = 2,5 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{59} = 17,00 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{60} = 2,5 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{61} = 13,00 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{62} = 4,5 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{63} = 3,0 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{64} = 5,0 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{65} = 3,0 \text{ mm} \pm 0,1 \text{ mm}$$

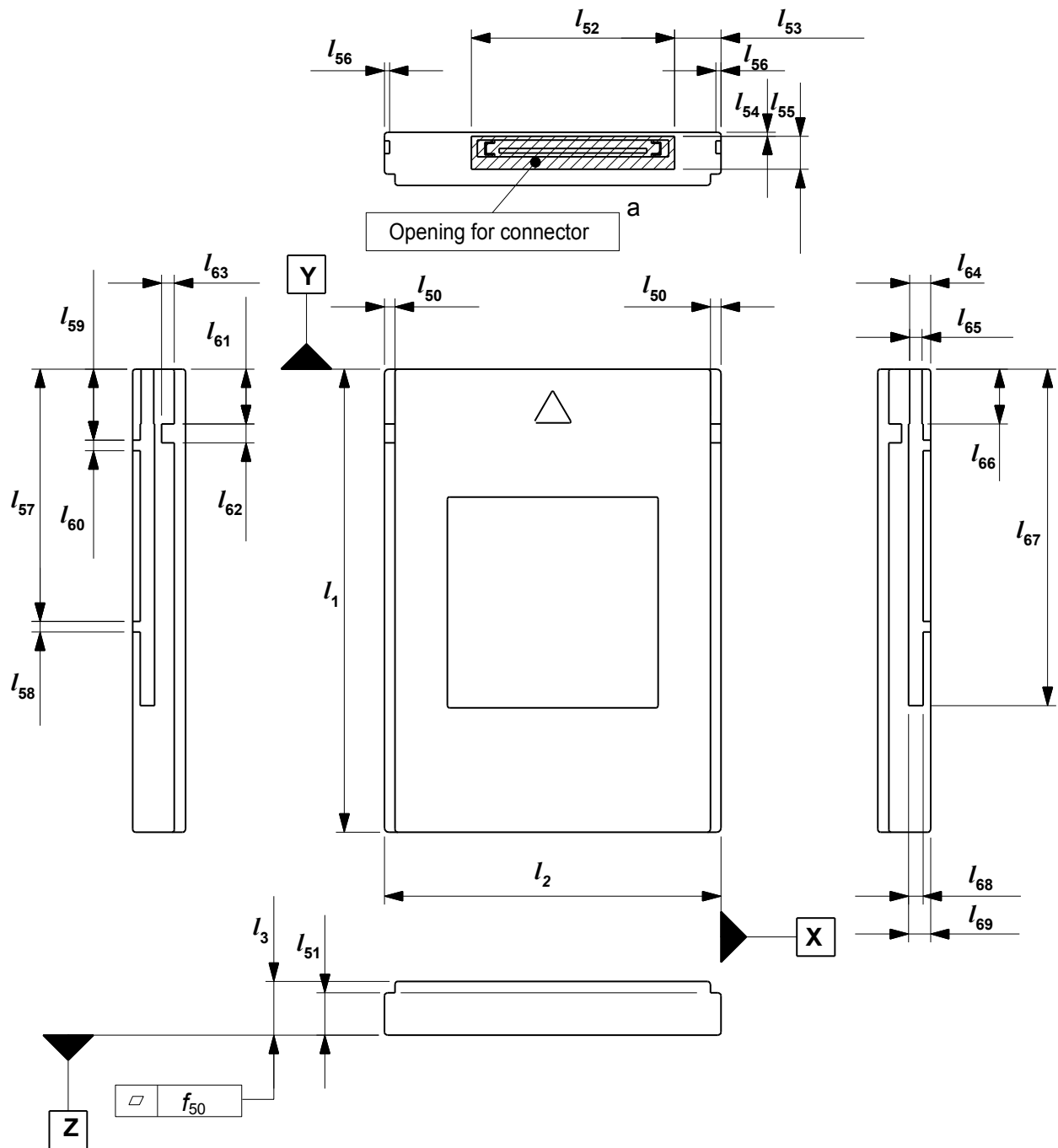
$$l_{66} = 13,00 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{67} = 80,0 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{68} = 3,4 \text{ mm} \pm 0,1 \text{ mm}$$

$$l_{69} = 5,2 \text{ mm} \pm 0,1 \text{ mm}$$

$$f_{50} = 0,3 \text{ mm}$$



<sup>a</sup> See Figure 11 in 8.4.7 for the exact position of the iVDR connector

**Figure 4 — Overall dimensions of the iVDR cartridge**

Figure 5 shows the reference plane of the iVDR cartridge.

The reference plane Z is determined by the supporting areas A, B and C or A, B and D. The reference plane Z is defined by either one of the planes ABC or ABD whose remaining supporting area D or C is inward of the plane itself.

The flatness of the supporting areas comprised from A to D is 0,15 mm or less.

