

DVD-ROM DRIVE UNIT

LK-RV624D

INSTRUCTION MANUAL

Please read through these instructions before operating this unit.

Interface : ATAPI

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TABLE OF CONTENTS

IMPORTANT SAFETY NOTICE

1. PRECAUTIONS WHEN OPERATING	A-5
1.1 PRECAUTIONS WHEN TRANSPORTING	A-5
1.2 INSTALLATION LOCATION	A-5
1.3 PRECAUTIONS FOR USE	A-5
1.4 PRECAUTIONS FOR OPERATION	A-5
1.5 PRECAUTIONS WHEN HANDLING DISCS	A-5
2. PARTS AND FUNCTIONS	A-7
2.1 FRONT VIEW	A-7
2.2 REAR VIEW	A-8
2.3 SIDE VIEW	A-8
3. CONNECTIONS	A-9
3.1 CONNECTING VIEW	A-9
4. GUIDE TO OPERATION	A-10
4.1 INSTALLATIONS	A-10
5. GENERAL DESCRIPTION	A-11
5.1 FEATURE SUMMARY	A-11
5.2 POWER SAVING	A-11
6. SPECIFICATION SUMMARY	A-12
6.1 PERFORMANCE	A-12
6.2 ERROR RATES	A-13
6.3 AUDIO PERFORMANCE	A-13
6.4 GENERAL PERFORMANCE	A-13
6.5 ENVIRONMENTAL CONDITIONS	A-13
6.6 PICK UP LASER	A-13
7. BEFORE REQUESTING SERVICE	A-14
7.1 TROUBLESHOOTING	A-14

IMPORTANT SAFETY NOTICE

NOTICE

- (1) You may not reproduce or transcribe any part of this publication without permission.
- (2) We reserve the right to revise this document at any time without notice.
- (3) If you have any questions about this document, contact your sales representative.

SAFETY NOTICE

- (1) To prevent fire or electric shock, do not expose this appliance to rain or moisture.
- (2) To avoid electric shock or damage to the eyes due to laser beam, do not attempt to disassemble the cabinet.

For USA

FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO FREQUENCY INTERFERENCE STATEMENT

Class B Computing Device

NOTE : This equipment has been tested and found to comply with the limits for a Class **B** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and , if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures :

- - Reorient or relocate the receiving antenna.
- - Increase the separation between the equipment and receiver.
- - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- - Consult the dealer or an experienced radio/TV technician for help.

FCC WARNING : Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CAUTION :

Use shielded connecting cables in order to meet FCC emission limits and also to prevent interference to nearby radio and television reception.

LASER SAFETY INFORMATION

Class 1 LASER Product

This equipment is certified to comply with DHHS Rule 21 CFR Chapter 1, Subchapter J in effect as of date of manufacture.

Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN60825 for Class 1 laser products.

Class 1 laser products are not considered to be hazardous. To ensure continued product safety, the following precautions should be heeded. This equipment has the Optical Pickup which has the Dual Lasers (DVD & CD).

Caution :

- (1) The use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- (2) Do not open the drive unit; no user adjustments or serviceable parts are inside.



- This label is attached to the inner side of the bottom case in the drive unit.



CAUTION - LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM.
VORSICHT- LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET. NICHT IN DEN STRAHL BLICKEN.
ADVARSEL- LASERSTRÅLING VED ÅBNING. SE IKKE IND I STRÅLEN.
ADVARSEL- LASERSTRÅLING NÄR DEKSEL ÅPNET. STIRR IKKE INN I STRÅLEN.
VARNING - LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD. STIRRA EJ IN I STRÅLEN
VARO ! AVATTAESSA OLET ALTTIINA LASERSÄTEILYLLE. ÄLÄ TUJUTA SÄTEESEEN.
CAUTION - INVISIBLE LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS.
VORSICHT- UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET. NICHT IN DEN STRAHL BLICKEN AUCH NICHT MIT OPTISCHEN INSTRUMENTEN.
ADVARSEL- USYNLIG LASERSTRÅLING VED ÅBNING. SE IKKE IND I STRÅLEN-HELLER IKKE MED OPTISKE INSTRUMENTER.
ADVARSEL- USYNLIG LASERSTRÅLING NÄR DEKSEL ÅPNET. STIRR IKKE INN I STRÅLEN ELLER SE DIREKTE MED OPTISKE INSTRUMENTER.
VARNING - OSYNLIG LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD. STIRRA EJ IN I STRÅLEN OCH BETRÄKTA EJ STRÅLEN MED OPTISKA INSTRUMENT.
VARO ! NÄKYMÄTÖNTÄ AVATTAESSA OLET ALTTIINA LASERSÄTEILYLLE. ÄLÄ TUJUTA SÄTEESEEN ÄLÄKÄ KATSO SITÄ OPTISEN LAITTEEN LÄPI.

