



Serial ATA

BD/DVD/CD WRITER

DRIVE UNIT

BDR-209EBK

PRODUCT SPECIFICATION

< JB-U0395 >

< JB-K0520 >

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PIONEER CORPORATION

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1. Blank page

2. Features

Maximum Write Speed	16X CAV at BD-R 14X CAV at BD-R DL 8X PCAV at BD-R LTH 8X ZCLV at BD-R TL 6X ZCLV at BD-R QL 2X CLV at BD-RE/-RE DL/-RE TL 16X CAV at DVD-R/+R 8X Z- CLV at DVD+RW, DVD-R DL/+R DL 6X CLV at DVD-RW 5X CLV at DVD-RAM 40X CAV at CD-R 24X Z- CLV at CD-RW
Maximum Read Speed	12X CAV at BD-ROM, BD-R 10X CAV at BD-RE 8X CAV at BD-ROM DL, BD-R DL 6X CAV at BD-RE DL 6X CLV at BD-R TL, BD-R QL 4x CLV at BD-RE TL 8X CAV at BD-R LTH 16X CAV at DVD-ROM, DVD-R/+R 12X CAV at DVD-ROM DL, DVD-RW/+RW and DVD-R DL/+R DL 5X CLV at DVD-RAM 40X CAV at CD-ROM, CD-R 24X CAV at CD-RW
Buffer Memory Size	4Mbyte
ATAPI Interface	Serial ATA Revision 2.6
Data Transfer Mode	Gen1i 1.5Gbits / sec

5.25inch Half-Height built in type (Horizontal / Vertical installation available)
Supports "Buffer Under Run" protection. (BD, DVD and CD)

Supports "Bus Encryption" (BD-ROM only)

This product will obtain the certification of "Microsoft® Windows® Logo Program".
(WHQL)

This product complies to RoHS Directive and WEEE Directive.

Disc Format supported

BD-ROM (with copy protection)
BD-R Ver1.1 & 1.2 & 1.3 & 2.0 (Read / Write)
BD-RE Ver2.1 & 3.0 (Read / Write)

DVD-R Ver.2.0 & 2.1 for General (Read / Write)
DVD-R DL Ver3.0 (Read / Write)
DVD-RW Ver.1.0 & 1.1 & 1.2 (Read / Write)
DVD+R Ver.1.3 (Read / Write)
DVD+R DL Ver1.0 & 1.1(Read / Write)
DVD+RW Ver.1.3 & high speed Ver.1.0 (Read / Write)
DVD-RAM Ver.2.0 & 2.1 & 2.2 (Read / Write)

KODAK Photo CD Single and Multi-session
CD Extra (CD PLUS)
Video CD
CD text data (Read / Write)
CD-R discs (Read / Write)
CD-RW discs (Read / Write)

3. Name of Parts / Function / Setting

3.1. Front

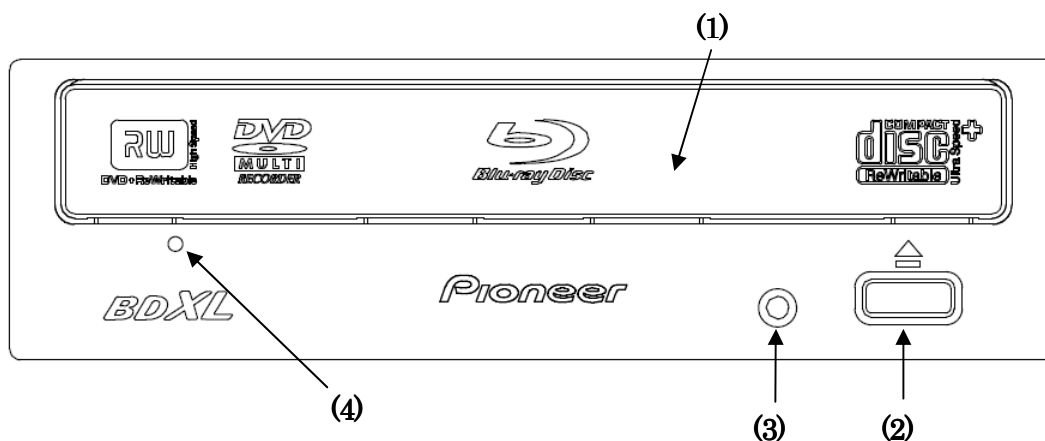


Figure 3-A: Front Panel

Disc Loading Tray (1)

Open the loading tray by pressing the eject button. And place a BD or DVD or CD disc into the slit with the label facing up.