$$l_{70} = 60 \text{ mm}$$

$$l_{71} = 10 \text{ mm}$$

$$l_{72} = 77 \text{ mm}$$

$$l_{73} = 25 \text{ mm}$$

$$d_{50} = 8,0 \text{ mm}$$

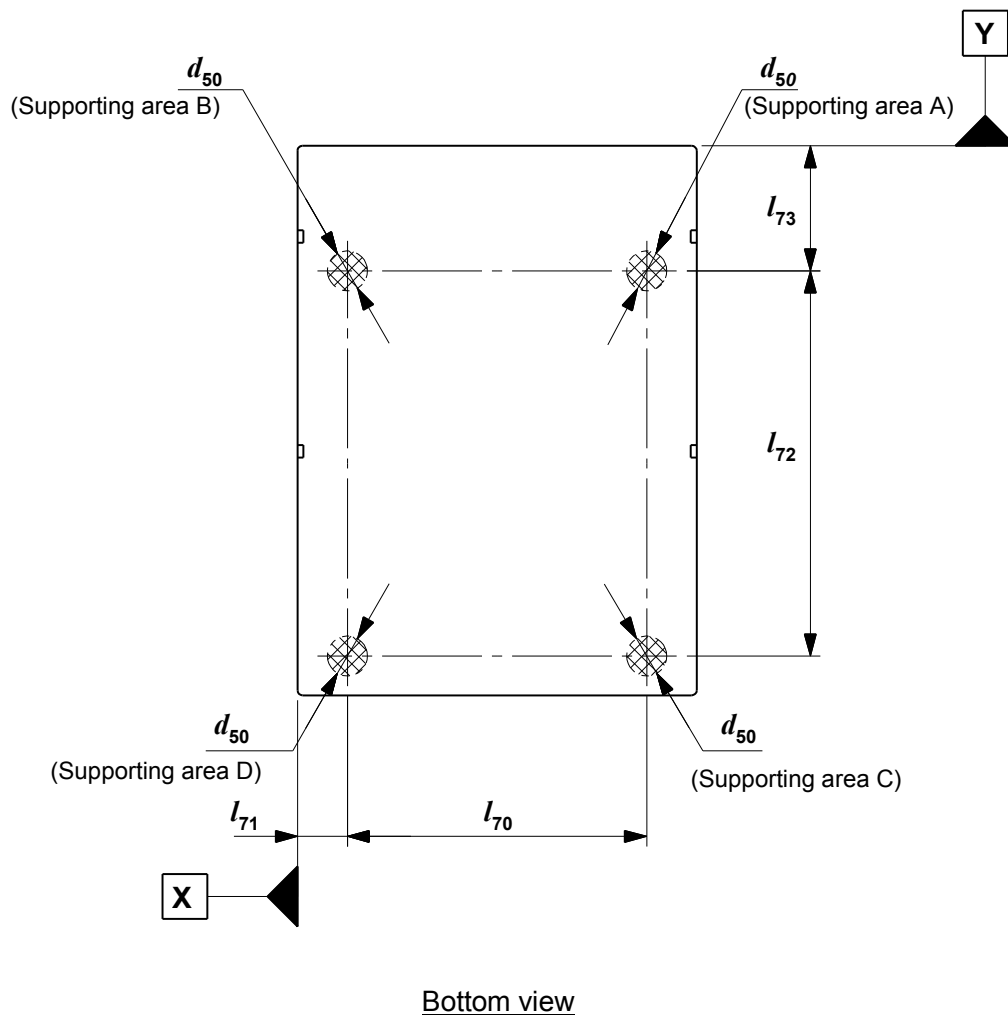


Figure 5 — Supporting areas at the bottom part of the iVDR cartridge



### 8.4.2 Guide rail

Figure 6 shows a diagram of the guide rails.

The guide rails are placed on both sides and are used for loading and ejecting.

They also aid in properly inserting the cartridge connector

The radius of the rail edge guide shall be

$r_{50} = 0,3 \text{ mm max.}$  (8 places).

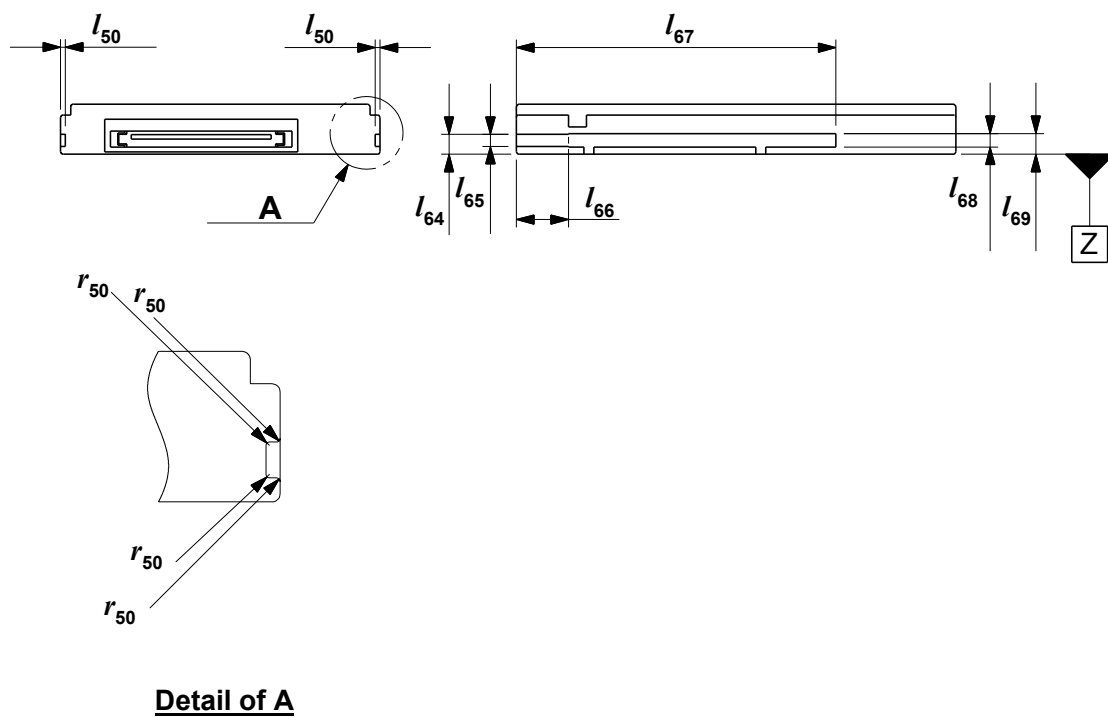


Figure 6 — Guide rails of the iVDR cartridge

### 8.4.3 Gaps for locking system

Figure 7 shows the gaps for the locking system. These gaps shall be used for locking the iVDR cartridge in place to prevent users from ejecting a cartridge in operation.

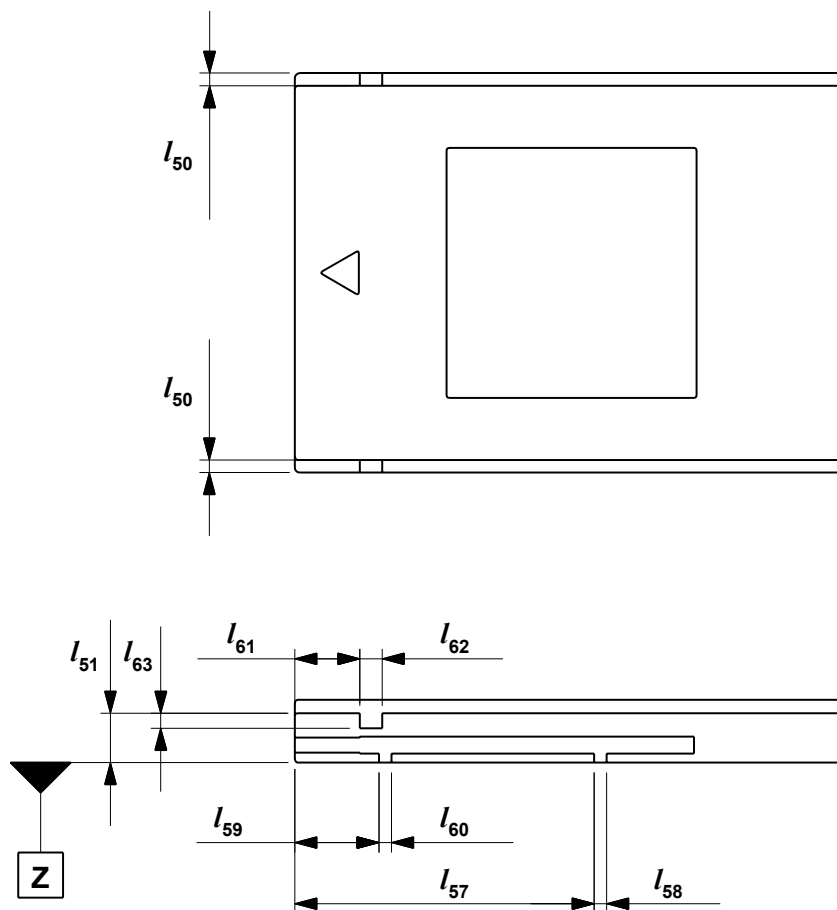


Figure 7 — Gaps for locking system

#### 8.4.4 Load area and Eject area

Figure 8 shows a diagram of the load and the eject area.

