TEAC CD-5010B-070
CD-ROM DRIVE FOR AUDIO SYSTEM

HARDWARE SPECIFICATION

Rev. A

21 sheets in Total

8856

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1. SCOPE

This is hardware specification of the TEAC CD-5010B-070 built-in type CD-ROM Drive for Audio System (hereinafter referred to as drive). As for the software specification, refer to "CD-5010B Software Specification".

2. OUTLINE

The outline of this drive is given in Table 2-1.

(Table 2-1) Outline of the specification

Model name	CD-5010B-070
TEAC P/N	19772370-70
Applicable safety standards	UL, C-UL, TÜV, CE
Data transfer rate (burst)	66.6M Bytes/sec max
Average access time	200msec, average by TEAC standards
Disc rotation speed	1,850rpm (Approx)
Host interface	IDE (ATAPI)
Power source	+5Vdc, +12Vdc
Loading mechanism	Disc tray
Starting time	15sec (CD-ROM)
Readable discs	CD-DA CD-ROM CD-R, CD-RW
Applicable format	CD-DA CD-ROM (Mode1, Mode2) CD-ROM XA Mode 2 (Form1, Form2)
Front bezel	Not equipped
Eject button	Not equipped
Access indicator	Not equipped
Laser class	Class 1 laser product
Drive configuration	Master
RoHS directive	Complies with

3. CONSTRUCTION

3.1 External Construction

Model name	CD-5010B-070
Height	41.3mm
Width	146.0mm
Depth	165.0mm
Mass	700g or less
External view	Refer to Fig. 3.1-1.

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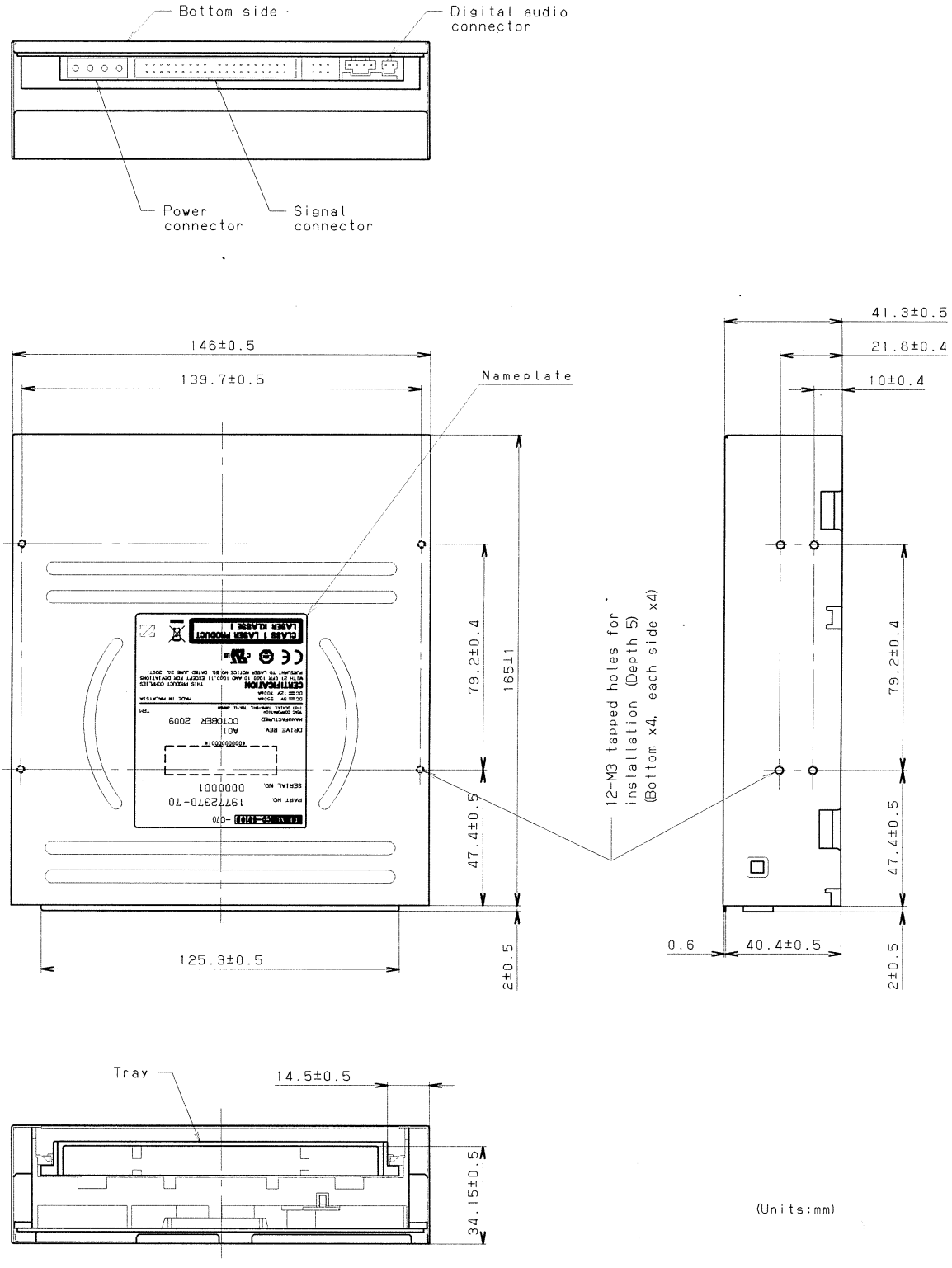