Press the eject button or push the front part of the tray to load it with the disc.

The drive does not support to load/unload any unique shape of media: such as a heart, a hexagon and so forth.

Eject Button (2)

Press this button to unload/load the tray.

Indicator (3)

The drive status is indicated with (Yellow Green LED).

Status	Indicator
During reading	Lit
During writing	Lit
Tray open/close	Lit

Forced Eject hole (4)

Insert a stiff rod into the hole and push to eject the tray when the tray doesn't unload by pressing the eject button. In the normal operation, the eject button should be used to unload the tray. Make sure the power of the drive is turned off and wait more than one minute till the disc rotation stops when access the eject hole.

3.2 Rear

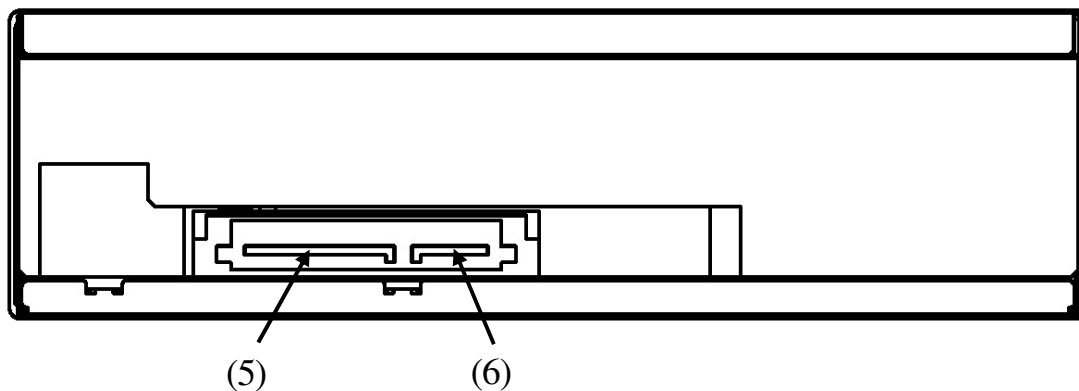


Figure 3-B: Rear Panel

DC Input (5)

Pin	Name	Function
1	V3.3	3.3 V Power (Not used)
2	V3.3	3.3 V Power (Not used)
3	V3.3	3.3 V Power (Not used)
4	GND	
5	GND	
6	GND	
7	V5	5 V Power
8	V5	5 V Power
9	V5	5 V Power
10	GND	
11	DAS/DSS	Device Activity Signal / Disable Staggered Spin-up (Not used)
12	GND	
13	V12	12 V Power
14	V12	12 V Power
15	V12	12 V Power

SATA Interface (6)

To connect the SATA port in the computer, use 7pin cable.

Total length of the cable must be less than 1m according to the SATA specifications.

Pin	Name	Function
1	GND	
2	A+	Differential Signal Pair A
3	A-	
4	GND	
5	B-	Differential Signal Pair B
6	B+	
7	GND	

4. Power Supply

4.1. Input Voltage

Normal DC Input Voltage	+5V	+12V
Voltage Allowance	+/- 5%	+/- 10%
Ripple Voltage	100 mVp-p	200 mVp-p

4.2. Rated Power

+5V	+12V
1.4A	2.2A

4.3. Current and Power Consumption

Conditions		+5V Current [mA]	+ 12V Current [mA]	Power Consumption [W]
Stand-by (average)	Laser OFF, Motor OFF	70	10	0.5
Write (average)	BD BD-R(SL) 16x CAV write	1080	1500	23.4
	DVD DVD-R(SL) 16x CAV write	850	710	12.8
	CD CD-R 40x CAV write	830	550	10.8
Read (average)	BD BD-ROM (SL) 12X CAV Read	690	600	10.7
	DVD DVD-ROM (SL) 16X CAV read	840	740	13.1
	CD CD-ROM 40x CAV read	900	600	11.7
Random (average)	Access BD-ROM (SL) random access	790	700	12.4
Maximum (Peak)	BD-R(SL) Start Up	800	2,500	34.0

Note: The current is measured with current probe and applied 1 kHz LPF to reject high frequency spikes.