The system shall use these areas for loading and ejection of the cartridge as listed below.

$$l_{74} = 5,0 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{75} = 10,0 \text{ mm} \pm 0,5 \text{ mm}$$

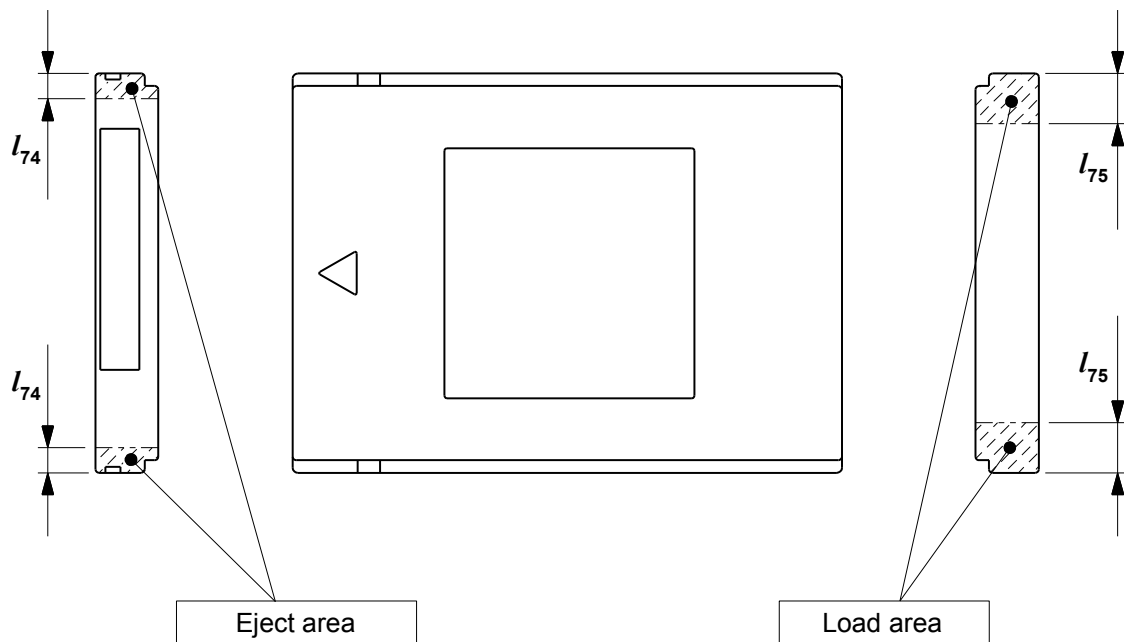


Figure 8 — Load area and eject area

#### 8.4.5 Clamp area

Figure 9 shows a drawing of the clamp area.

This area shall not be irregular-shaped, which may cause functional problems of the system.

The system shall be free from clamping in areas other than the designated area.

$$l_{76} = 10,0 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{77} = 17,5 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{78} = 10,0 \text{ mm} \pm 0,5 \text{ mm}$$

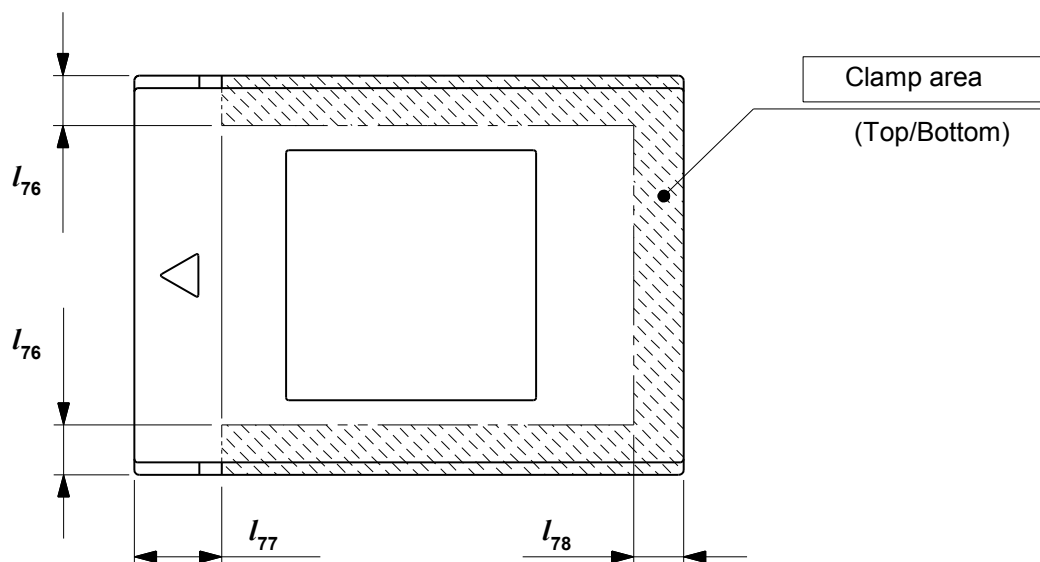


Figure 9 — Clamp area

#### 8.4.6 Insertion direction mark area and label area

Figure 10 shows an area of set-up position.

This standard defines areas to affix labels and a direction mark. The content of these labels is not specified. Labelling is not required but if a label is affixed in the designated areas then the thickness of the labels shall not cause the cartridge thickness  $L_3$  to exceed the value specified in 8.2.

$$l_{79} = 2,5 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{80} = 15,5 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{81} = 10,0 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{82} = 10,0 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{83} = 10,0 \text{ mm} \pm 0,5 \text{ mm}$$

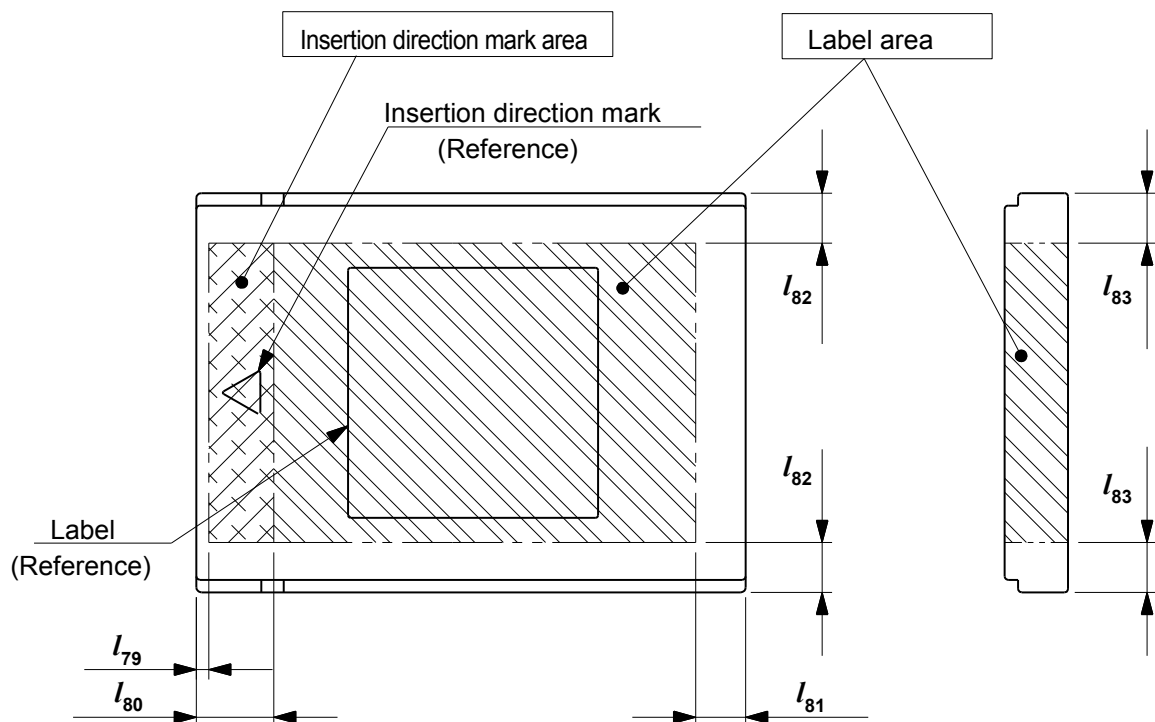


Figure 10 — Insertion direction mark area and label area

#### 8.4.7 Connector position

Figure 11 shows the position of the iVDR plug connector. In Figure 11, length  $l_{84}$  is a distance between the center line of iVDR cartridge and the center line of iVDR connector. The plug connector specifications are described in 9.

