

# Instructions for Use

## RadiForce® MX242W

Color LCD monitor

### **Important**









Please read this “Instructions for Use”, and “Installation Manual” (separate volume) carefully to familiarize yourself with safe and effective usage.

Please retain this manual for future reference.

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- For monitor adjustment and settings, refer to the “Installation Manual”.
  - For the latest product information including the “Instructions for Use”, refer to our web site :  
<http://www.eizoglobal.com>
-

## SAFETY SYMBOLS

This manual and this product use the safety symbols below. They denote critical information. Please read them carefully.

 <b>WARNING</b> Failure to abide by the information in a WARNING may result in serious injury and can be life threatening.	 <b>CAUTION</b> Failure to abide by the information in a CAUTION may result in moderate injury and/or property or product damage.
 Indicates a warning or caution. For example,  indicates an "electrical shock" hazard.	
 Indicates a prohibited action. For example,  means "Do not disassemble".	
 Indicates a mandatory action. For example,  means "Ground the unit".	

This product has been adjusted specifically for use in the region to which it was originally shipped. If operated outside this region, the product may not perform as stated in the specifications.

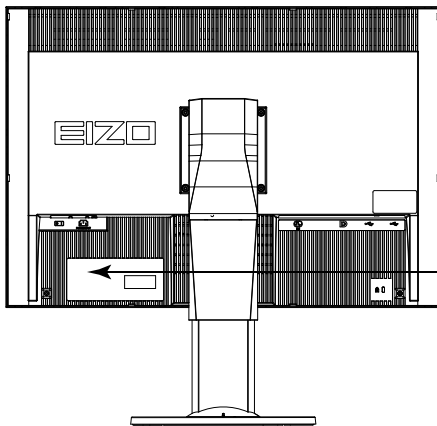
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# PRECAUTIONS

## IMPORTANT











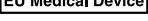




- This product has been adjusted specifically for use in the region to which it was originally shipped. If the product is used outside the region, it may not operate as specified in the specifications.
- To personal safety and proper maintenance, please read carefully this section and the caution statements on the monitor.

### Location of the Caution Statements




<p><b>WARNING</b> RISK OF ELECTRIC SHOCK. DO NOT OPEN.</p> <p><b>AVERTISSEMENT</b> RISQUE DE CHOC ELECTRIQUE. NE PAS OUVRIR.</p> <p><b>WARNUNG</b> GEFAHR DES ELEKTRISCHEN SCHLAGES. RÜCKWAND NICHT ENTFERNEN.</p> <p>警告 触电危険、请勿打开后盖。</p> <p>警告 感電の恐れあり、カバーをあけないでください。</p>
<p>The equipment must be connected to a grounded main outlet. L'appareil doit être relié à une prise avec terre. Jordet stikkontakt skal benyttes når apparatet tilkobles datanett. Apparaten skall anslutas till jordat nätuttag. 设备必须连接到接地的电源插座。 電源コードのアースは必ず接地してください。</p>

## Symbols on the unit

Symbol	This symbol indicates
	Main Power Switch: Press to turn the monitor's main power off.
	Main Power Switch: Press to turn the monitor's main power on.
	Power button: Press to turn the monitor's power on or off.
	Alternating current
	Alerting electrical hazard
	CAUTION: Refer to "SAFETY SYMBOLS" (page 2).
	WEEE marking: Product must be disposed of separately; materials may be recycled.
	CE marking: EU conformity mark in accordance with the provisions of Council Directive and/or Regulation (EU).
	Manufacturer
	Date of manufacture
	Medical device in EU
EU Importer	Importer in EU
	Mark signifying compliance with UK regulations
	UK Responsible Person
	Authorised representative in Switzerland
	Authorised representative in the European Community

## WARNING

If the unit begins to emit smoke, smells like something is burning, or makes strange noises, disconnect all power connections immediately and contact your EIZO representative for advice.

Attempting to use a malfunctioning unit may result in fire, electric shock, or equipment damage.

### Do not open the cabinet or modify the unit.

Opening the cabinet or modifying the unit may result in fire, electric shock, or burn.



### Refer all servicing to qualified service personnel.

Do not attempt to service this product yourself as opening or removing covers may result in fire, electric shock, or equipment damage.

### Keep small objects or liquids away from the unit.

Small objects accidentally falling through the ventilation slots into the cabinet or spillage into the cabinet may result in fire, electric shock, or equipment damage. If an object or liquid falls/spills into the cabinet, unplug the unit immediately. Have the unit checked by a qualified service engineer before using it again.



### Place the unit at a sturdy and stable place.

A unit placed on an inadequate surface may fall and result in injury or equipment damage. If the unit falls, disconnect the power immediately and ask your local EIZO representative for advice. Do not continue using a damaged unit. Using a damaged unit may result in fire or electric shock.



### Use the unit in an appropriate location.

Otherwise, fire, electric shock, or equipment damage may result.

- Do not place outdoors.
- Do not place in any form of transportation (ships, aircraft, trains, automobiles, etc.).
- Do not place in dusty or humid environments.
- Do not place in locations where water may be splashed on the screen (bathrooms, kitchens, etc.)
- Do not place in locations where steam comes in direct contact with the screen.
- Do not place near heat generating devices or humidifiers.
- Do not place in locations where the product is subject to direct sunlight.
- Do not place in environments with inflammable gas.
- Do not place in environments with corrosive gases (such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine, ammonia, and ozone).
- Do not place in environments with dust, components that accelerate corrosion in the atmosphere (such as sodium chloride and sulfur), conductive metals, and so on.