(Fig. 3.1-1) External view of the drive

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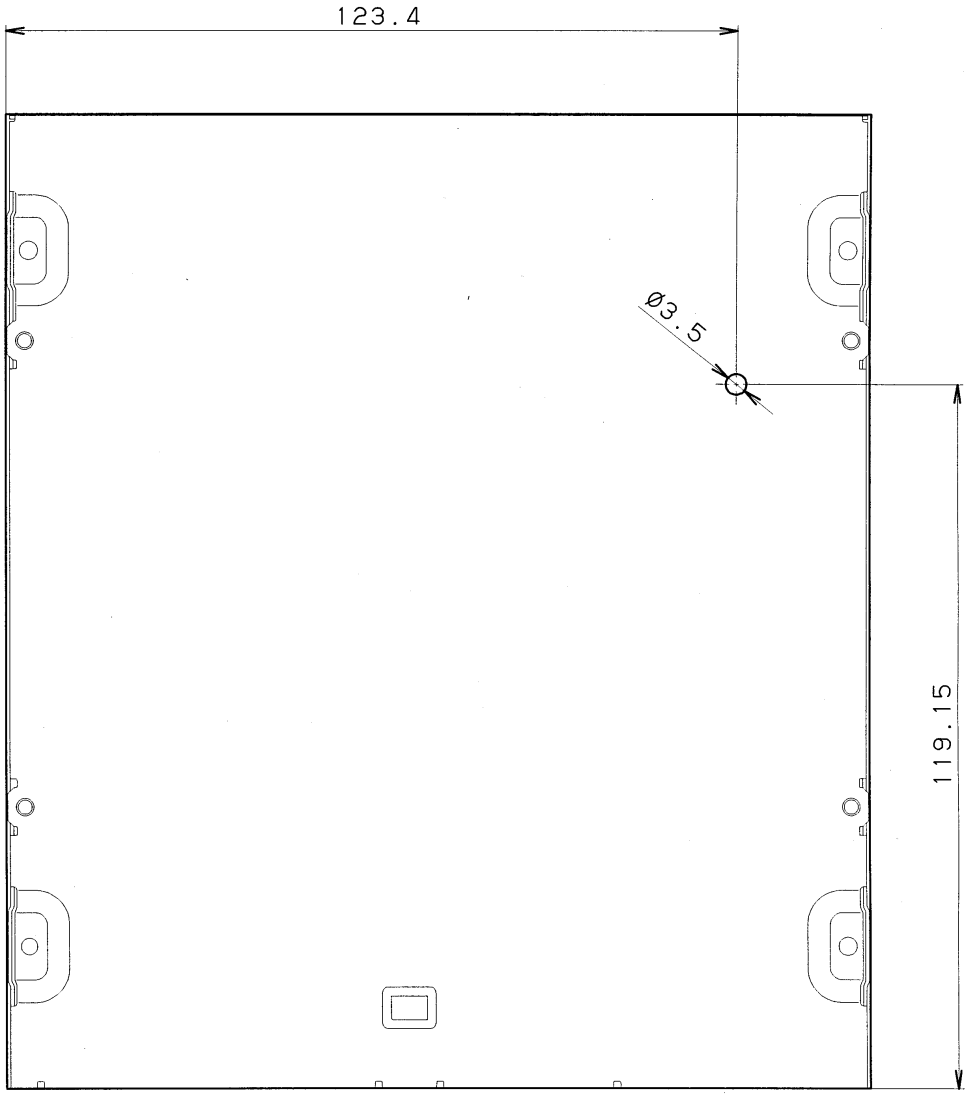

(Units: mm)

(Fig. 3.1-2) Bottom view of the drive

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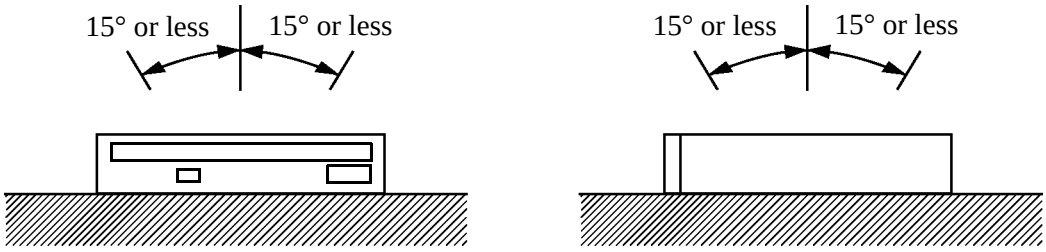
3.2 Installation

(1) Installation direction : Refer to Fig. 3.2-1.
(2) Tilt : Refer to Fig. 3.2-1 below.
(3) Installation method : The fixing holes in the side of the unit are used.
Separate discussions and arrangements are required when the installation holes are not used.



(Fig. 3.2-1) Tilt of the drive

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4. DISC SPECIFICATION

4.1 Applicable Disc Format

- CD-DA
- CD-ROM Mode1
- CD-ROM XA Mode2 (Form1, Form2)
- Multi-session Photo CD
- CD-I
- Video CD
- Enhanced CD
- CD Extra

4.2 Rotational Speed

Refer to Table 4.2-1 for the rotational speed.