5. Installation

5.1. Mounting direction

This drive can be used in both Horizontal and Vertical orientations.

Allowance tilt in operation is within +/- 5 degrees from horizontal/vertical position.

6. Environmental Conditions

6.1. Temperature and Humidity

Drive condition	Test items	Min.	Typ.	Max.	Units	Remarks
Operation	Temperature	+5	-	+45	°C	within 10°C/hour deviation within 10%/hour deviation No condensation
	Humidity	5	-	85	%RH	
	Wet Bulb Temp.	-	-	29	°C	
Non-Operation	Temperature	-20	-	+60	°C	within 10°C/hour deviation within 10%/hour deviation No condensation Storage period: 96H Before connecting DC power on a drive after low temperature storage, leave the drive 4 hours in the room temperature after the storage condition.
	Humidity	5	-	85	%RH	
	Wet Bulb Temp.	-	-	29	°C	
Transportation (packaging condition)	Temperature	-40	-	+60	°C	within 20°C/hour deviation within 20%/hour deviation No condensation Storage period: 96H Before connecting DC power on a drive after low temperature storage, leave the drive 4 hours in the room temperature after the storage condition.
	Humidity	5	-	85	%RH	
	Wet Bulb Temp.	-	-	29	°C	

6.2. Vibration

Drive condition	Test items	Test condition	Criteria
Operation <Sweep vibration>	Acceleration	0.25 G peak	No error occurs during the operation Nor error is found during the operation after this test.
	Frequency	10 ~ 300Hz	
	Sweeping	1 octave/minute	
	Test Cycle	1 cycle/axis	
Operation <Random>	Acceleration	0.4 G peak	No error occurs during the operation Nor error is found during the operation after this test.
	Frequency	5 ~ 800Hz	
	Test mode	Random	
	Testing Time	5 minutes/axis	
Non-Operation <Sweep>	Acceleration	2 G peak	No damage is found on the drive after this test
	Frequency	7 – 300Hz	
	Sweeping	1 octave/minute	
	Testing Cycle	1 cycle/axis	
Transportation (packaging condition)	X-direction	5-50Hz : 0.7G, 15 minutes	No damage is found on the drive after this test The drive works normally after each cycle test.
	Y-direction	5-50Hz : 0.7G, 15 minutes	

6.3. Shock

Drive condition	Test item	Test Condition	Criteria
Operation	Acceleration	1G peak	No error occurs during the operation. Nor error is found during the operation after this test.
	Pulse	11 msec (half-sine)	
	Number of pulse	10 times x 10 sec interval 6 directions	
Non-Operation <Half-sine>	Acceleration	150 G	No damage is found on the drive after this test
	Pulse	3 msec	
	Number of pulse	1 pulse (in 6 directions)	
Non-Operation <Square wave>	Acceleration	60 G	No damage is found on the drive after this test
	Pulse	180 inch/sec	
	Number of	6 directions	
Transportation (packaging condition)	Height	70 cm	The test is done with packaging condition. No damage is found on the drive after this test The drive works normally after this test.
	Direction	1 corner, 3 edges, 6 faces	

6.4. ESD (Electro Static Discharge Susceptibility)

Drive condition	Test Item	Test Condition	Criteria
Operation	Voltage	+/- 4 kV (contact) +/- 10 kV (in air)	Standard: IEC61000-4-2 No drive error.
	Charge Capacitor	150 pF	
	Discharge Resistor	330 ohm	
Non-Operation	Voltage	+/-8 kV (contact) +/- 15kV (in air)	Standard: IEC61000-4-2 No hardware damage.
	Charge Capacitor	150 pF	
	Discharge Resistor	330 ohm	