**To avoid danger of suffocation, keep the plastic packing bags away from babies and children.**

### Use the enclosed power cord and connect to the standard power outlet in your country.

Be sure to use within the rated voltage of the power cord. Otherwise, fire or electric shock may result.

Power supply: 100-240Vac 50/60Hz

### To disconnect the power cord, grasp the plug firmly and pull.

Tugging on the cord may damage and result in fire or electric shock.



### The equipment must be connected to a grounded main outlet.

Failure to do so may result in fire or electric shock.





## WARNING

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### Use the correct voltage.

- The unit is designed for use with a specific voltage only. Connection to another voltage than specified in this “Instructions for Use” may cause fire, electric shock, or equipment damage.  
Power supply: 100-240Vac 50/60Hz
  - Do not overload your power circuit, as this may result in fire or electric shock.
- 

### Handle the power cord with care.

- Do not place the cord underneath the unit or other heavy objects.
- Do not pull on or tie the cord.

If the power cord becomes damaged, stop using it. Using of a damaged cord may result in fire or electric shock.



### For electrical safety, do not connect or disconnect the power cord in the presence of patients.

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### Never touch the plug and power cord if it begins to thunder.

Touching them may result in electric shock.



### When attaching an arm stand, please refer to the user’s manual of the arm stand and install the unit securely.

Otherwise, the unit may become detached, resulting in injury and/or equipment damage. Before installation, make sure that desks, walls, or any other installation surface has adequate mechanical strength. If the unit falls, please ask your local EIZO representative for advice. Do not continue using a damaged unit. Using a damaged unit may result in fire or electric shock. When reattaching the tilt stand, please use the same screws and tighten them securely.

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### Do not touch a damaged LCD panel directly with bare hands.

Liquid crystal is poisonous. If any part of your skin comes in direct contact with the panel, wash thoroughly. If liquid crystal enters your eyes or mouth, immediately flush with large amounts of water and seek medical attention.



### Fluorescent backlight lamps contain mercury (the products that have LED backlight lamps contain no mercury), dispose according to local, state or federal laws.

Exposure to elemental mercury can result in effects on the nervous system, including tremors, memory loss, and headaches.

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## CAUTION

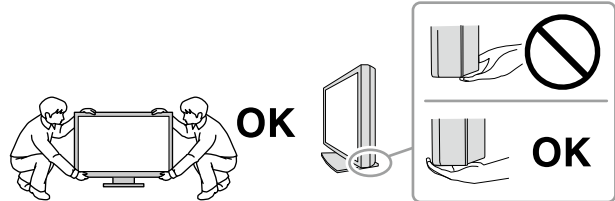
### Handle with care when carrying the unit.

Disconnect the power cord and cables when moving the unit. Moving the unit with the power cord or cables attached is dangerous and may result in injury.

### Carry or place the unit according to the correct specified methods.

- When carrying, grasp and firmly hold the unit as shown in the illustration below.
- Large-size units are heavy. Unpack or carry the unit with at least two people.

Dropping the unit may result in injury or equipment damage.



### Do not block the ventilation slots on the cabinet.

- Do not place any objects on the ventilation slots.
- Do not install the unit in a place with poor ventilation or inadequate space.
- Do not use the unit laid down or upside down.

Blocking the ventilation slots prevents proper airflow and may result in fire, electric shock, or equipment damage.



### Do not touch the plug with wet hands.

Doing so may result in electrical shock.



### Use an easily accessible power outlet.

This is to facilitate disconnecting the power in case of a problem.

### Periodically clean the area around the power plug and the ventilation slot of the monitor.

Dust, water, or oil on the plug may result in fire.

### Unplug the unit before cleaning it.

Cleaning the unit while it is plugged into a power outlet may result in electric shock.

**If you plan to leave the unit unused for an extended period of time, disconnect the power cord from the wall socket after turning off the power switch for the safety and the power conservation.**

**This product is suitable for placing near patients, but not for direct contact with patients.**

**For users in the territory of the EEA and Switzerland:**

**Any serious incident that has occurred in relation to the device should be reported to the Manufacturer and the Competent Authority of the Member State in which the user and/or patient is established.**

# Notice for this monitor

## Intended use

This product is intended to be used in displaying and viewing digital images for review and analysis by trained medical practitioners. It does not support the display of mammography images for diagnosis.

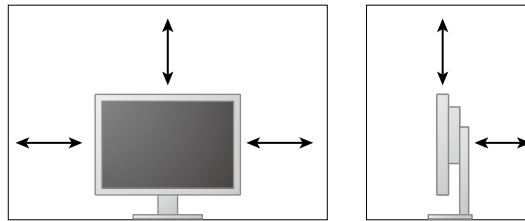
Caution: Federal law (USA) restricts this device to sale by or on the order of a physician.

### Attention

- This product may not be covered by warranty for uses other than those described in this manual.
- The specifications noted in this manual are only applicable when the following are used:
  - Power cords provided with the product
  - Signal cables specified by us
- Only use optional products manufactured or specified by us with this product.

## Installation Requirements

- Carefully read the "PRECAUTIONS" (page 3) and always follow the instructions.
- When installing the monitor in a rack, ensure that there is adequate space around the sides, back and top of the monitor.



- Position the monitor so that there is no light to interfere with the screen.
- If you place this product on a lacquer-coated desk, the color may adhere to the bottom of the stand due to the composition of the rubber.