(Table 4.2-1) Rotational speed

Operation/Disc format	Read speed/Disc speed
Read (CD-ROM Model)	10x CAV 1,850rpm
Read (CD-ROM Mode2 Form2)	10x CAV 1,850rpm
Read (CD-DA)	10x CAV 1,850rpm
Play Audio	10x CAV 1,850rpm
Mixed (CD-ROM Model and Mode2 Form2 or CD-DA)	10x CAV 1,850rpm
CD-RW (Read only operation)	10x CAV 1,850rpm

4.3 Data Capacity

- 650MB/700MB : CD-ROM Mode1
  : CD-ROM XA Mode2 Form1
- 738MB/795MB : CD-ROM XA Mode2 Form2
- 74min/79min : CD-DA

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5. PERFORMANCE

5.1 Operating Performance

(1) Average random access time : 200msec average (CD-ROM, 10x)
(2) Disc speed : Refer to 4.2.
(3) Data transfer rate
  (a) Read sustained : 560 to 1,300kB/sec (CD-ROM Model)
  (b) Programmed I/O : 16.7MB/sec max (Mode 0 to 4)
  (c) Multi-word DMA : 16.7MB/sec max (Mode 0 to 2)
  (d) Ultra DMA : 66.6MB/sec max (Mode 0 to 4)
(4) Starting time
  CD-ROM : 15sec max (single-session Audio CD)
  When power is switched on/when disc is loaded
(5) Tray loading time : Refer to Table 5.1-1.

(Table 5.1-1) Tray loading time

Mode	Min(sec)	Max(sec)
Opening time	1.3	2.1
Closing time	1.9	2.7

*During a driving current runs through the loading motor
*Measuring a time at which the driving current value is dropped to zero after sending the current when the tray is opened/closed by Eject command without a media, with the current probe caught in the red wire of the loading motor.

(6) Data buffer capacity : 198KB

5.2 Specifications of the Mechanism

(1) Loading mechanism
  (a) Insertion
    • Power loading by pushing the disc tray
    • Power loading using the interface command
  (b) Eject
    • Power eject using the interface command
    • Manual eject using the emergency hole (in an emergency and power off)
    • Manual eject using the bottom emergency hole (in power on)
(2) How to insert and take out the disc
    • When inserting the disc, place it towards the front edge or back edge of the tray to maneuver it into position.
    • When taking the disc out, pull it upward without applying excessive force on the disc.

5.2.1 Digital audio output

(1) Format : Conforms to EIAJ CP-1201.
(2) Connector
  (a) Drive side connector : 53103-0250 Molex or equivalent
  (b) Pin number chart : Refer to Table 5.2.1-1.

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(Table 5.2.1-1) Digital audio output connector pin number

Pin No.	Signal
1	GND
2	D out

(c) Cable side matched connector : 5103-0220 Molex or equivalent

5.3 Acoustic Noise

Operating : 35dBA or less
(during 10x CAV read, microphone is set at a distance of 0.5m from the front side of the drive)

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6. ENVIRONMENTAL CONDITIONS

The environmental conditions as specified here do not include the environmental conditions of the disc. The environmental conditions of the disc should follow the specifications of the applicable disc.

(1) Ambient temperature
  (a) During operation : 5 to 45°C
  (b) During non-operation : –30 to 60°C
  (c) During transportation (packaged)
    : –40 to 65°C

(2) Temperature gradient
  (a) During operation : 20°C/hour or less (non-condensing)
  (b) During non-operation/transportation
    : 20°C/hour or less (non-condensing)

(3) Relative humidity
  (a) During operation : 20 to 90% (non-condensing)
    provided that the maximum wet-bulb temperature is 29°C or less.
  (b) During non-operation/transportation
    : 10 to 85% (non-condensing)
    provided that the maximum wet-bulb temperature is 38°C or less.
  (c) During transportation (packaged)
    : 5 to 90% (non-condensing)
    provided that the maximum wet-bulb temperature is 38°C or less.

(4) Vibrations
  (a) During operation : 2.94m/s^2 (0.3G) or less
    provided that the sweep frequency is 10 to 500Hz and sweep rate, 1oct/min.
  (b) During non-operation : 19.6m/s^2 (2.0G) or less
    provided that the sweep frequency is 10 to 500Hz and sweep rate, 1oct/min.
  (c) Transportation (packaged) : 9.8m/s^2 (1.0G) or less
    provided that the sweep frequency is 5 to 50Hz and sweep rate, 1oct/min.
    7.35m/s^2 (0.75G) or less
    provided that the sweep frequency is 5 to 500Hz and sweep rate, 1oct/min.

(5) Shock
  (a) During operation
    : 49m/s^2 (5G) or less (half-sine shock pulse; 3msec, interval;10sec)
  (b) During non-operation/transportation
    : 490m/s^2 (50G) or less (half-sine shock pulse; 11msec)

(6) Dust : office environment

(7) Cooling : natural air cooling

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7. RELIABILITY

(1) Mean time between failures (MTBF)
: 60,000POH or more (the frequency of use should be 10% at normal temperature and humidity)

(2) Mean time to repair (MTTR) : 30minutes

(3) Loading/ejecting life : 10,000 times or more

(4) Seeking life : 10^6 times or more (random access, 40°C, duty; 20% or less)

(5) Error rate

(a) Read error rate : Mode1 and Mode2 (Form1) : once per 10^{12} bits or less
Mode2 (Form2) and CDDA : once per 10^9 bits or less

(6) Self-diagnosis

(a) When power is switched ON: Various controllers, RAM, buffer

8. SAFETY STANDARDS

The drive complies with the following safety standards:

(1) UL standard
(2) C-UL standard
(3) TÜV standard
(4) CE standard

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9. FRAME GROUND

The frame of the drive is electrically connected to 0Vdc.

10. POWER INTERFACE

10.1 Power Supply Used

The following specifications apply to the power interface connector of the drive.