7. Specifications

7.1. Disc Format

DISC Format	Write	Read
BD-ROM Ver.1.0 (Single Layer, Dual Layer)	N/A	Y
BD-R Ver.1.1, 1.2, 1.3 (Single Layer)	Y	Y
BD-R Ver.1.1, 1.2, 1.3 (Dual Layer)	Y	Y
BD-R Ver.2.0 (Triple Layer)	Y	Y
BD-R Ver.2.0 (Quadruple Layer)	Y	Y
BD-R LTH Ver.1.2, 1.3	Y	Y
BD-RE Ver.2.1(Single Layer)	Y	Y
BD-RE Ver.2.1(Dual Layer)	Y	Y
BD-RE Ver.3.0 (Triple Layer)	Y	Y
DVD (DVD-5; Single layer, Single side 4.7Gbytes)	N/A	Y
DVD (DVD-9; Dual layer, Single side 8.54Gbytes)	N/A	Y
DVD (DVD-10; Single layer, Dual side 9.4Gbytes)	N/A	Y
DVD (DVD-18; Dual layer, Dual side 17.09Gbytes)	N/A	Y
DVD-R Ver.1.0 (for authoring 3.95Gbytes)	N	Y
DVD-R Ver.2.0 (for authoring 4.7Gbytes)	N	Y
DVD-R Ver.2.0 and 2.1 (for general 4.7Gbytes)	Y	Y
DVD-R DL (Dual Layer) Ver.3.0 (8.54Gbytes)	Y	Y
DVD-RW Ver.1.0, 1.1 and 1.2	Y	Y
DVD-R download	N	Y
DVD+R Ver.1.0, 1.1, 1.2, 1.3	Y	Y
DVD+R DL Ver.1.0 and 1.1 (8.54Gbytes)	Y	Y
DVD+RW Ver.1.1, 1.2, 1.3.	Y	Y
DVD+RW high speed Ver.1.0	Y	Y
DVD-RAM Ver.2.0, 2.1, 2.x	Y	Y
CD-ROM Mode1	N/A	Y
CD-ROM XA Mode2 (form 1, form2)	N/A	Y
Photo CD (single and multiple session)	Y(*1)	Y
Video CD	Y(*1)	Y
CD-DA	Y(*1)	Y
CD-Extra, CD-Text	Y(*1)	Y
CD-Text	Y(*1)	Y
CD-R	Y	Y
CD-RW (Supports AM2)	Y	Y
HS CD-RW (Supports AM2)	Y	Y
US CD-RW (Supports AM2)	Y	Y
US+ CD-RW (Supports AM2)	Y	Y

Notes: (*1) Recording Software's support is required.

7.2. Read Speed

DISC Format	Transfer Speed
BD-ROM (Single layer)	12X CAV
BD-ROM (Dual layer)	8X CAV
BD-R (Single layer)	12X CAV
BD-R (Dual layer)	8X CAV
BD-R (Triple layer)	6X CLV
BD-R (Quadruple layer)	6X CLV
BD-R LTH	8X CAV
BD-RE (Single layer)	10X CAV
BD-RE (Dual layer)	6X CAV
BD-RE (Triple layer)	4X CAV
DVD-ROM (Single layer)	16X CAV
DVD-ROM (Dual layer)	12X CAV
DVD-R /+R (Single layer)	16X CAV
DVD-R DL(Dual Layer)/+R DL (Double Layer)	12X CAV
DVD-R download	16X CAV
DVD-RW/+RW	12X CAV
DVD-Video (Single layer, Dual layer)	5X CAV
DVD-RAM	5X CLV
CD-ROM	40X CAV
Video CD	9.3X CAV
CD-DA (Play audio)	9.3X CAV
CD-DA (Data extraction)	24X CAV
CD-Extra	9.3X CAV
CD-R	40X CAV
CD-RW	24X CAV

Note: The speeds for Recordable/Rewritable media listed here are the one when it is finalized.

The read speed on not finalized disc is the same speed as writing mode. The default write speed is maximum speed which drive supports.