## Maintenance

- It takes about 30 minutes for the performance of electrical parts to stabilize. Please wait 30 minutes or more after the monitor power has been turned on or the monitor has recovered from the power saving mode, and then adjust the monitor.
- Monitors should be set to a lower brightness to reduce changes in luminosity caused by long-term use and maintain a stable display. Periodically perform constancy tests. Calibrate if necessary. For details, refer to the User Manuals for the RadiCS/RadiCS LE monitor quality control software.
- Otherwise, parts (such as the LCD panel or the fan) may deteriorate in the long-term. Periodically check that they are operating normally.
- When the screen image is changed after displaying the same image for extended periods of time, an afterimage may appear. Use the screen saver or power save function to avoid displaying the same image for extended periods of time.
- If the monitor displays continuously over a long period of time, dark smudges or burn-in may appear. To maximize the life of the monitor, we recommend the monitor be turned off periodically.
- The backlight of the LCD panel has a fixed lifetime. When the screen becomes dark or begins to flicker, please contact your local EIZO representative.
- The screen may have defective pixels or a small number of light dots on the screen. This is due to the characteristics of the panel itself, and is not a malfunction of the product.



- Do not press on the panel or edge of the frame strongly, as this may result in display malfunctions, such as interference patterns, etc. If pressure is continually applied to the panel, it may deteriorate or damage your panel. (If the pressure marks remain on the panel, leave the monitor with a black or white screen. The symptom may disappear.)
- Do not scratch or press on the panel with any sharp objects, as this may result in damage to the panel. Do not attempt to brush with tissues as this may scratch the panel.
- When the monitor is cold and brought into a room or the room temperature goes up quickly, dew condensation may occur on the interior and exterior surfaces of the monitor. In that case, do not turn the monitor on. Instead wait until the dew condensation disappears, otherwise it may cause some damage to the monitor.

## Cleaning

Periodic cleaning is recommended to keep the monitor looking new and to prolong its operation lifetime.

### Attention

- Do not use chemicals on a frequent basis. Chemicals such as alcohol and antiseptic solution may cause gloss variation, tarnishing, and fading of the cabinet or panel, and also quality deterioration of the image.
- Never use any thinner, benzene, wax, and abrasive cleaner, which may damage the cabinet or panel.
- Do not let chemicals come into direct contact with the monitor.

### Note

- The optional ScreenCleaner is recommended for cleaning the cabinet and panel surface.

Gently wipe off any dirt on the cabinet or panel surface with a soft cloth soaked in a small amount of water or one of the chemicals listed below.

### Chemicals that may be used for cleaning

Material name	Product name
Ethanol	Ethanol
Isopropyl alcohol	Isopropyl alcohol
Chlorhexidine	Hibitane
Sodium hypochlorite	Purelox
Benzalkonium chloride	Welpas
Alkyldiaminoethylglycine	Tego 51
Glutaral	Sterihyde
Glutaral	Cidex Plus28

## To use the monitor comfortably

- An excessively dark or bright screen may affect your eyes. Adjust the brightness of the monitor according to the environmental conditions.
- Staring at the monitor for a long time tires your eyes. Take a 10-minute rest every hour.
- Look at the screen from a proper distance and from a proper angle.

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# Chapter 1 Introduction

Thank you very much for choosing an EIZO color LCD color.

## 1-1. Features

- 24.0" wide format LCD
- Wide-gamut panel
- Supports a resolution of 2.3 M pixels (1920 dots × 1200 lines)
- IPS panel with 178° horizontal and vertical viewing angles
- Applicable to DisplayPort (applicable to 8 bit or 10 bit, not applicable to audio signals)
- The CAL Switch function allows the user to select the display mode optimum to the displayed image.  
Refer to the Installation Manual (on the CD-ROM).
- Selectable DICOM (page 19) Part 14 complied screen.
- The quality control software "RadiCS LE" used to calibrate the monitor and to manage the history is included.  
See "1-3. EIZO LCD Utility Disk" (page 12).
- The software "ScreenManager Pro for Medical" to adjust the screen using the mouse and keyboard is included  
See "1-3. EIZO LCD Utility Disk" (page 12).
- Power saving function  
This product is equipped with power saving function.
  - 0 W power consumption when the main power is off  
Equipped with main power switch. When the monitor is not required, the power supply can be shut off using the main power switch
- Stand with wide range of movement  
The monitor can be adjusted to a position where it provides you with a comfortable and less tiring work environment.  
(Tilt: up 35°/down 5°, Swivel: 344°, Adjustable height: 110 mm (Tilt: 35°), 130 mm (Tilt: 0°))
- Long service life LED backlight LCD panel

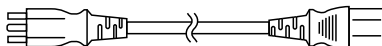
## 1-2. Package Contents

Check that all the following items are included in the packaging box. If any items are missing or damaged, contact your local EIZO representative.

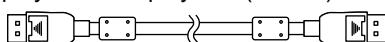
### Note

- Please keep the packaging box and materials for future movement or transport of the monitor.

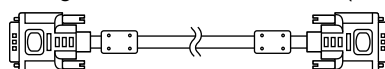
- Monitor
- Power cord



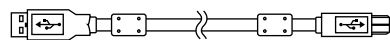
- Digital signal cable:  
DisplayPort - DisplayPort (PP300)



- Digital signal cable: DVI-D - DVI-D (DD300)



- USB cable: UU300



- Stand base



- Cable holder



- EIZO LCD Utility Disk (CD-ROM)
- Instructions for Use
- Assembling the Stand

## 1-3. EIZO LCD Utility Disk

An “EIZO LCD Utility Disk” (CD-ROM) is supplied with this product. The following table shows the disk contents and the overview of the software programs.