(1) DC +12V

(a) Operating voltage range : ± 5% (11.4 ~ 12.6V)

(b) Allowable ripple voltage : 120mVp-p or less (including spike noise)

(c) Current consumption : Refer to Table 10.1-1. (excluding 10ms or less)

(Table 10.1-1) Current consumption

	12V	5V
Standby	20mA	70mA
Read	700mA	550mA
Start	1,300mA	800mA
Seek	800mA	800mA

(2) DC +5V

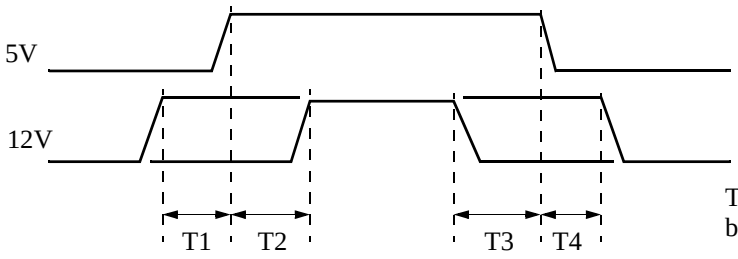
(a) Operating voltage range : ± 5% (4.75 ~ 5.25V)

(b) Allowable ripple voltage : 100mVp-p or less (including spike noise)

(c) Current consumption : Refer to Table 10.1-1. (excluding 10ms or less)

(3) Power sequence

The sequence shall be as shown below.



T1, T2, T3 and T4 shall be within 50 ms.

10.2 Power Interface Connector and Cable

(1) Power interface connector

(a) Drive side connector : 53109-0410 MOLEX or equivalent

(b) Number of pins : 4

(c) Protection method for mis-connection: Mechanical protection by the shape of the connector's housing.

(d) Connector pin diagram : Refer to Fig.10.2-1.

(e) Connector layout : Refer to Fig.10.2-1.

(f) Pin number chart : Refer to Table 10.2-1.

(g) Cable side matched connector : 8981-4P MOLEX

Matched pin : 8980-3L MOLEX or equivalent.

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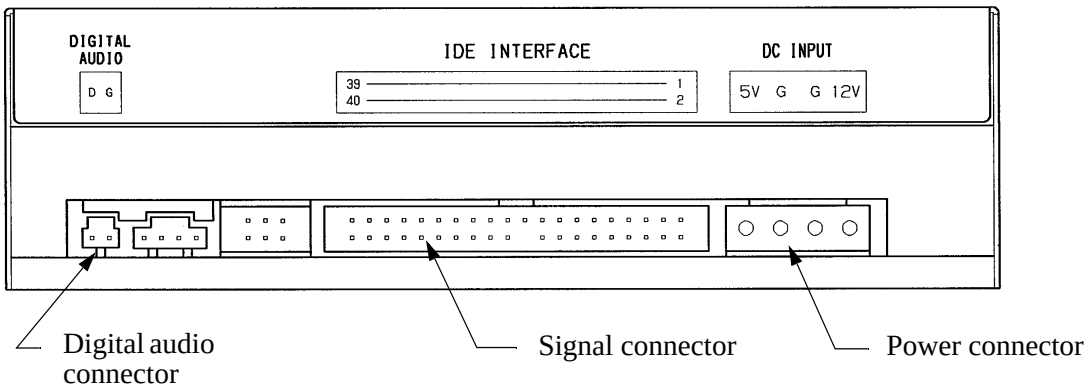
(2) Power cable : The maximum current consumption of this drive and voltage at the power connector should be taken into consideration.

(Table 10.2-1) Power interface connector pin number

Pin No.	Power
1	+12Vdc
2	0V
3	0V
4	+5Vdc



(Fig. 10.2-1) Connectors and terminals (Rear view)

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11. SIGNAL INTERFACE CONNECTOR AND CABLE

(1) Signal interface connector

(a) Drive side connector : 5342-40GS1 MOLEX or equivalent

(b) Number of pins and pitch : 2.54mm (0.1 in) pitch
20 pins × 2 rows (40 pins)

(c) Connector pin diagram : Refer to Fig. 11-1.

(d) Connector layout : Refer to Fig.11-1.

(e) Connector pin-assignment table : Refer to Table 11-1.

(f) Cable side matched connector : 5320-40AGS1 MOLEX or equivalent.

(2) Signal interface cable

(a) Type : 40-conductor flat cable

(b) Conductor size : AWG28 or more

(c) Characteristic impedance : 100Ω ± 10% (recommended)

(d) Maximum cable length : 0.46m

(Table 11-1) Signal interface pin-assignment table

No.	Signal	No.	Signal
1	RESET	2	GND
3	+DD7	4	+DD8
5	+DD6	6	+DD9
7	+DD5	8	+DD10
9	+DD4	10	+DD11
11	+DD3	12	+DD12
13	+DD2	14	+DD13
15	+DD1	16	+DD14
17	+DD0	18	+DD15
19	GND	20	(KEY)
21	+DMARQ	22	GND
23	– DIOW	24	GND
25	– DIOR	26	GND
27	– IORDY	28	CSEL
29	+DMACK	30	GND
31	+INTRQ	32	– IOCS16
33	+DA1	34	– PDIAG
35	+DA0	36	+DA2
37	– CS0	38	– CS1
39	– DASP	40	GND

Remarks : The plus mark in the signal column indicates high-level true signal and the minus mark, low-level true signal.

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12. IDE HARDWARE INTERFACE

12.1 Outline

(1) Applicable standard

ANSI standard : X3T13/1153D (ATA-4)

SFFC : SFF-8020i Rev. 2.6 and SFF-8090v5

12.2 COMMAND SET

12.2.1 ATA COMMAND

Refer to table 12.2.1-1.