The read speed will be slow down automatically in case uncorrectable read error happens while disc read to ensure better reading.

In the worst case, the speed might be slow down to 1X CLV at BD, 2X CLV at DVD reading.

7.3. WriteSpeed

Media Type	Transfer Speed
BD-R (Single Layer)	2X CLV(*1)
	4X CLV
	6X Z-CLV
	8X Z-CLV, P-CAV
	10X Z-CLV, P-CAV
	12X CAV
	16X CAV
BD-R (Dual Layer)	2X CLV(*1)
	4X CLV
	6X Z-CLV
	8X Z-CLV, P-CAV
	10X Z-CLV, P-CAV
	12X CAV
	14X CAV
BD-R (Triple Layer)	2X CLV
	4X CLV
	6X CLV
	8X ZCLV
BD-R (Quadruple Layer)	2X CLV
	4X CLV
	6X CLV
BD-R LTH	2X CLV(*1)
	4X CLV
	6X Z-CLV
	8X P-CAV
BD-RE (Single Layer, Dual Layer)	2X CLV(*1)
BD-RE (Triple Layer)	2X CLV

DVD-R (Single Layer)	1X CLV(*1)
	2X CLV(*1)
	4X CLV(*1)
	6X CLV(*1)
	8X Z-CLV(*1)
	8X P-CAV
	12X Z-CLV
	12X P-CAV
	16X CAV
DVD-R DL(Dual Layer)	2X CLV(*1)
	4X CLV(*1)
	6X CLV(*1)
	8X Z-CLV(*1)
DVD-RW	1X CLV(*1)
	2X CLV(*1)
	4X CLV(*1)
	6X CLV(*1)
DVD+R(Single Layer)	2.4X CLV(*1)
	4X CLV(*1)
	6X CLV(*1)
	8X Z-CLV(*1)
	8X P-CAV
	12X Z-CLV
	12X P-CAV
	16X CAV
DVD+R DL(Double Layer)	2.4X CLV(*1)
	4X CLV(*1)
	6X CLV(*1)
	8X Z-CLV(*1)
DVD+RW	2.4X CLV(*1)
	3.3X CLV(*1)
	4X CLV(*1)
	6X CLV(*1)
	8X Z-CLV(*1)
DVD-RAM	2X CLV(*1)
	3X CLV(*1)
	5X CLV(*1)

CD-R		4X CLV(*1)
		10X CLV(*1)
		16X CLV(*1)
		24X Z-CLV
		24X P-CAV
		32X Z-CLV
		32X P-CAV
		40X CAV
	CD-RW	Normal & HS
HS & US		10X CLV(*1)
US & US+		16X CLV(*1)
		24X Z-CLV

Note: The writing speeds with mark (*1) are the speed for both 80/120 mm discs, the other speeds without (*1) are only for 120 mm discs.

7.4. Applicable Write Format

BD-RE (SL/DL/TL)	Random Recording
BD-R (SL/DL/TL/QL)	Sequential Recording
DVD-R (SL/DL)	Disc at Once Incremental Recording (Multi-Border Recording)
DVD-RW	Restricted Overwriting Disc at Once Incremental Recording (Multi-Border Recording)
DVD+R (SL/DL)	Sequential Recording (Multi-Session Recording)
DVD+RW	Random Recording
DVD-RAM	Random Recording
CD-R and CD-RW	Disc at Once Track at Once Session at Once Packet Recording

7.5. Disc Size Diameter

φ120mm / φ80mm

- * An 80mm disc cannot be used when the drive is vertical mounted.
- * The drive does not support disc adapter to be attached on 80mm disc.
- * The drive does not support non-standard discs such as Shaped or Biz Card size discs.

7.6. Sustained Data Transfer Rate

Data Read

Parameter		Inner	Ave.	Outer	Unit	Remarks
Sustained	BD	20,700	-	54,000	Kbytes /sec	4.6X – 12X CAV mode over24 Block Transfer
	DVD	8,910	-	21,600		6.6X – 16X CAV mode over16 Block Transfer
	CD	2,580	-	6,000		17.2X – 40X CAV mode over16 Block Transfer

Note: The value of “DVD” is specified when DVD-ROM Single Layer Disc is used.