### ● Disk contents and software overview

The disk includes application software programs for adjustment, and Installation Manual. Refer to Readme.txt file on the disk for software startup procedures or file access procedures.

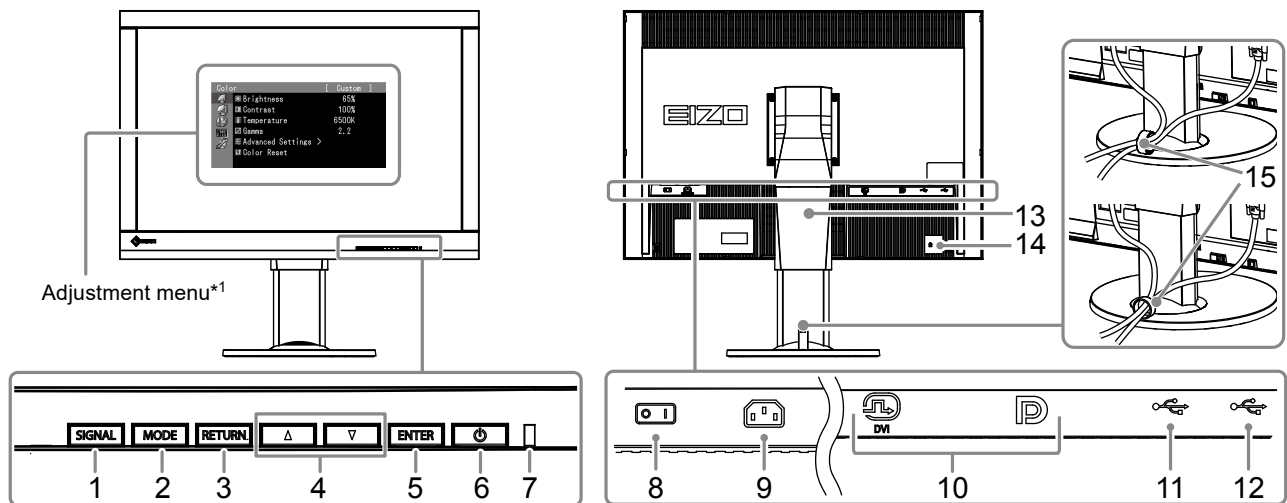
Contents	Overview
Readme.txt file	
RadiCS LE (for Windows)	Quality control software for calibrating the monitor and managing the calibration history.
ScreenManager Pro for Medical (for Windows)	Software for adjusting the screen using the mouse and keyboard.
Installation Manual of this monitor (PDF file)	
“Instructions for Use” of this monitor (PDF file)	

### ● Using RadiCS LE/ScreenManager Pro for Medical

For the installation and use of “RadiCS LE/ScreenManager Pro for Medical”, refer to the respective User’s Manual on the disk.

When using this software, you will need to connect a PC to the monitor with the supplied USB cable. For more information, refer to the Installation Manual (on the CD-ROM).

## 1-4. Controls and Functions



1. <b>SIGNAL button</b>	Switches input signals for display.
2. <b>MODE button</b>	Switches the CAL Switch mode.
3. <b>RETURN button</b>	Cancels the setting/adjustment and exits the Adjustment menu.
4. <b>▲▼ button</b>	Provides the menu selection as well as the adjustment and setting of a function.
5. <b>ENTER button</b>	Displays the Adjustment menu, determines an item on the menu screen, and saves values adjusted.
6. <b>Power button</b>	Turns the power on or off.
7. <b>Power Indicator</b>	Indicates the monitor's operation status. Green: Operating Orange: Power saving mode OFF: Main power/Power off
8. <b>Main power switch</b>	Turns the main power on or off.
9. <b>Power connector</b>	Connects the power cord.
10. <b>Input signal connectors</b>	Left: DVI-I connector / Right: DisplayPort connector
11. <b>USB upstream port</b>	Connects the USB cable to use the software that needs USB connection, or to use USB hub function.
12. <b>USB downstream port</b>	Connects a peripheral USB device.
13. <b>Stand</b>	Used to adjust the height and angle of the monitor screen.
14. <b>Security lock slot</b>	Complies with Kensington's MicroSaver security system.
15. <b>Cable holder</b>	Covers the monitor cables.

\*1 For instructions for use, refer to the Installation Manual (on the CD-ROM).

# Chapter 2 Setting Up

## 2-1. Compatible Resolutions

The monitor supports the following resolutions.

Resolution	vertical scan frequency
640 × 480	60 Hz
720 × 400	70 Hz
800 × 600	60 Hz
1024 × 768	60 Hz
1280 × 960	60 Hz
1280 × 1024	60 Hz
1600 × 1200	60 Hz
1680 × 1050	60 Hz
1920 × 1200 <sup>*1</sup>	60 Hz

\*1 Recommended resolution.

## 2-2. Connecting Cables

### Attention

- Check that the monitor and the PC are powered off.
- When replacing the current monitor with this monitor, be sure to change the PC settings for resolution and vertical scan frequency to those that are available for this monitor. Refer to the compatible resolution table before connecting the PC.