(Table 12.2.1-1) ATA COMMAND

CODE	COMMAND
08	ATAPI SOFT RESET
E5	CHECK POWER MODE
90	EXECUTE DRIVE DIAGNOSTIC
E3	IDLE
E1	IDLE IMMEDIATE
00	NOP
A0	ATAPI PKT.
A1	ATAPI IDENTIFY DEVICE
EF	SET FEATURE
E6	SLEEP
E2	STANDBY
E0	STANDBY IMMEDIATE

12.2.2 ATAPI COMMAND

Refer to table 12.2.2-1.

(Table 12.2.2-1) List of the ATAPI commands (Sheet 1 of 2)

CODE	COMMAND
4A	GET EVENT STATUS NOTIFICATION
12	INQUIRY
BD	MECHANISM STATUS
55	MODE SELECT
5A	MODE SENSE
4B	PAUSE/RESUME
45	PLAY AUDIO (10)
A5	PLAY AUDIO (12)
47	PLAY AUDIO MSF
1E	PREVENT/ALLOW MEDIUM REMOVAL
28	READ (10)

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(Table 12.2.2-1) List of the ATAPI commands (Sheet 2 of 2)

CODE	COMMAND
A8	READ (12)
5C	READ BUFFER CAPACITY
25	READ CD/DVD CAPACITY
BE	READ CD
B9	READ CD MSF
51	READ DISC INFORMATION
44	READ HEADER
42	READ SUB-CHANNEL
43	READ TOC/PMA/ATIP
52	READ TRACK/RZONE INFORMATION
03	REQUEST SENSE
01	REZERO UNIT
2B	SEEK
BB	SET CD-ROM SPEED
1B	START/STOP UNIT
4E	STOP PLAY/SCAN
00	TEST UNIT READY
23	READ FORMAT CAPACITIES
46	GET CONFIGURATION
AC	GET PERFORMANCE
A2	SEND EVENT
B6	SET STREAMING

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13. NAMEPLATE INDICATION

13.1 Plate Attaching Position

Attach the nameplate on top of the top cover. (See Figure 3.1-1.)