The value of “BD” is specified when BD-ROM Single Layer Disc is used.

The above values are theoretical value and actual performance might be lower than specs when reading due to condition of disc.

Data Write

Parameter		Inner	Ave.	Outer	Unit	Remarks
Sustained	BD-R	29,700	-	72,000	Kbytes /sec	16X CAV BD-R write
	DVD-R /+R	8,910	-	21,600		16X CAV DVD-R/+R write
	CD-R	2,580	-	6,000		40X CAV CD-R write

Notes: The drive automatically slow down disc rotation speed to ensure data reading when unbalanced, warped or scratched disc is read, then data transfer rate becomes lower in this case than its specifications in normal.

The transfer rate at CD-ROM read is specified when 1.3m scanning velocity disc is played.

7.7. Buffer Memory Size

4Mbytes

7.8. Access Time/Seek Time

Parameter		Typ. [msec]	Remarks
Random Access Time	BD	180	Random Average
	DVD (-R/RW) (+R/RW)	170(170) (170)	
	CD	160	
Random Seek Time	BD	160	Random Average
	DVD (-R/RW) (+R/RW)	150(150) (150)	
	CD	140	
Full Stroke Seek Time	BD	270	Average
	DVD (-R/RW) (+R/RW)	270 (270) (270)	
	CD	250	

Note: The value of "CD" is specified when CD-ROM Mode1 Disc is used.

The values of "DVD" "BD" are specified when ROM Single Layer Discs are used.

7.9. Initializing Time/Stop Time

Parameter		Spec [sec] (Typical)	Remarks
Initializing Time	BD-ROM(S)	4	The period between disc spin up and pause on the first address after TOC reading. Takes 4 more sec. for BCA disc.
	BD-ROM(D)	5	
	BD-RE	9	
	BD-R	8	
	DVD-ROM(S)	6	
	DVD-ROM(D)	8	
	DVD-R (+R)	8(8)	
	DVD-RW(+RW)	8(8)	
	DVD-RAM	20	
	CD	7	
	CD-R	8	
CD-RW	8		
Stop Time	BD, DVD, CD	6	The period between pause condition and spindle stop condition by stop command.

Note: The value of "CD" is specified when CD-ROM Mode1 Disc is used.

The values of "DVD" "BD" are specified when ROM Single Layer Discs are used.

7.10. Unloading Time

Parameter	Spec [sec]	Remarks
Unloading Time	Less than 2.7	The period the eject button is pressed when the disc is stop condition and unloaded completely.

7.11. Acoustic

Item	Spec. [dB (A)]	Remarks
Sound Pressure (ISO7779:Operator Position)	Less than 47	Without loading operation, with 0.15 imbalance disc at 9,700 rpm. Sequential read and random seek operation.

8. Dimensions/Weight/Packing

8.1. Dimensions/Weight

Dimensions: W148mm x D180mm x H42.3mm (Including Front Bezel)