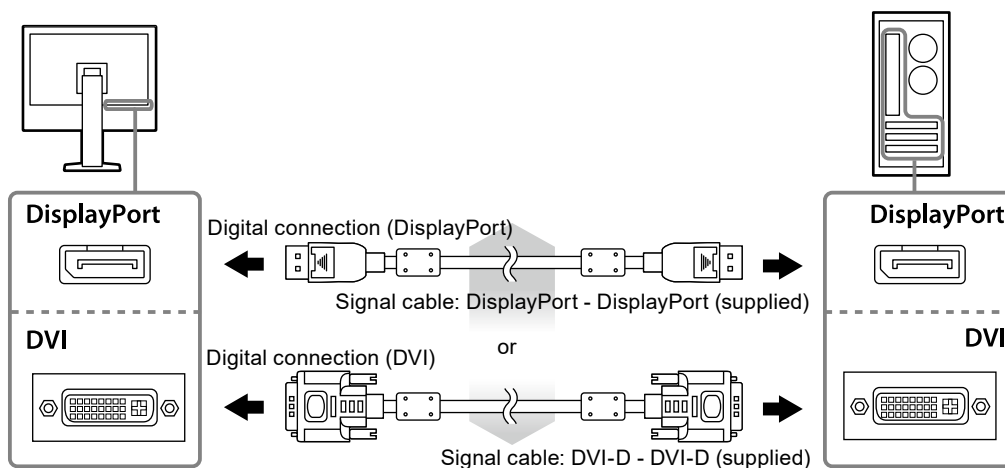
### Note

- When connecting multiple PCs to this product, refer to the Installation Manual (on the CD-ROM).

### 1. Connect the signal cables to the input signal connectors and PC.

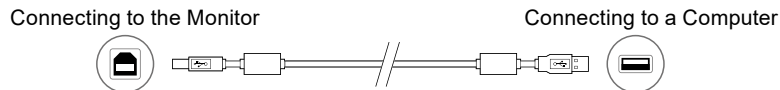
Check the shape of the connectors, and connect the cables.

After connecting the signal cable, tighten the screws of the connectors to secure the coupling.

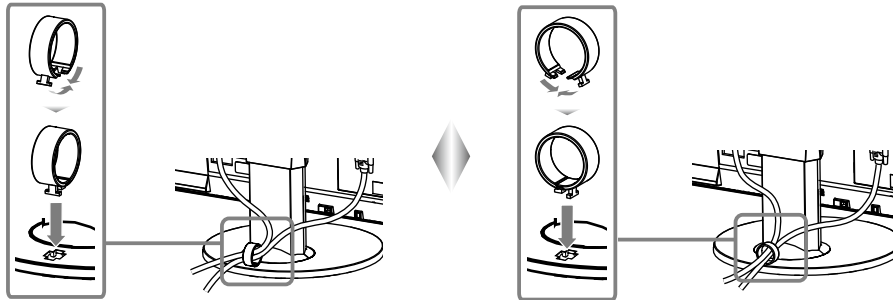


### 2. Plug the power cord into a power outlet and the power connector on the monitor.

### 3. Connect the USB cable when using RadiCS LE or ScreenManager Pro for Medical.



### 4. A cable holder is supplied with this product. Use the holder to organize the cables connected to the monitor.



### 5. Press to turn on the monitor.

The monitor's power indicator lights up green.

### 6. Turn on the PC.

The screen image appears.

If an image does not appear, refer to "Chapter 3 Troubleshooting" (page 16) for additional advice.

#### Attention

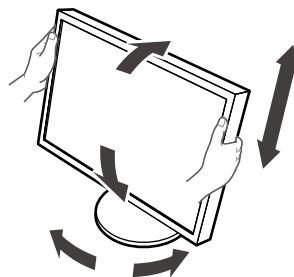
- Turn off the monitor and PC after using them.
- For the maximum power saving, it is recommended that the Power button be turned off. Turning off the main power switch or unplugging the power cord completely shuts off power supply to the monitor.

#### Note

- In order to maximize the monitor life and to minimize luminance deterioration as well as power consumption, proceed the following:
  - Use the power saving function of the computer.
  - Turn off the monitor and PC after using them.

## 2-3. Adjusting the Screen Height and Angle

Hold left and right edge of the monitor with both hands, and adjust the screen height, tilt and swivel of the screen to the best condition for working.


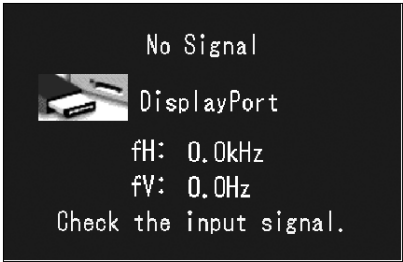
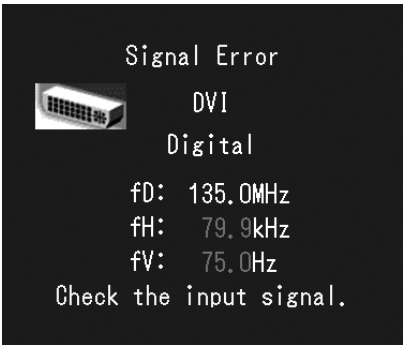


#### Attention

- Be sure that the cables are correctly connected.

# Chapter 3 Troubleshooting

If a problem still remains after applying the suggested remedies, contact your local EIZO representative.