- This label is attached to the bottom of the drive unit.
- Diese Aufschrift befindet sich auf der Bodenplatte des Gerätes. (For German)
- Märkningen återfinns på drivenhetens undersida. (For Swedish)
- Denne merkelappen er festet til undersiden av spilleren. (For Norwegian)
- Denne etiket er sat fast i bunden af drev-enheden. (For Danish)
- Tämä etiketti on liimattu laitteen pohjaan. (For Finnish)

For Finnish

VAROITUS! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 yllittäväälle näkymättömälle lasersäteilylle.

For Swedish

VARNING! Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

for DVD

LASER Specification

Type: Semiconductor laser GaAs
Wave Length: 658 ± 8 nm
Divergence: $\theta = 73,7^\circ \pm 3^\circ$
Output Power: 0.8 mW

Laser-Daten: (For German)

Typ: GaAs-Halbleiter-Laser
Wellenlänge: 658 ± 8 nm
Divergenz: $\theta = 73,7^\circ \pm 3^\circ$
Ausgangsleistung: 0,8 mW

Laser- specifikationer: (For Swedish)

Typ: Laserhalvedare GaAs
Våglängd: 658 ± 8 nm
Divergens: $\theta = 73,7^\circ \pm 3^\circ$
Uteffekt: 0,8 mW

LASER Spesifikasjon: (For Norwegian)

Type: Halvleder laser GaAs
Bølgelengde: 658 ± 8 nm
Divergens: $\theta = 73,7^\circ \pm 3^\circ$
Utgangseffekt: 0,8 mW

Laser Specifikationer: (For Danish)

Type: Semiconductor GaAs
Bølge-længde: 658 ± 8 nm
Divergens: $\theta = 73,7^\circ \pm 3^\circ$
Udgang-effekt: 0,8 mW

LASERin tekniset tiedot: (For Finnish)

Tyyppi: Laserpuolijohdin GaAs
Aallon pituus: 658 ± 8 nm
Hajaantumisen: $\theta = 73,7^\circ \pm 3^\circ$
Teho: 0,8 mW

for CD

LASER Specification

Type: Semiconductor laser GaAlAs
Wave Length: 775 ~ 815 nm (Typical 790 nm)
Divergence: $\theta = 57,4^\circ \pm 3^\circ$
Output Power: 0.28 mW

Laser-Daten: (For German)

Typ: GaAlAs-Halbleiter-Laser
Wellenlänge: 775 ~ 815 nm (Typisch 790 nm)
Divergenz: $\theta = 57,4^\circ \pm 3^\circ$
Ausgangsleistung: 0,28 mW

Laser- specifikationer: (For Swedish)

Typ: Laserhalvedare GaAlAs
Våglängd: 775 ~ 815 nm (Typiskt 790 nm)
Divergens: $\theta = 57,4^\circ \pm 3^\circ$
Uteffekt: 0,28 mW

LASER Spesifikasjon: (For Norwegian)

Type: Halvleder laser GaAlAs
Bølgelengde: 775 ~ 815 nm (Typisk 790 nm)
Divergens: $\theta = 57,4^\circ \pm 3^\circ$
Utgangseffekt: 0,28 mW

Laser Specifikationer: (For Danish)

Type: Semiconductor GaAlAs
Bølge-længde: 775 ~ 815 nm (Typisk 790 nm)
Divergens: $\theta = 57,4^\circ \pm 3^\circ$
Udgang-effekt: 0,28 mW

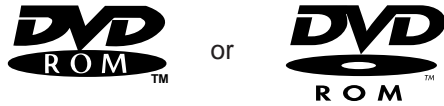
LASERin tekniset tiedot: (For Finnish)

Tyyppi: Laserpuolijohdin GaAlAs
Aallon pituus: 775 ~ 815 nm (Tyypillinen 790 nm)
Hajaantumisen: $\theta = 57,4^\circ \pm 3^\circ$
Teho: 0,28 mW

INTRODUCTION

DVD-ROM is read-only memory using a CD-ROM disc system and an audio compact disc system as a media package which handles digital data. To enjoy audio CD, please insert the Headphone plug into the Headphone jack.