Net Weight: 740g

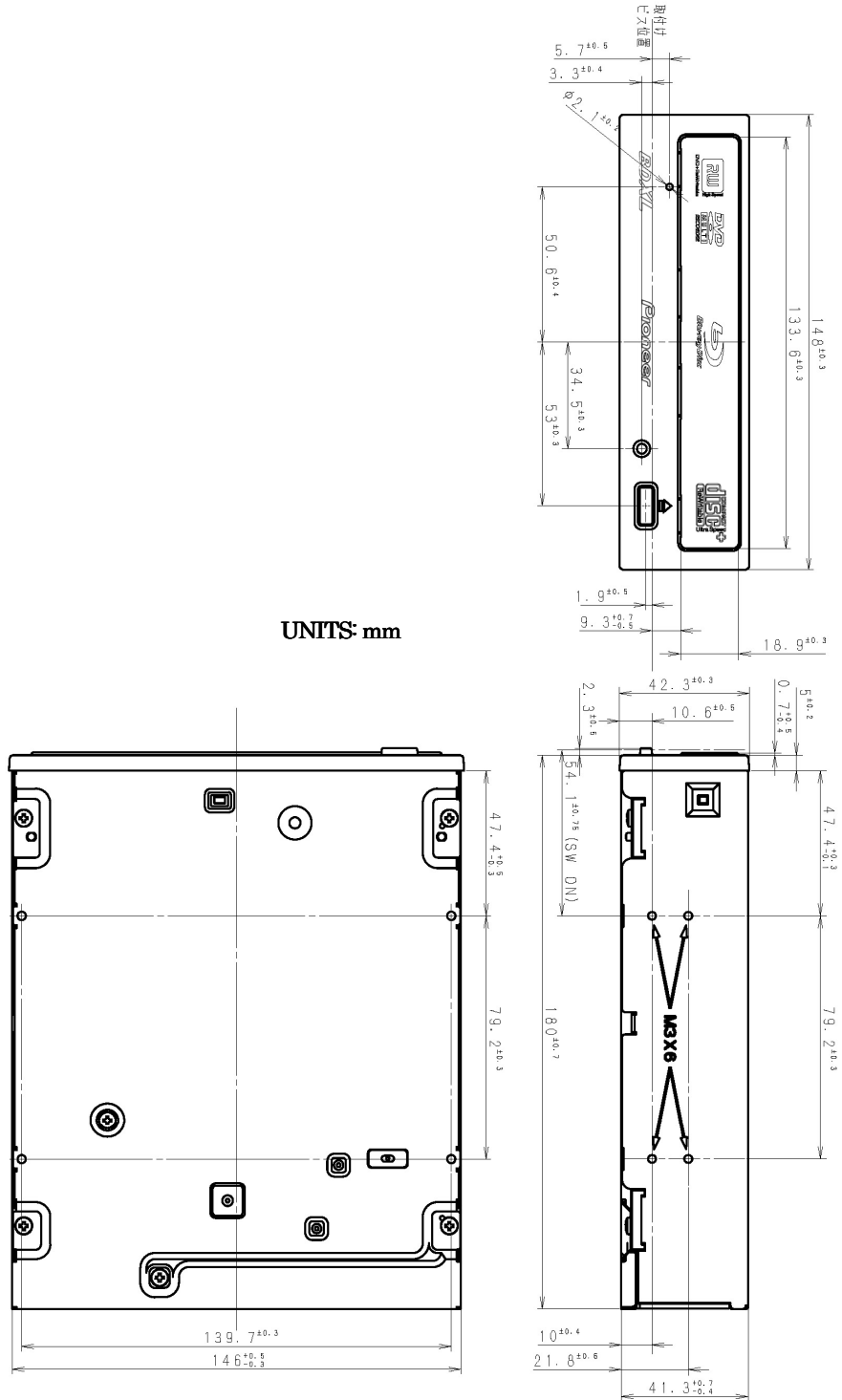


Figure 8-A: Dimensions

8.2. Dimensions and Weight of Packing Box

Dimensions: W530mm x D350mm x H245mm.