Problem	Possible cause and remedy
<p><b>1. No picture</b></p> <ul style="list-style-type: none"> <li>• Power indicator does not light.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Power indicator is lighting green.</li> <li>• Power indicator is lighting orange.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Power indicator is flashing orange and green.</li> </ul>	<ul style="list-style-type: none"> <li>• Check whether the power cord is connected properly.</li> <li>• Turn the main power switch on.</li> <li>• Press .</li> <li>• Turn off the main power, and then turn it on again a few minutes later.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Increase "Brightness", "Gain" in the Adjustment menu.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Switch the input signal with SIGNAL.</li> <li>• Move the mouse or press any key on the keyboard.</li> <li>• Check whether the PC is turned on.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• The device that is connected using DisplayPort have a problem. Solve the problem, turn off the monitor, and then turn it on again. Refer to the User's Manual of the output device for further details.</li> </ul>
<p><b>2. The message below appears.</b></p> <ul style="list-style-type: none"> <li>• This message appears when no signal is input. Example:</li> </ul> <div data-bbox="269 954 673 1214" data-label="Image">  </div> <ul style="list-style-type: none"> <li>• The message shows that the input signal is out of the specified frequency range. (Such signal frequency is displayed in magenta.) Example:</li> </ul> <div data-bbox="269 1361 673 1704" data-label="Image">  </div> <p>fD: Dot clock (Displayed only during digital signal input) fH: Horizontal scan frequency fV: Vertical scan frequency</p>	<p>This message appears when the signal is not input correctly even when the monitor functions properly.</p> <ul style="list-style-type: none"> <li>• The message shown left may appear, because some PCs do not output the signal soon after power-on.</li> <li>• Check whether the PC is turned on.</li> <li>• Check whether the signal cable is connected properly.</li> <li>• Switch the input signal with SIGNAL.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Check whether the PC is configured to meet the resolution and vertical scan frequency requirements of the monitor (see "2-1. Compatible Resolutions" (page 14)).</li> <li>• Reboot the PC.</li> <li>• Select an appropriate setting using the graphics board's utility. Refer to the manual of the graphics board for details.</li> </ul>