$$l_{84} = 4,8 \text{ mm} \pm 0,3 \text{ mm}$$

$$l_{85} = 4,9 \text{ mm} \pm 0,5 \text{ mm}$$

$$l_{86} = 2,5 \text{ mm} \pm 0,5 \text{ mm}$$

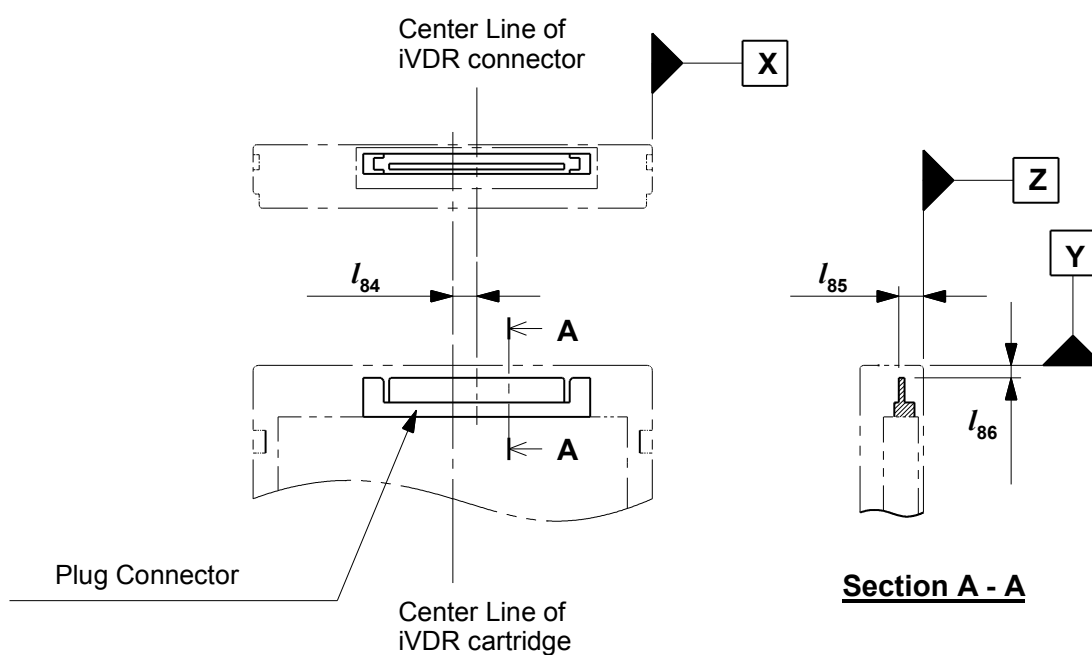
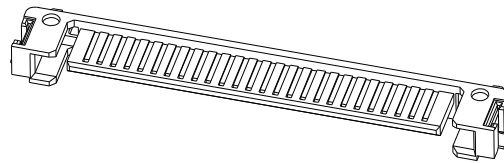


Figure 11 — Position of iVDR connector

## 9 iVDR cartridge plug connector description

### 9.1 General specification

The connector mounted on the iVDR cartridge is named “plug connector” in this specification. Figure 12 shows outline of the iVDR cartridge plug connector.



**Figure 12 —Outline of iVDR Cartridge plug connector**

### 9.2 Configuration specification

Figure 13 shows a drawing of the iVDR cartridge plug connector. The asymmetrical shape of the connector assures proper mating with its counterpart. connector dimensions are specified below:

- $l_4 = 46,43 \text{ mm}$
- $l_5 = 41,13 \text{ mm} \pm 0,15 \text{ mm}$
- $l_6 = 0,30 \text{ mm} \pm 0,05 \text{ mm}$  (2 places)
- $l_7 = 4,00 \text{ mm} \pm 0,08 \text{ mm}$
- $l_8 = 0,30 \text{ mm} \pm 0,05 \text{ mm}$  (4 places)
- $l_9 = 1,10 \text{ mm} \pm 0,02 \text{ mm}$
- $l_{10} = 34,99 \text{ mm} \pm 0,08 \text{ mm}$
- $l_{11} = 31,75 \text{ mm} \pm 0,02 \text{ mm}$
- $l_{12} = 4,90 \text{ mm} \pm 0,08 \text{ mm}$
- $l_{13} = 1,27 \text{ mm} \pm 0,02 \text{ mm}$
- $l_{14} = 0,84 \text{ mm} \pm 0,08 \text{ mm}$
- $l_{15} = 1,97 \text{ mm} \pm 0,02 \text{ mm}$
- $l_{16} = 2,40 \text{ mm} \pm 0,08 \text{ mm}$
- $l_{17} = 1,90 \text{ mm} \pm 0,08 \text{ mm}$
- $l_{18} = 0,30 \text{ mm} \pm 0,05 \text{ mm}$
- $l_{19} = 1,23 \text{ mm} \pm 0,05 \text{ mm}$

$$l_{20} = 4,40 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{21} = 0,52 \text{ mm} \pm 0,20 \text{ mm}$$