This drive unit uses DVD-ROM discs which bear the following mark.



This drive unit uses CD-ROM discs which bear the following mark.



This drive unit uses CD-R discs which bear the following mark (read only).



This drive unit uses audio compact discs which bear the following mark.



CHAPTER 1 PRECAUTIONS WHEN OPERATING

1.1 PRECAUTIONS WHEN TRANSPORTING

To avoid damage

- * Keep the original packing materials for the drive unit.
- * Before you transport the drive unit, remove the disc from the drive unit and repack the drive unit in its original packing.

1.2 INSTALLATION LOCATION

Do not place unit in the following environments.

- * High-temperature, high-humidity, extreme temperature changes.
- * Dusty
- * Excessive vibration/ sudden shock.
- * Inclined place.
- * Direct sunlight.

1.3 PRECAUTIONS FOR USE

- * Never push objects of any kind through the Cabinet slots, never spill liquid of any kind on the unit.
- * Do not place objects on the product.
- * Do not attempt to service this product yourself.
- * Do not open or remove covers.
- * Do not place foreign objects in the drive unit and attempt to operate.
- * Do not use DVD-ROM drive when vertically installed.

1.4 PRECAUTIONS FOR OPERATION

To avoid error

- * Do not move the drive unit during operation.
- * Do not operate the unit directly after a sudden increase in temperature.

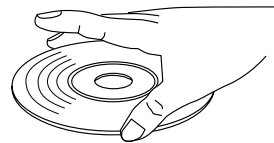
NOTE :

A great proportion of problems are usually caused by the following.

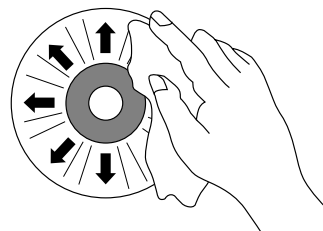
- ① Dust or Finger-prints on the surface of the disc.
- ② Random Electrical Noise.
- ③ Scratches and Defects on the surface of the disc.

1.5 PRECAUTIONS WHEN HANDLING DISCS

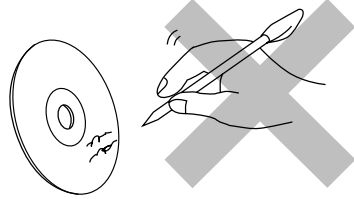
- ① Hold the disc by the edges, do not touch the surface of the disc.



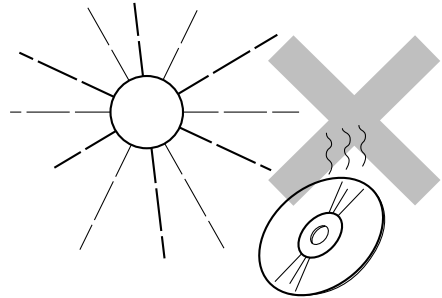
- ② To remove dust or fingerprint, use a clean, soft, dry cloth.



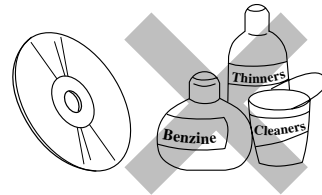
- ③ Do not write on, or paste paper to the surface of the disc.
Should not paste a large or thick label to the outer back surface (the label side) of the disc, or it generates drive vibration due to imbalance of the disc.



- ④ Do not store the disc in a place where the temperature is high.



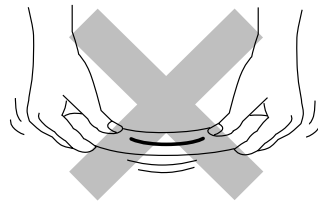
- ⑤ Do not use benzine, thinners and cleaners, etc.