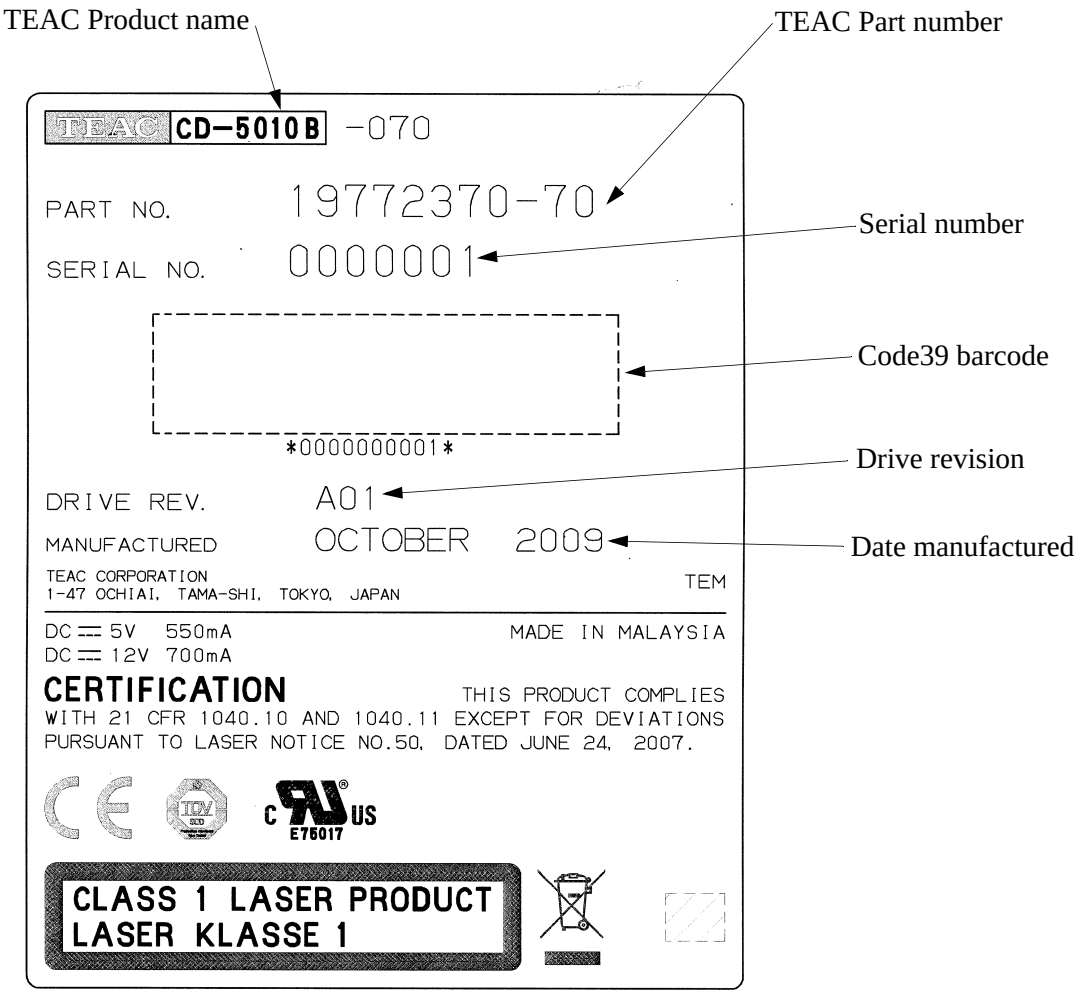
13.2 Indication Contents

(1) TEAC Product name and Part number

(Table 13.2-1) TEAC Product name and Part number

Product name	Part number
CD-5010B-070	19772370-70

(2) Serial number and Barcode
(3) Drive revision
(4) Date manufactured



(Fig. 13.2-1) Nameplate

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14. OTHERS

14.1 Safety of Laser Products

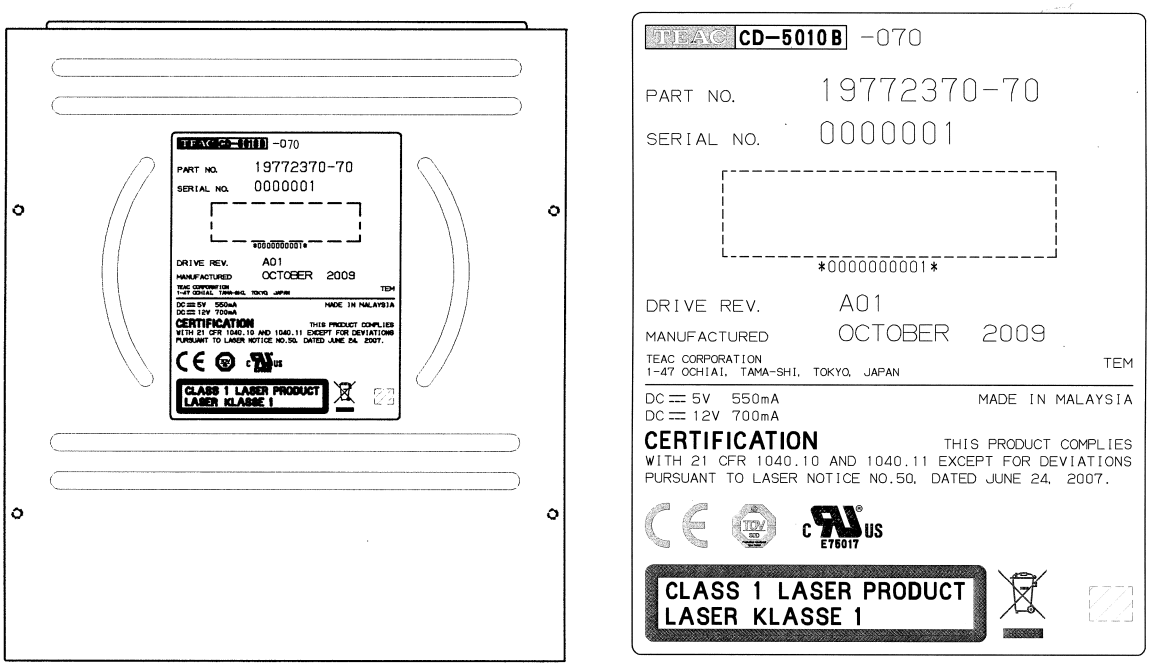
When selling this unit or a system with this unit to an end user, print the following text in the instruction manual or enclose the separate sheet on which the following text is printed with the instruction manual.

This product has been designed and manufactured according to FDA regulations "title 21. CFR. chapter1, subchapter J. based on the radiation Control for Health and Safety Act of 1968", and is classified as a class 1 laser product. There is no hazardous invisible laser radiation during operation because invisible laser radiation emitted inside of this product is completely confined in the protective housings.
The label required in this regulation is shown bellow.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Optical pickup

Type	: HOP-1501XB
Manufacturer	: Hitachi Media Electronics
Laser output	: Less than 0.5mW on the objective lens
Wavelength	: 785±22nm



(Fig. 14.1-1)