$$l_{22} = 0,52 \text{ mm} \pm 0,20 \text{ mm}$$

$$l_{23} = 0,2 \text{ mm}$$

$$l_{24} = 0,15 \text{ mm}$$

$$l_{25} = 0,1 \text{ mm}$$

$$\alpha_1 = 65^\circ$$

$$\alpha_2 = 30^\circ$$

$$\alpha_3 = 30^\circ$$

$$\alpha_4 = 65^\circ$$



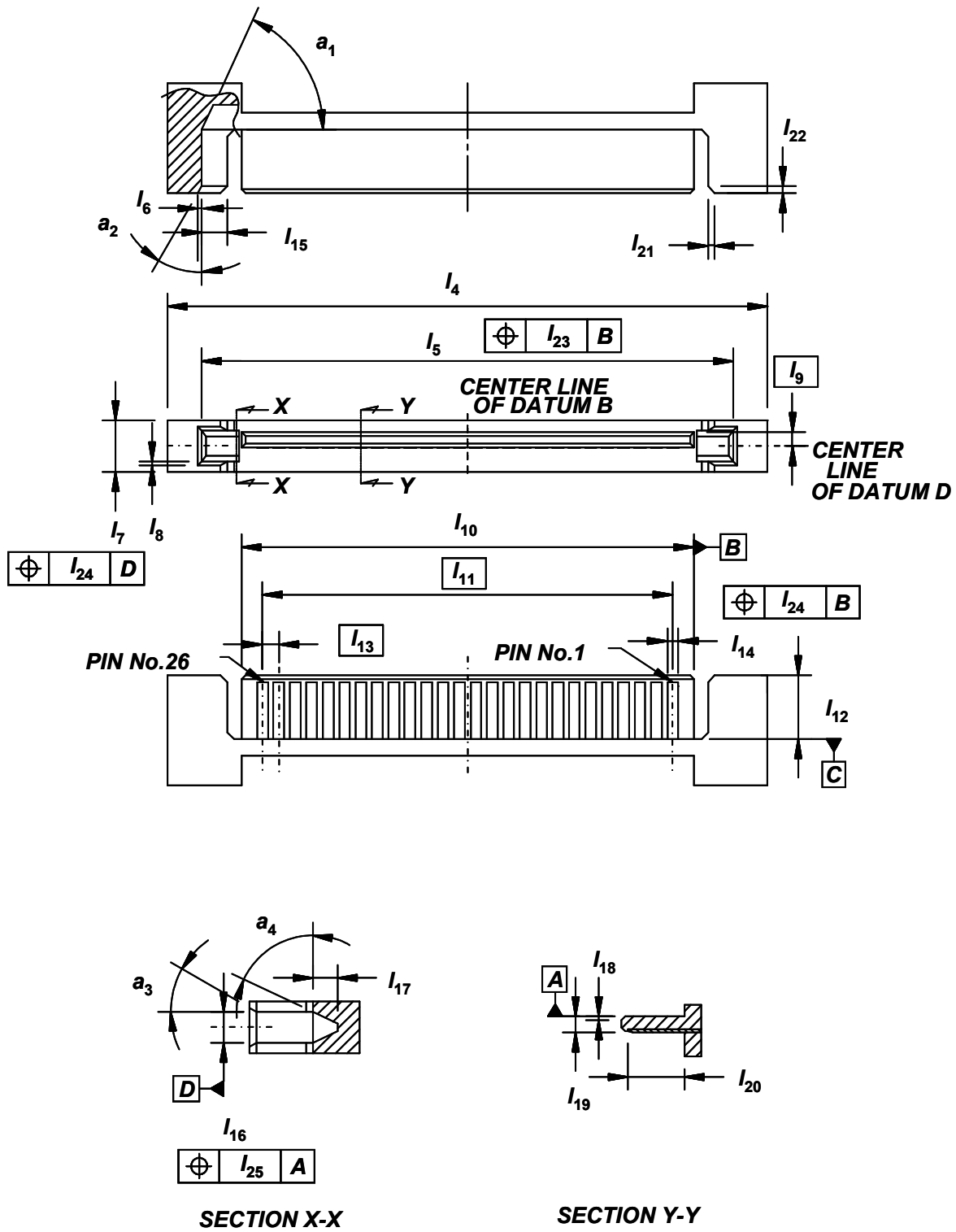


Figure 13 – iVDR cartridge plug connector

### 9.3 Mating and Unmating force of the connector

The insertion and disconnecting force of the connector is specified in Table 1.

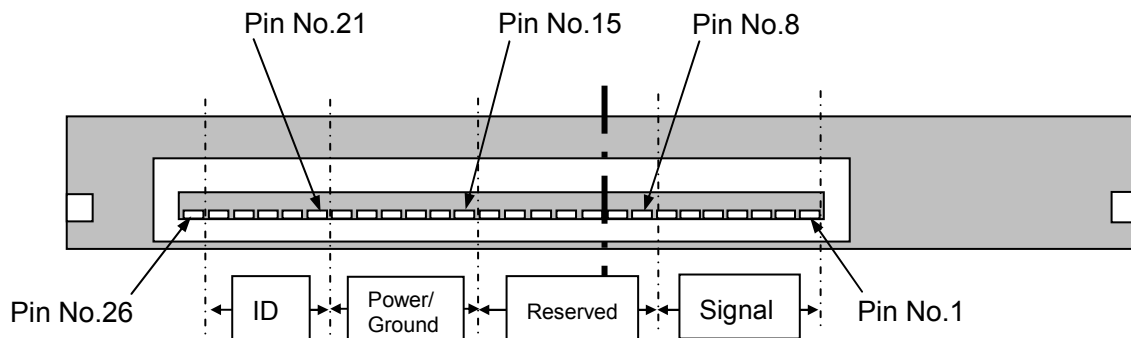
**Table 1 — Insertion and disconnecting force of the connector**

Item	Specification
Mating force	0,48 N max. per connector pin
Unmating force	0,17 N min. per connector pin 0,39 N max. per connector pin

## 10 Signal description of iVDR cartridge plug connector

### 10.1 Signal assignments for connector

Figure 14 shows the diagram of the iVDR cartridge plug connector pin configuration; Table 2 shows the pin assignments.



**Figure 14 —Pin configuration of iVDR cartridge plug connector**

(1) Signal part

This part consists of differential signals and ground. Signal format and characteristics shall be defined in 11.

(2) Reserved part

This part is reserved.

(3) Power / Ground part

The Settings of this part are shown in Table 3.

(4) ID part

The Settings of this part are shown in Table 4.

Logical level shall be designated as follows.

Logic "1" (H) = OPEN (Open),

Logic "0" (L) = GND (Ground),

see also 10.2.

The input voltage specification of this part is shown at Table 5. Description of receptacle connector is described in Annex A.

**Table 2 — Plug Connector Pin Assignment**

No.	Name	Type	Description	Part
1	PA-S1	GND	Ground	Signal
2	PA-S2	A+	Differential signal	
3	PA-S3	A-	Differential signal	
4	PA-S4	GND	Ground	
5	PA-S5	B-	Differential signal	
6	PA-S6	B+	Differential signal	
7	PA-S7	GND	Ground	
8	-	-	Reserved	Reserved
9	-	-	Reserved	
10	-	-	Reserved	
11	-	-	Reserved	
12	-	-	Reserved	
13	-	-	Reserved	
14	-	-	Reserved	
15	P1	GND	Ground	Power /Ground
16	P2	GND	Ground	
17	P3	GND	Ground	
18	P4	PWR	Power	
19	P5	PWR	Power	
20	P6	PWR	Power	
21	ID1	PWR-ID 0	Power ID 0	ID
22	ID2	PWR-ID 1	Power ID 1	
23	ID3	IF-ID 0	Interface ID 0	
24	ID4	IF-ID 1	Interface ID 1	
25	ID5	IF-ID 2	Interface ID 2	
26	-	-	Reserved	-

Note) The plug connector pins have same length.

**Table 3 — Power ID Assignment**

PWR-ID 0	PWR-ID 1	Specification
1	1	Operating voltage of iVDR is 5V.

**Table 4 — Interface ID Assignment**

IF-ID 0	IF-ID 1	IF-ID 2
0	1	1

**Table 5 — Input Voltage of ID Part**

Item	Specification
Input voltage	6V max.

## 10.2 System recognition by ID pin

The logical level shall be determined by the following. Logic “1” (H) shall be designated by OPEN (Open), and Logic “0” (L) shall be designated by GND (Ground). A schematic diagram of the pin configuration is shown in Figure 15.