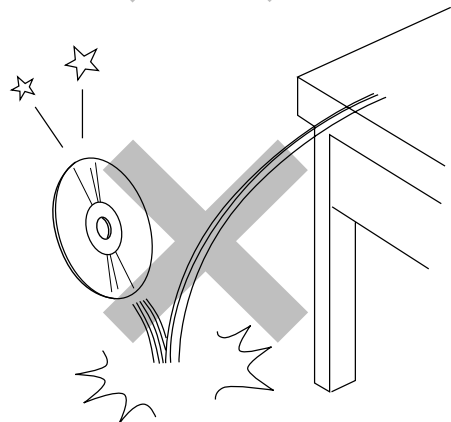
- ⑥ Do not make the center hole larger.



- ⑦ Do not bend the disc.

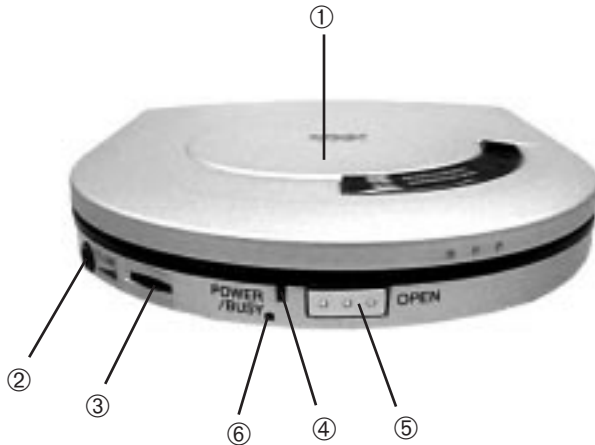


- ⑧ Do not drop the disc, or subject it to shock.



CHAPTER 2 PARTS AND FUNCTIONS

2.1 FRONT VIEW



① **DISC COVER**

Covers a disc.

② **HEAD PHONE JACK**

Headphone can be connected using a 3.5mm stereo mini plug.

③ **VOLUME**

Adjusts audio output level of Headphone.

④ **POWER / BUSY INDICATOR**

Amber lights when data is being accessed from the disc, or the drive is playing an audio CD. Green lights when power is on (Stand-by).

⑤ **OPEN BUTTON**

Opens the disc cover.

⑥ **EMERGENCY EJECT HOLE**

Insert an instrument such as straightened paper clip into this hole to manually open the disc cover. (See 4.1)

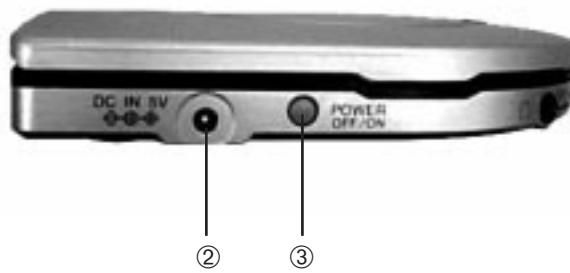
2.2 REAR VIEW



① IDE CONNECTOR

Connects to host computer's IDE interface connector.