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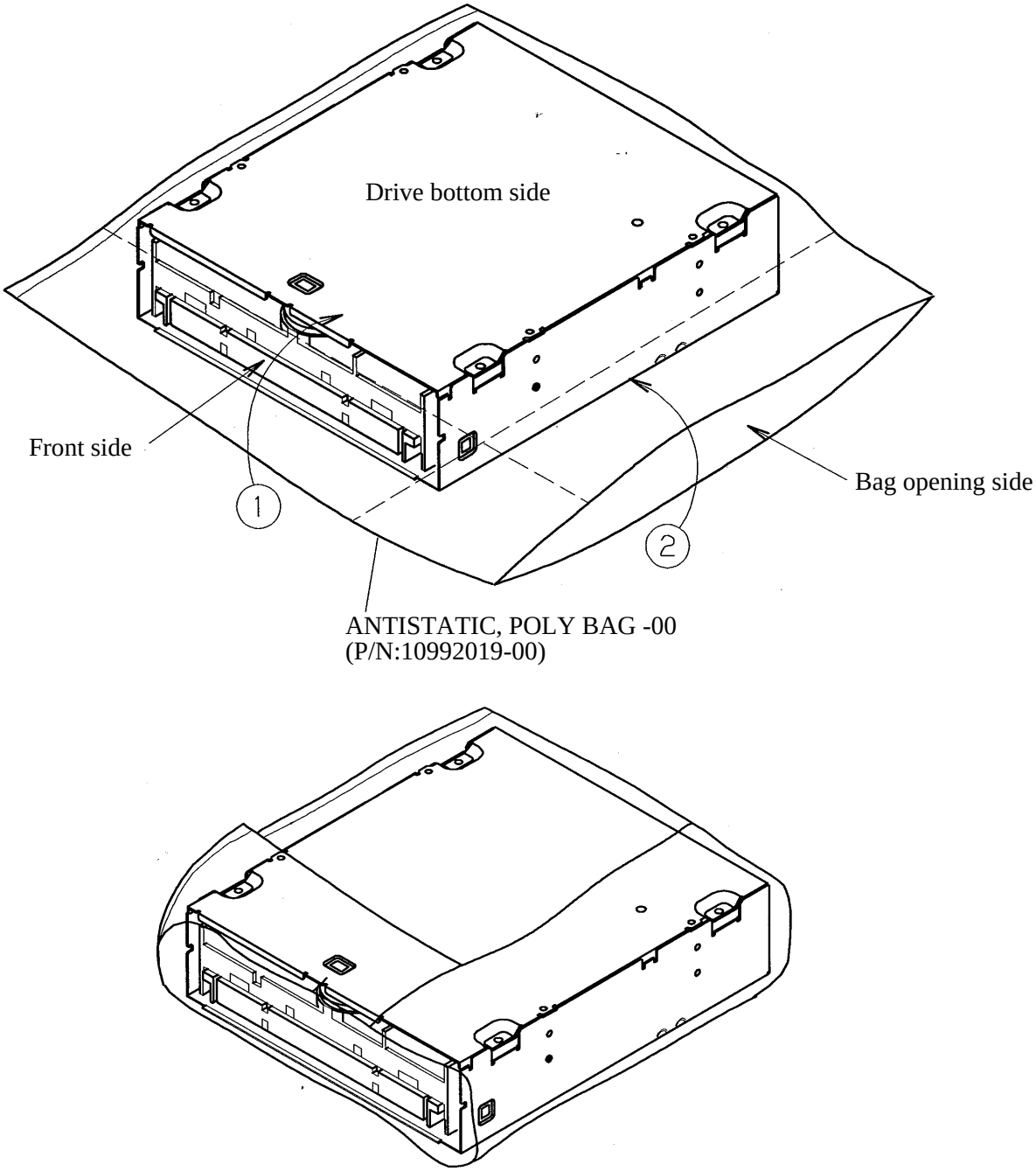
14.2 RoHS Compliance

The drive complies with European directive "2002/95//EC".

14.3 Wrapping the Drive

The drive is inserted into the antistatic poly bag fully in the direction shown in figure and the bag is folded in the order shown below to wrap without flexure in the bag.



(Fig. 14.3-1) Wrapping the drive

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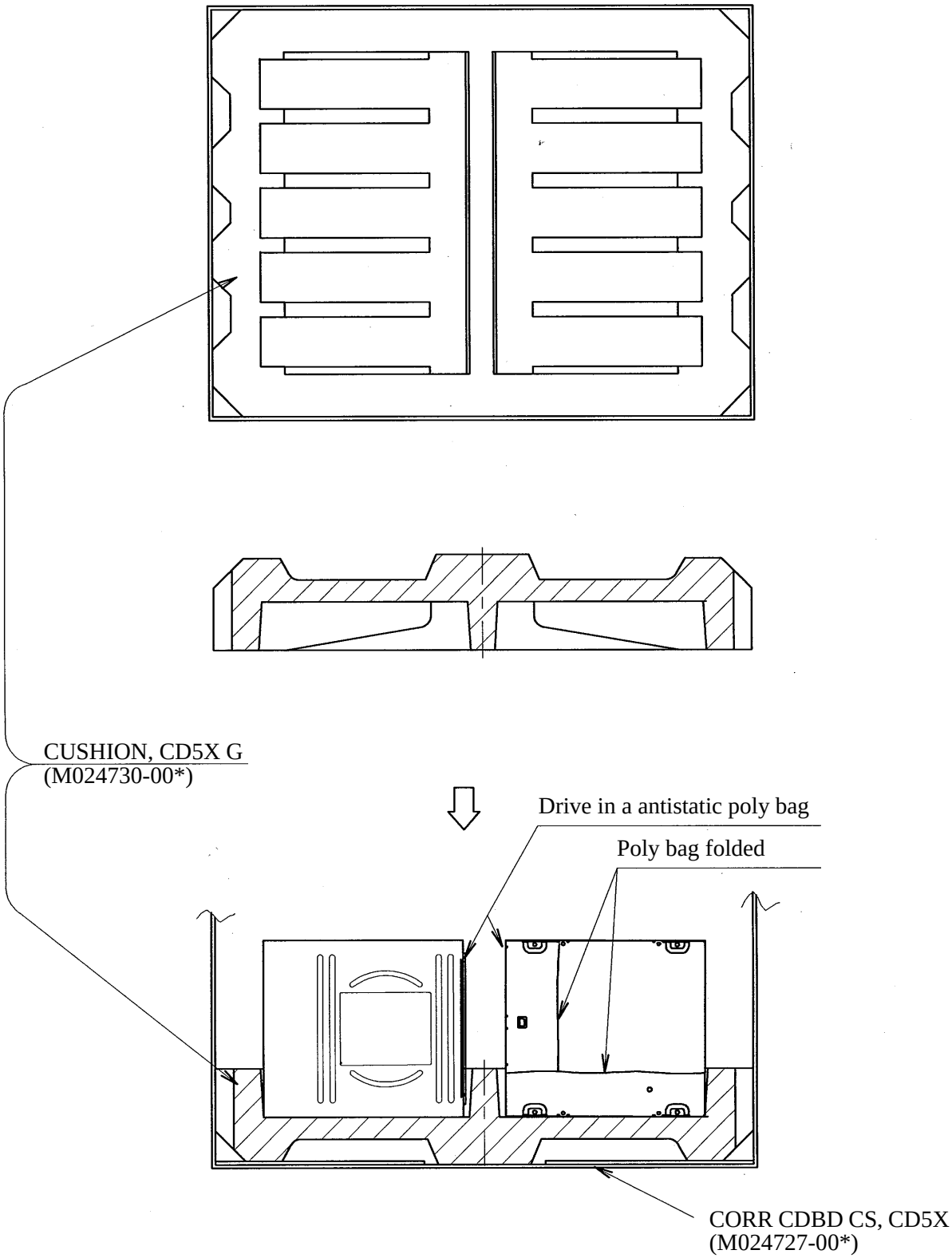
14.4 Inserting the Drive

The drive wrapped in the antistatic poly bag is inserted into the CUSHION LOWER in the direction shown in figure, and the CUSHION UPPER is set on the drives.