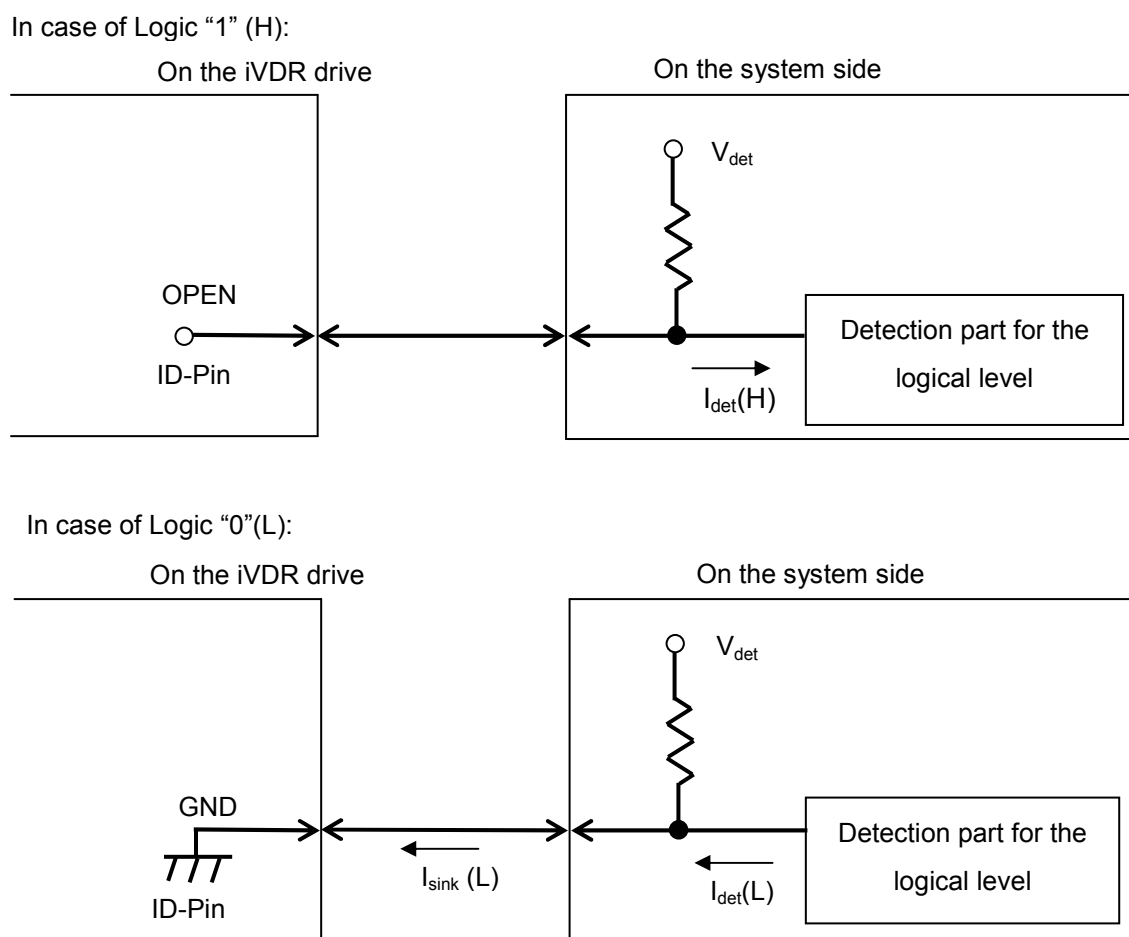


Figure 15 — Schematic diagram of ID pin

In Figure 15, voltage and current are defined as follows;

- (1)  $V_{det}$  : Pull-up voltage on the system side.
- (2)  $I_{det}(H)$ : electric current applied to the detection part for the logical level at Logic "1" (H).
- (3)  $I_{det}(L)$ : electric current applied to the detection part for the logical level at Logic "0" (L).
- (4)  $I_{sink}(L)$ : electric current applied to the system side at Logic "0" (L).
- (5) The means of detection used for the maximum value of detected electric current  $I_{det}(H)$ ,  $I_{det}(L)$  and also the logical level are regulated by the specification of the system side. The maximum value of the IL is regulated by the specification on the system side.

The range of the logical level shall be set, based on the assumption below, with the specification on the system side into consideration. A schematic diagram of the pin configuration is shown in Figure 16.

The values of Logic "0" (L) and Logic "1" (H) shall be properly designated, on the assumption that the following necessary qualifications shall be met

$$GND < \text{the value of Logic "0" (L)} < \text{the value of Logic "1" (H)} < V_{det}$$

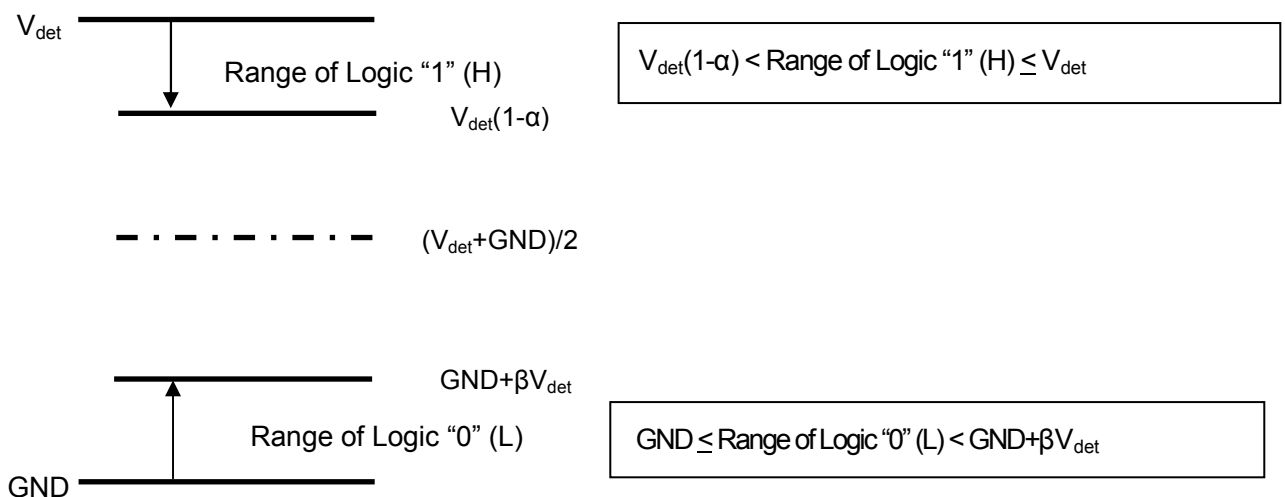
That is to say,

$$GND < \text{the maximum value of Logic "0" (L)} < \text{the minimum value of Logic "1" (H)} < V_{det}$$

$$GND < GND + (\beta_{max})V_{det} < V_{det}(1 - \alpha_{max}) < V_{det}$$

Provided, however, that  $\alpha$  and  $\beta$  are coefficients that are defined within the following ranges.

$$0 < \alpha < 1, \text{ and } 0 < \beta < 1.$$



**Figure 16 — Schematic diagram of the logical level**

## **11 Signal format description of the signal part**

### **11.1 General description**

The signal part complies with serial plug segment described in 14.2 of ANSI INCITS 397-2005 (153D).

### **11.2 Physical layer electronics**

The physical layer electronics of the signal part comply with Phy (Physical layer electronics) in 14.4 of ANSI INCITS 397-2005 (153D).

### **11.3 Electrical features**

The electrical features of the signal part comply with Electrical features in 14.5 of ANSI INCITS 397-2005 (153D).