Gross Weight: 9.0kg

8.3. Packaging Condition

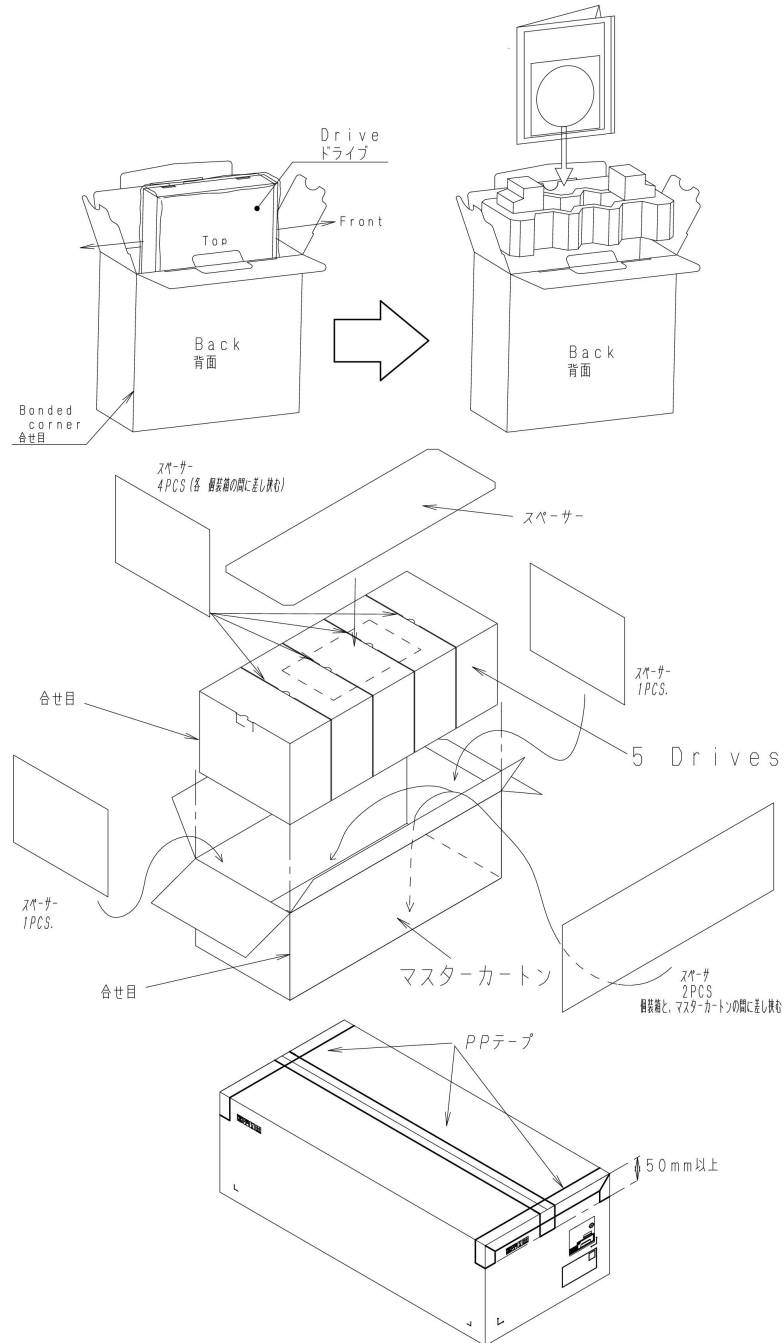


Figure 8-B: Packaging condition

9. Safety and Radiation

9.1. Safety Regulation

(UL)	UL60950-1 2nd Edition
(cUL)	CSA-C22.2 No.60950-1-07 2nd Edition
(CB Report)	IEC 60950-1:2005(Second Edition), Am 1: 2009
(TUV)	EN60950-1: 2006 +A11:2009 +A1:2010 +A12:2011

9.2. Laser

(IEC-LASER)	IEC 60825-1 Ed.2(2007), Clauses 8 and 9
(EN-LASER)	EN 60825-1 2nd edition-2007 Caluse 8 and 9
(FDA)	FDA 21CFR Subchapter J, Laser Notice No.50

9.3. EMC

(IEC-EMC)	IEC CISPR22 : 2009
	IEC CISPR24 : 2010
(FCC)	FCC Part15 Class B
(ICES)	ICES-003 Issue 5 Class B
(CE)	EN55022:2010 Class B
	EN55024:2010
(BSMI)	CNS13438: 2006
(C-Tick)	AS/NZS CISPR22:2009

10. Reliability

The below figures are defined based on the room temperature condition.

10.1. MTBF

(Mean Time Between Failure)

60,000 POH (duty: read 20%, write 2%)

10.2. Loading/Unloading Durability

30,000 Times

11. Change History

Rev.	Date	Page	Changes (Old → Revised)
1.00	2013/10/29	-	Initial Release

12. Notes

* Specifications and drawings are subject to change according to its improvement.

* Microsoft, Windows are trademarks of Microsoft Corporation.

Serial ATA
BD/DVD/CD WRITER
DRIVE UNIT

BDR-209EBK
PRODUCT SPECIFICATION

October 29, 2013

PIONEER CORPORATION

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