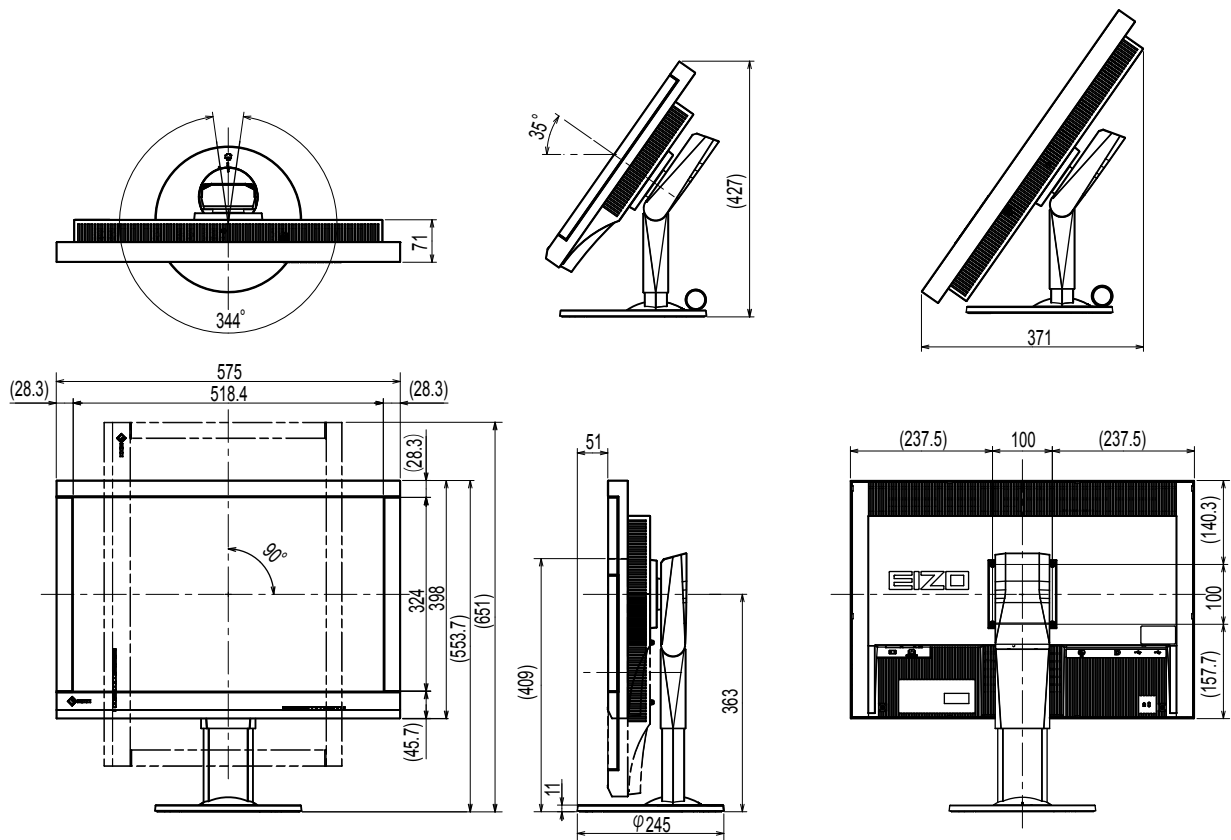


# Chapter 4 Specifications

LCD Panel	Type	IPS (Anti-Glare)
	Backlight	LED
	Size	61 cm (24.1 inch) (61.1 cm diagonal)
	Native Resolution	2.3M pixels (1920 dots × 1200 lines)
	Display Size (H x V)	518.4 mm × 324.0 mm
	Pixel Pitch	0.27 mm
	Display Colors	10-bit colors: 1.07 billion (maximum) colors
	Viewing Angles (H / V, typical)	178° / 178°
	Recommended Brightness	180 cd/m <sup>2</sup>
	Contrast ratio (typical)	1000:1
	Response Time (typical)	12 ms (Black-white-black)
Video Signals	Input Terminals	DVI-I × 1, DisplayPort × 1
	Digital Scanning Frequency (H / V)	31 kHz - 76 kHz / 59 Hz - 61 Hz (VGA TEXT: 69 Hz - 71 Hz) Frame synchronous mode: 59 Hz - 61 Hz
	Analog Scanning Frequency (H / V)	26 kHz - 76 kHz / 49 Hz - 71 Hz (VGA TEXT: 69 Hz - 71 Hz)
	Synchronous signal	Separate, TTL, positive/negative
	Dot clock	165 MHz (maximum)
USB	Port	Upstream port × 1, Downstream port × 2
	Standard	USB Specification Revision 2.0
Power	Input	100 - 240 V ac ±10%, 50/60 Hz 0.70 A - 0.40 A
	Maximum Power Consumption	68 W or less
	Power Save Mode	0.5 W or less (when only the DVI (analog) connector is connected, "Input Selection" is set to "Manual", no USB device is connected, and "DP PowerSave" is set to "On")
	Standby Mode	0.5 W or less (when no USB device is connected, and "DP PowerSave" is set to "On")
Physical Specifications	Dimensions	575 mm × 409 - 553.7 mm × 245 mm ( W × H × D ) (Tilt: 0°)
	Dimensions (Without Stand)	575 mm × 398 mm × 71 mm ( W × H × D )
	Net Weight	Approx. 8.7 kg
	Net Weight (Without Stand)	Approx. 6.0 kg
	Height Adjustment Range	138.6 mm (Tilt: 35°) 144.7 mm (Tilt: 0°)
	Tilt	Up 35°, down 5°
	Swivel	344°
	Pivot	90° (clockwise)
Operating Environmental Requirements	Temperature:	0°C to 35°C (32°F to 95°F)
	Humidity	20% to 80% R.H. (no condensation)
	Air pressure	540 hPa to 1060 hPa
Transportation/Storage Environmental Requirements	Temperature	-20°C to 60°C (-4°F to 140°F)
	Humidity	10% to 90% R.H. (no condensation)
	Air pressure	200 hPa to 1060 hPa

## Outside Dimensions

Unit: mm



## Accessories

Calibration Kit	EIZO "RadiCS UX1" Ver. 4.3.2 or later EIZO "RadiCS Version Up Kit" Ver. 4.3.2 or later
Network QC Management Software	EIZO "RadiNET Pro" Ver. 4.3.2 or later
Cleaning Kit	EIZO "ScreenCleaner"
Signal Cable (DVI-I - D-Sub)	FD-C16

For the latest information about the accessories and information about the latest compatible graphics board, refer to our web site.

<http://www.eizoglobal.com>

# Chapter 5 Glossary

## Clock

The analog signal input monitor needs to reproduce a clock of the same frequency as the dot clock of the graphics system in use, when the analog signal is converted to a digital signal for image display. This is called clock adjustment. If the clock pulse is not set correctly, some vertical bars appear on the screen.

## DDC (Display Data Channel)

VESA provides the standardization for the interactive communication of the setting information, etc. between a PC and the monitor.

## DisplayPort

This is the interface standard for image signals standardized in accordance with VESA. It was developed with the aim of replacing the conventional DVI and analog interfaces, and it can transmit high resolution signals and sound signals, which DVI does not support. The standard size and mini size connectors have been standardized.

## DICOM (Digital Imaging and Communication in Medicine)

The DICOM standard was developed by the American College of Radiology and the National Electrical Manufacturer's Association of the USA.

The DICOM compatible device connection enables to transfer the medical image and information. The DICOM, Part 14 document defines the digital, grayscale medical image display.

## DVI (Digital Visual Interface)

DVI is a digital interface standard. DVI allows direct transmission of the PC's digital data without loss.

This adopts the TMDS transmission system and DVI connectors. There are two types of DVI connectors. One is a DVI-D connector for digital signal input only. The other is a DVI-I connector for both digital and analog signal inputs.

## DVI DMPM (DVI Digital Monitor Power Management)

DVI DMPM is a digital interface power saving function. The "Monitor ON (operating mode)" and "Active Off (power saving mode)" are indispensable for DVI DMPM as the monitor's power mode.

## Gain

This is used to adjust each color parameter for red, green and blue. An LCD monitor displays the color by the light passing through the panel color filter. Red, green and blue are the three primary colors. All the colors on the screen are displayed by combining these three colors. The color tone can be changed by adjusting the light intensity (volume) passing through each color's filter.

## Gamma

Generally, the monitor brightness varies nonlinearly with the input signal level, which is called "Gamma Characteristic". A small gamma value produces a low-contrast image, while a large gamma value produces a highcontrast image.

## **HDCP (High-bandwidth Digital Content Protection)**

Digital signal coding system developed to copy-protect the digital contents, such as video, music, etc.

This helps to transmit the digital contents safely by coding the digital contents sent via the DVI or HDMI connector on the output side and decoding them on the input side.

Any digital contents cannot be reproduced if both of the equipments on the output and input sides are not applicable to HDCP system.

## **Phase**

Phase means the sampling timing to convert the analog input signal to a digital signal. Phase adjustment is made to adjust the timing. It is recommended that phase adjustment be made after the clock is adjusted correctly.