## Annex A (normative)

### iVDR cartridge receptacle specification

#### A.1 Configuration specification

Figure A.1 shows a diagram of the receptacle connector. Dimensions shall be as follows;

$$l_{200} = 36,79 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{201} = 31,75 \text{ mm}$$

$$l_{202} = 15,875 \text{ mm}$$

$$l_{203} = 1,27 \text{ mm}$$

$$l_{204} = 1,95 \text{ mm} \pm 0,05 \text{ mm}$$

$$l_{205} = 1,15 \text{ mm}$$

$$l_{206} = 0,40 \text{ mm} \pm 0,05 \text{ mm}$$

$$l_{207} = 35,29 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{208} = 40,43 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{209} = 38,65 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{210} = 0,50 \text{ mm} \pm 0,05 \text{ mm}$$

$$l_{211} = 7,4 \text{ mm min.}$$

$$l_{212} = 3,50 \text{ mm} \pm 0,08 \text{ mm}$$

$$l_{213} = 0,60 \text{ mm} \pm 0,08 \text{ mm}$$

$$l_{214} = 1,70 \text{ mm} \pm 0,08 \text{ mm}$$

$$l_{215} = 1,40 \text{ mm} \pm 0,10 \text{ mm}$$

$$l_{216} = 5,20 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{217} = 1,40 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{218} = 1,90 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{219} = 0,35 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{220} = 0,35 \text{ mm} \pm 0,15 \text{ mm}$$

$$l_{221} = 0,2 \text{ mm}$$

$$l_{222} = 0,15 \text{ mm}$$

$$r_{200} = 0,2 \text{ mm} \pm 0,2 \text{ mm}$$

$$r_{201} = 0,3 \text{ mm} \pm 0,2 \text{ mm}$$

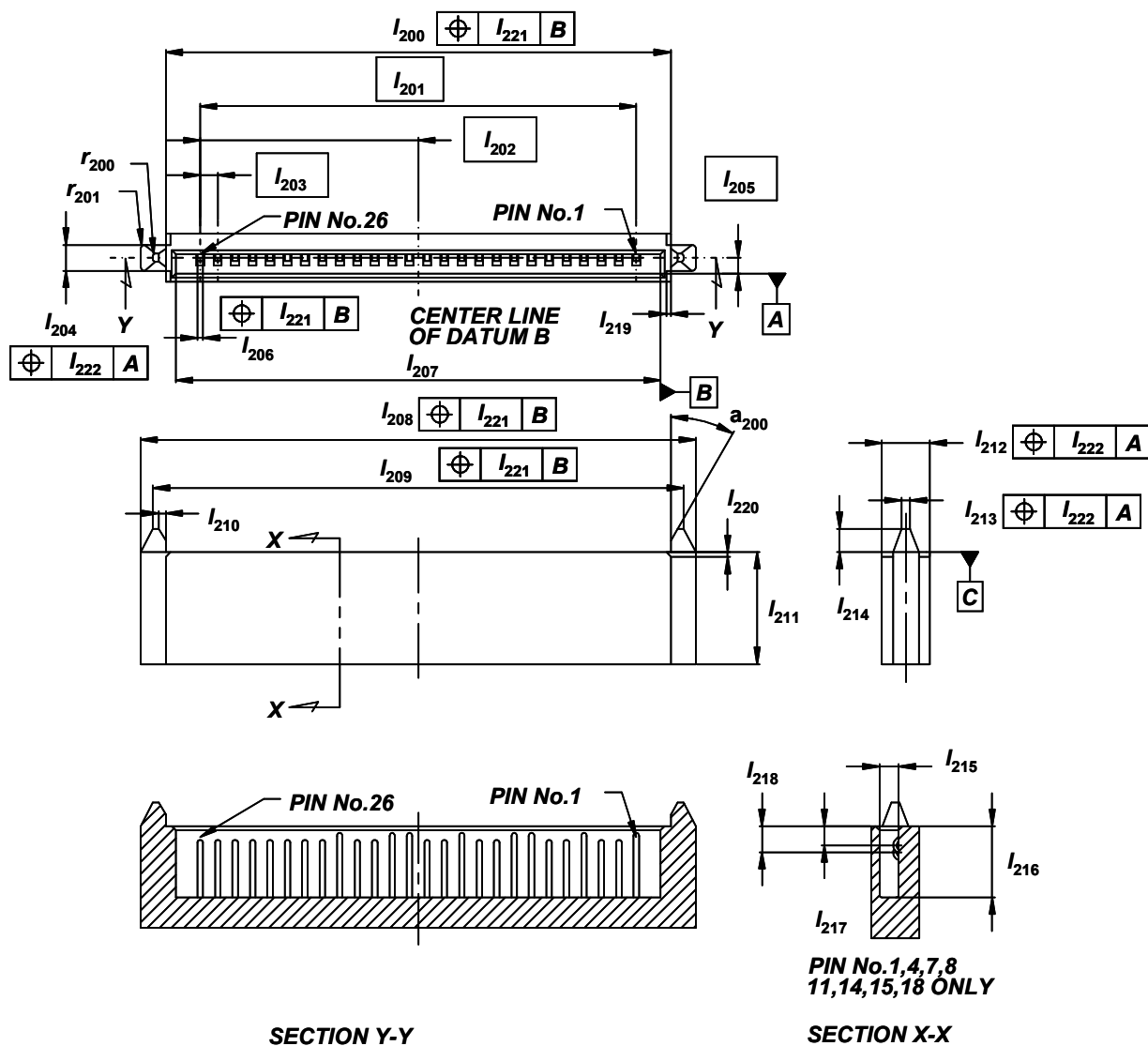


Figure A.1 —iVDR cartridge receptacle connector

Pin length of the iVDR cartridge receptacle connector has two lengths defined by Table A.2. Pins' number 1, 4, 7, 8, 11, 14, 15, 18 have long pin length, other pins' number have short pin length.

**A.2 Contact material and surface plating [Informative]****Table A.1 — Material and surface treatment of the connector pins**

Material	Surface plating
Copper alloy	Contact Area : Under plate : Ni Over plate : Au (0.3µm or more) Solder area : Under plate : Ni Over plate : Sn alloy (2.5µm or more) or Au FLASH

## A.3 Signal assignment for connector

Table A.2 — Receptacle Connector Pin Assignment

No.	Name	Type	Description	Pin Length	Part
1	PA-S1	GND	Ground	Long	Signal
2	PA-S2	A+	Differential signal	Short	
3	PA-S3	A-	Differential signal	Short	
4	PA-S4	GND	Ground	Long	
5	PA-S5	B-	Differential signal	Short	
6	PA-S6	B+	Differential signal	Short	
7	PA-S7	GND	Ground	Long	
8	-	-	Reserved	Long	Reserved
9	-	-	Reserved	Short	
10	-	-	Reserved	Short	
11	-	-	Reserved	Long	
12	-	-	Reserved	Short	
13	-	-	Reserved	Short	
14	-	-	Reserved	Long	
15	P1	GND	Ground	Long	Power /Ground
16	P2	GND	Ground	Short	
17	P3	GND	Ground	Short	
18	P4	PWR	Power	Long	
19	P5	PWR	Power	Short	
20	P6	PWR	Power	Short	
21	ID1	PWR-ID 0	Power ID 0	Short	ID
22	ID2	PWR-ID 1	Power ID 1	Short	
23	ID3	IF-ID 0	Interface ID 0	Short	
24	ID4	IF-ID 1	Interface ID 1	Short	
25	ID5	IF-ID 2	Interface ID 2	Short	
26	-	-	Reserved	Short	-

## Annex B (Informative)

### Connecting condition of connector

#### B.1 Misalignment tolerance of the connector

Figure B.1 shows the misalignment tolerance of the connector.