2.3 SIDE VIEW



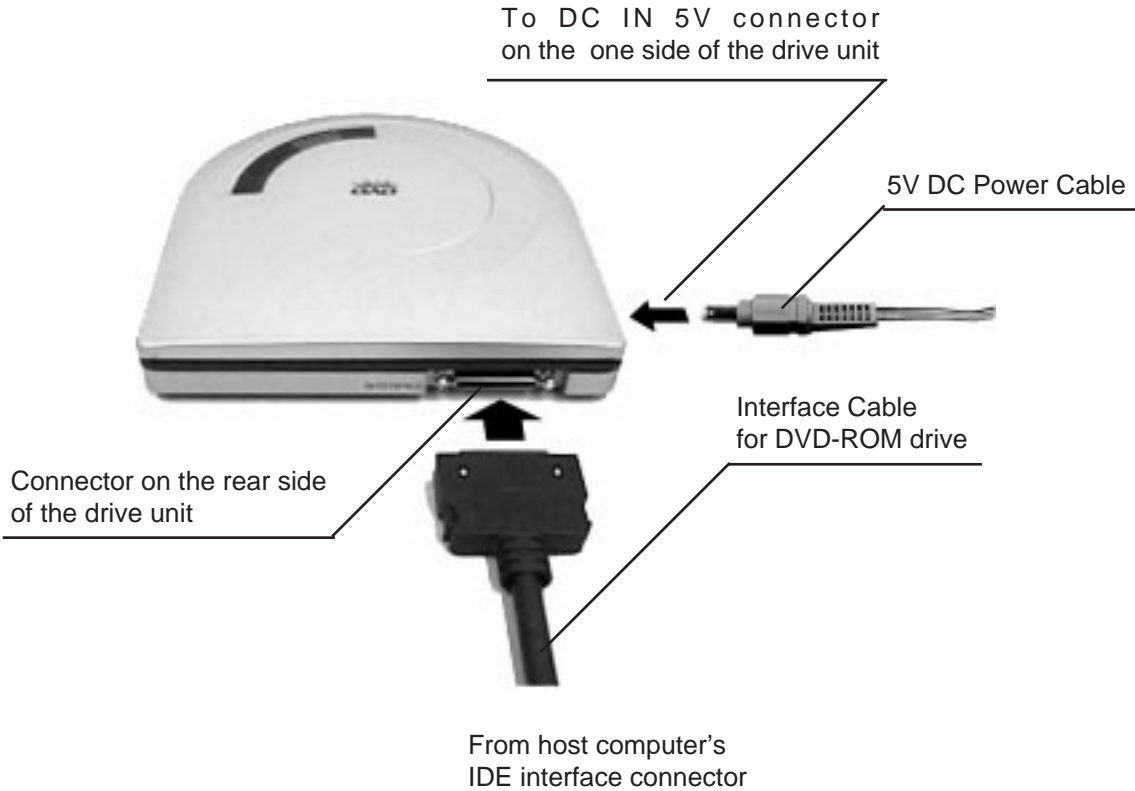
② DC (IN) CONNECTOR

Connects to 5V DC power source.

③ POWER OFF / ON SWITCH

CHAPTER 3 CONNECTIONS

3.1 CONNECTING VIEW



CHAPTER 4 GUIDE TO OPERATION

4.1 INSTALLATIONS

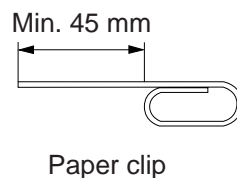
- Starting the drive.
 - ① Turn on the power supply.
 - ② Press the open button. The disc cover opens.
 - ③ Place the disc in the turn table inserting firmly the turn shaft to the disc center hole with the disc's label facing up.
 - ④ Press the disc cover to close.



CAUTION:

- Do not place any foreign objects in the drive. This could result in a malfunction.
- Do not manually force the disc cover to open.
- When the drive is not in use, keep the disc cover closed to protect against dust and dirt.

- In case of emergency, eject the tray manually
If for some reason the tray will not eject automatically, press the eject-bar (for example, insert a straightened paper clip minimum straight length = 45 mm, Diameter = 1 ~ 1.5 mm) into the emergency eject hole to manually open the disc cover. (Before proceeding with this emergency step, make sure that the power is switched OFF.)



CHAPTER 5 GENERAL DESCRIPTION

5.1 FEATURE SUMMARY

- ① Embedded ATAPI Interface.
- ② Horizontal Installation Type.
- ③ Slim Stand Alone Design.
- ④ Magnesium Body (Bottom case only).

5.2 POWER SAVING

- ① When the drive waits for a command from the Host for more than two minutes, then the drive enters Power Save Mode. Laser and Spindle motor stop.
- ② Re-start is automatic when the Host Command is received or eject button is pushed.