(Fig. 14.4-1) Inserting the drives into the package

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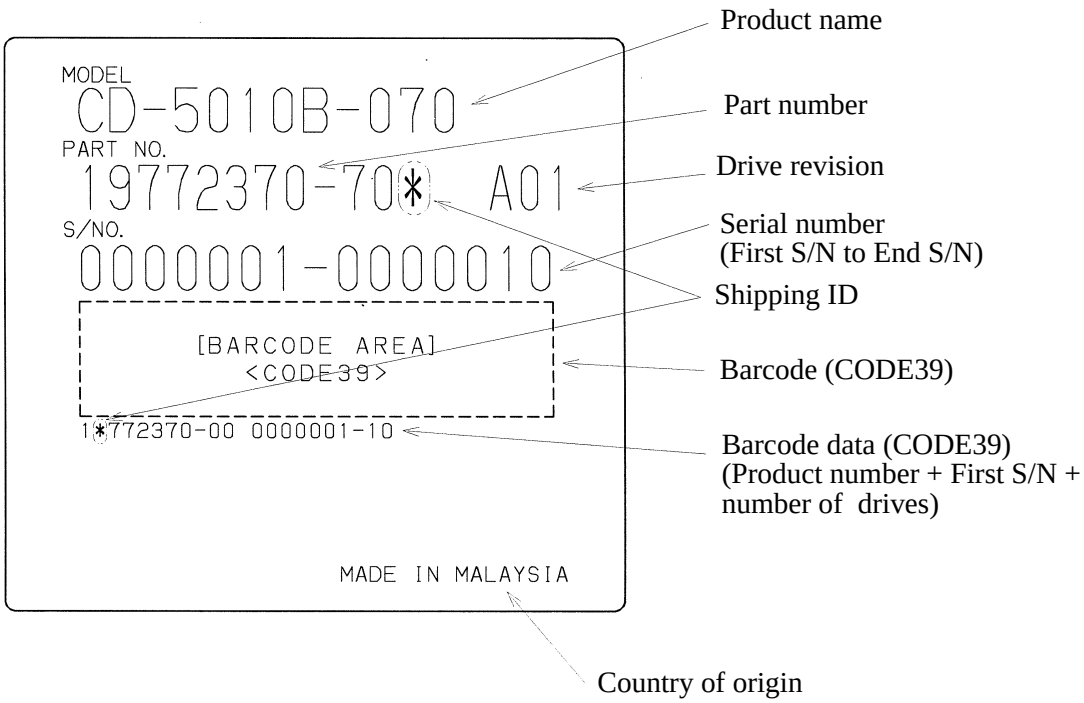
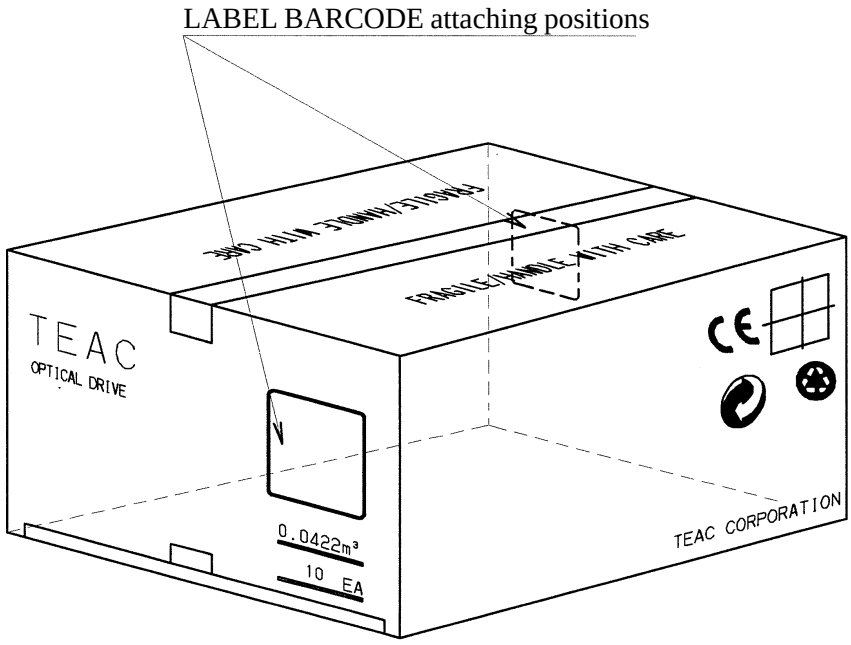
14.5 Closing the External Package Using Tape and Indications



(Fig. 14.5-1) LABEL BARCODE contents



Close the external package using tape. (I-shape attaching)
Tape : 14809645
P-P TAPE (#40)

(Fig. 14.5-2) Attaching positions of the LABEL BARCODE and packing appearance

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