Tolerance in the horizontal direction;

$$l_{300} = +1,20 \text{ mm.}$$

Tolerance in the vertical direction;

$$l_{301} = +1.00 \text{ mm max.}$$

The position of the iVDR cartridge plug connector should be adjusted within this alignment tolerance so that the plug connector can fit into the receptacle connector of the system.

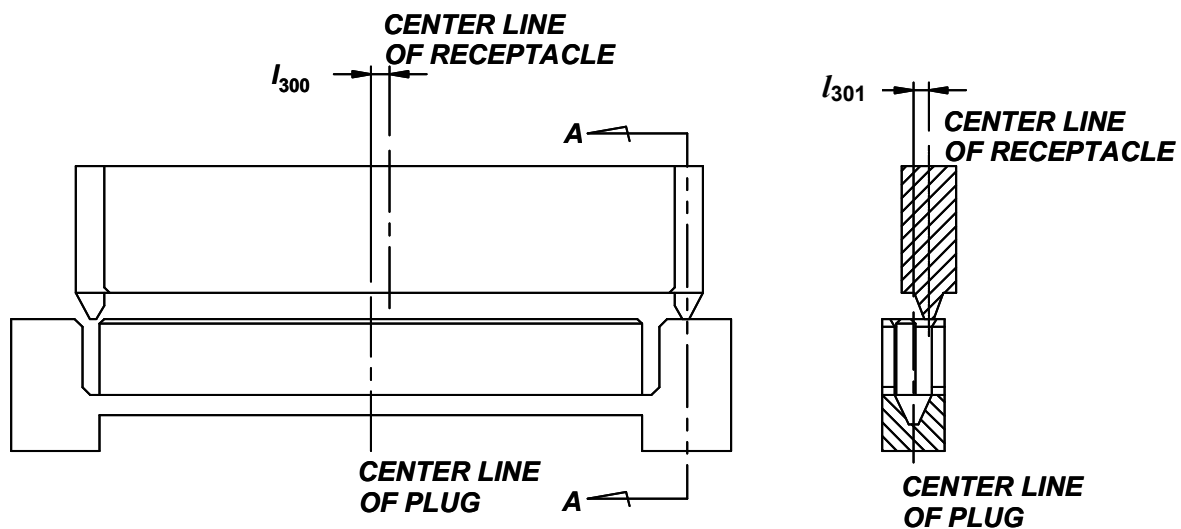


Figure B.1 — Misalignment tolerance

## B.2 Fully-mated dimension

Figure B.2 shows fully-mated dimension (recommended values).

$$l_{302} = 0,6 \text{ mm max.}$$

$$l_{303} = 2,5 \text{ mm}$$

$$l_{304} = 7,4 \text{ mm min.}$$

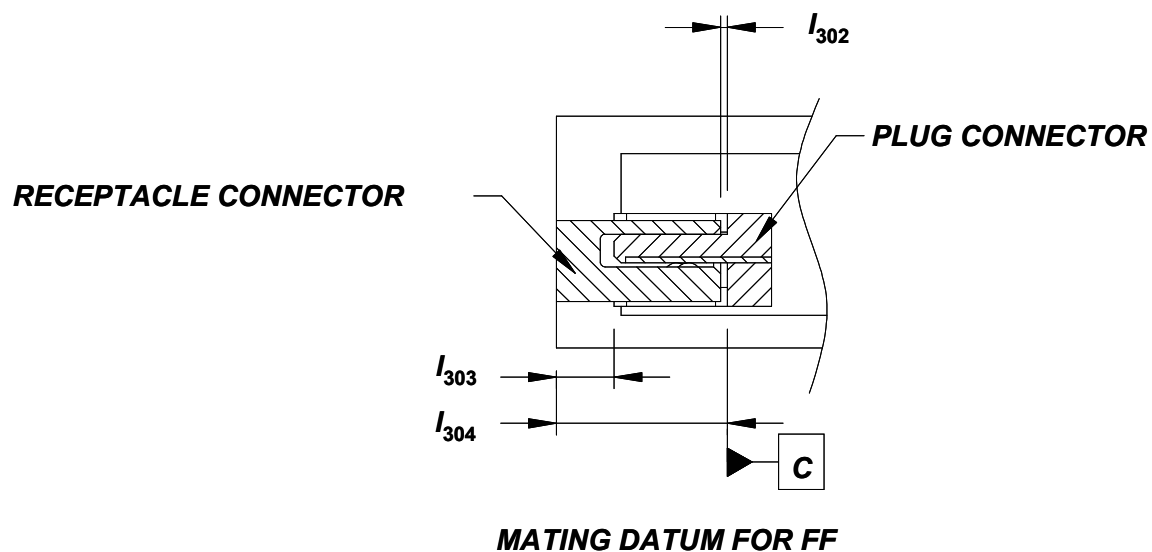


Figure B.2 — Fully-mated dimension

## **Annex C (Informative)**

### **Recommendations for transportation**

#### **C.1 Environment**

It is recommended that during transportation that the iVDR cartridges be kept in the following conditions:

- Temperature: -40 °C to 65 °C
- Relative humidity: 5% to 95%
- Wet bulb temperature 40 °C max.
- Temperature gradient: 20°C/h max.
- Atmospheric pressure: 282hPa to 1 050hPa

No condensation on or in the iVDR cartridge shall occur. The specifications for storage environment should apply during transportation.

#### **C.2 Hazards**

Transportation of iVDR cartridges involve three potential hazards:

##### **C.2.1 Impact loads and vibration**

The following recommendations should minimize damage during transportation.

- i. Avoid mechanical loads that would distort the iVDR cartridge shape.
- ii. Avoid dropping the iVDR cartridge from more than 1,0 m height.
- iii. The iVDR cartridge should be placed in individual containers and the containers should be properly latched.
- iv. The iVDR cartridge (in containers) should be fitted into a rigid shipping box containing adequate shock-absorbent material.
- v. The final box should have a clean interior and a construction that provides sealing to prevent the ingress of dirt and water.

### **C.2.2 Extremes of temperature and humidity**

- i. Extreme changes in temperature and humidity should be avoided.
- ii. Whenever an iVDR cartridge is received, it should be conditional in operating environment for a period of at least 24 h before it is used.

### **C.2.3 Effects of stray magnetic field**

During shipping, the iVDR cartridge should not be exposed to a magnetic field in excess of  $0,0015\text{Wb/m}^2$ .



## **Annex D (Informative)**

### **Example and supplement**

Mobile type of hard disk drive is supposed to be built into the iVDR cartridge. Major usage might be recording storage for broadcast or video contents.

Any other recording media other than hard disk drive is acceptable as a built-in media into the iVDR cartridge.

## Bibliography

- [1] Serial ATA Revision 2.6, February 15, 2007. [Serial ATA International Organization]
- [2] Serial ATA Interoperability Program Revision 1.2 – Policy Document v1.01. [Serial ATA International Organization]
- [3] Serial ATA Interoperability Program Revision 1.2 – Unified Test Document v1.0. [Serial ATA International Organization]