CHAPTER 6 SPECIFICATION SUMMARY

6.1 PERFORMANCE

① Disc diameter	12cm, 8cm
② Disc speed	
(DVD Single Layer 1x mode) *1	570 ~ 1390 r/min (CLV) *2
(DVD Dual Layer 1x mode)	630 ~ 1530 r/min (CLV)
(DVD Single Layer 6x mode)	3420 r/min (CAV) *3
(DVD Dual Layer 6x mode)	3780 r/min (CAV)
(CD 6x mode)	1284 r/min (CAV)
(CD 12x mode)	2568 r/min (CAV)
(CD 24x mode)	5243 r/min (CAV)
③ Data capacity	4.7 GBytes (DVD Single Layer) 8.5 GBytes (DVD Dual Layer) 656 MBytes (12 cm CD Disc)
④ Data transfer Rate	
Sequential (DVD 1x mode)	11.08 MBytes/s
Sequential (DVD CAV mode)	27.51 ~ 66.48 MBytes/s
Sequential (CD CAV mode)	1550 ~ 3600 KBytes/s
From buffer	16.67 MBytes/s (PIO Mode 4 without IORDY) 16.67 MBytes/s (Multi-word DMA Mode 2)
⑤ Access time	
Random access time (DVD CAV 6x mode) *4	170 ms typical
Fullstroke access time (DVD CAV 6x mode) *5	320 ms typical
Random access time (CD CAV mode) *6	120 ms typical
Fullstroke access time (CD CAV mode) *7	210 ms typical
⑥ Buffer Size	512 KBytes
MTBF	125,000 POH (duty 20%)

NOTE:

- *1 1x mode: 1x speed mode
- *2 CLV : Constant Linear Velocity
- *3 CAV : Constant Angular Velocity
- *4 Random access time (DVD) : Average Data read over the complete area from starting data recorded area(LBA:0) to maximum data recorded area(LBA:23197F), more than 2000 times including latency and layered error correction time.
- *5 Fullstroke access time (DVD) : From starting data recorded area (LBA:0) to maximum data recorded area (LBA:23197F) including latency and layered error correction time.
- *6 Random access time (CD) : Average Data read over the complete area from 00 min. 02 sec. 00 block to 59 min. 58 sec. 74 blocks, more than 2000 times including latency and layered error correction time.
- *7 Fullstroke access time (CD) : From 00 min. 02 sec. 00 block to 59 min. 58 sec. 74 blocks including latency and layered error correction time.

6.2 ERROR RATES

- Soft read errors Less than 10^{-9}
- Hard read errors Less than 10^{-12}

6.3 AUDIO PERFORMANCE

- Analog audio (Headphone)

- ① Number of channels 2
- ② Frequency response 100 Hz ~ 20 kHz
- ③ SN Ratio More than 70 dB
- ④ Distortion Less than 0.2 % (1 kHz)
- ⑤ Output level 0.60 Vrms [typical]

6.4 GENERAL PERFORMANCE

- ① Power requirement +5 V \approx 1.8 A
- ② Dimensions (W x H x D) 129 x 23 x 138.5 mm
- ③ Weight 275 g [typical]

6.5 ENVIRONMENTAL CONDITIONS

Operating

- Temperature 5 ~ 40 °C
- Humidity 20 ~ 80 %RH
(Max. wet bulb temp. is 29 °C, Non-condensation)

Non-operating

- Temperature - 10 ~ 60 °C
- Humidity 5 ~ 90 %Rh
(Non-condensation)

6.6 PICK UP LASER

① for DVD

- Type Semiconductor laser GaAs
- Wave Length 658 \pm 8 nm
- Divergence $\theta = 73.7^\circ \pm 3^\circ$
- Output power 0.8 mW

② for CD

- Type Semiconductor laser GaAlAs
- Wave Length 775 ~ 815 nm (typical 790 nm)
- Divergence $\theta = 57.4^\circ \pm 3^\circ$
- Output power 0.28 mW

CHAPTER 7 BEFORE REQUESTING SERVICE

7.1 TROUBLESHOOTING

- (1) There are many kinds of problems caused by misuse. When a problem occurs, check the table below which describes possible problems occurring with your DVD-ROM drive.
- (2) If the DVD-ROM drive is not operating correctly and you cannot restore operation by following the detailed procedures in the table below, do not remove the cover of the units or adjust further.
- (3) In the case of (2) above, unplug the unit and consult with your dealer or the nearest service station.

TROUBLE	CORRECTION
<ul style="list-style-type: none">• DVD-ROM drive does not operate and Busy Indicator does not light.	<ol style="list-style-type: none">① Confirm that the connection between the DVD-ROM drive and the host computer is correct.② Confirm that the program is correct.③ Confirm that the setting drive select switch is correct.④ Confirm that the disc has been inserted label side up.⑤ Confirm that foreign objects have not been placed in the DVD-ROM drive unit.

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.