## **Range Adjustment**

Range adjustment controls the signal output levels to display every color gradation. It is recommended that range adjustment be made before color adjustment.

## **Resolution**

The LCD panel consists of numerous pixels of specified size, which are illuminated to form images. This monitor consists of horizontal 1920 pixels and 1200 vertical pixels. At a resolution of 1920 × 1200, all pixels are illuminated as a full screen (1:1).

## **Temperature**

Color temperature is a method to measure the white color tone, generally indicated in degrees Kelvin. The screen becomes reddish at a low temperature, and bluish at a high temperature, like the flame temperature.

5000 K: Slightly reddish white

6500 K: White referred to as daylight-balanced color

9300 K: Slightly bluish white

## **VESA DPM (Video Electronics Standards Association - Display Power Management)**

VESA specifications achieve increased energy efficiency for computer monitors. This involves standardization of signals sent from the computer (graphics board).

DPM defines the status of signals transmitted between the computer and monitor.

# Appendix

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A round gothic bold bit map font designed by Ricoh is used for the characters displayed on this product.

# Medical Standard

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- It shall be assured that the final system is in compliance to IEC60601-1-1 requirement.
- Power supplied equipment can emit electromagnetic waves, that could influence, limit or result in malfunction of the monitor. Install the equipment in a controlled environment, where such effects are avoided.

## Classification of Equipment

- Type of protection against electric shock : Class I
- EMC class: IEC60601-1-2 Group 1 Class B
- Classification of medical device (EU): Class I
- Mode of operation : Continuous
- IP Class : IPX0

# EMC Information

The RadiForce series has a performance that appropriately displays medical images.

## Environments of Intended Use

The RadiForce series is intended to be used in the following environments.

- Professional healthcare facility environments such as clinics and hospitals

The following environments are not suitable for the RadiForce series to be used:

- Home healthcare environments
- In the vicinity of high-frequency surgical equipments such as electrosurgical knives
- In the vicinity of short-wave therapy equipments
- RF shielded room of the medical equipment systems for MRI
- In shielded location Special environments
- Installed in vehicles including ambulances
- Other special environment

## WARNING

The RadiForce series requires special precautions regarding EMC and need to be installed. You need to carefully read EMC Information and the “PRECAUTIONS” section in this document, and observe the following instructions when installing and operating the product.

The RadiForce series should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

When using a portable RF communication equipment, keep it 30 cm (12 inches) or more away from any part, including cables, of the RadiForce series. Otherwise, degradation of the performance of this equipment could result.

Anyone who connects additional equipment to the signal input part or signal output parts, configuring a medical system, is responsible that the system complies with the requirements of IEC60601-1-2.

Do not touch the signal input/output connectors while using the RadiForce series. Otherwise, the displayed image may be affected.

Be sure to use the cables attached to the product, or cables specified by EIZO.

Use of cables other than those specified or provided by EIZO of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and improper operation.


Cables	EIZO Designated Cables	Max. Cable Length	Shielding	Ferrite Core
Signal cable (DisplayPort)	PP300 / PP200	3 m	Shielded	With Ferrite Cores
Signal cable (DVI-D)	DD300 / FD-C39	3 m	Shielded	With Ferrite Cores
Signal cable (DVI-I)	FD-C16	2 m	Shielded	With Ferrite Cores
USB cable	UU300 / MD-C93	3 m	Shielded	With Ferrite Cores
Power cord (with earth)	-	3 m	Unshielded	Without Ferrite Cores

## Technical Descriptions

<b>Electromagnetic emissions</b>		
The RadiForce series is intended for use in the electromagnetic environment specified below. The customer or the user of the RadiForce series should assure that it is used in such an environment.		
<b>Emission test</b>	<b>Compliance</b>	<b>Electromagnetic environment - Guidance</b>
RF emissions CISPR11	Group 1	The RadiForce series uses RF energy only for its internal function. Therefore, its RF emission are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11	Class B	The RadiForce series is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC61000-3-2	Class D	
Voltage fluctuations / flicker emissions IEC61000-3-3	Complies	

<b>Electromagnetic immunity</b>			
The RadiForce series has been tested at the following compliance levels (C) according to the testing requirements (T) for Professional healthcare facility environments defined in IEC60601-1-2. The customer or the user of the RadiForce series should assure that it is used in such an environment.			
<b>Immunity test</b>	<b>Test level (T)</b>	<b>Compliance level (C)</b>	<b>Electromagnetic environment - Guidance</b>
Electrostatic discharge (ESD) IEC61000-4-2	±8 kV contact discharge ±15 kV air discharge	±8 kV contact discharge ±15 kV air discharge	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transients / bursts IEC61000-4-4	±2 kV power lines ±1 kV input / output lines	±2 kV power lines ±1 kV input / output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surges IEC61000-4-5	±1 kV line to line ±2 kV line to ground	±1 kV line to line ±2 kV line to ground	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	0 % $U_T$ (100 % dip in $U_T$ ) 0.5 cycles and 1 cycle 70 % $U_T$ (30 % dip in $U_T$ ) 25 cycles at 50 Hz 0 % $U_T$ (100 % dip in $U_T$ ) 250 cycles at 50 Hz	0 % $U_T$ (100 % dip in $U_T$ ) 0.5 cycles and 1 cycle 70 % $U_T$ (30 % dip in $U_T$ ) 25 cycles at 50 Hz 0 % $U_T$ (100 % dip in $U_T$ ) 250 cycles at 50 Hz	Mains power quality should be that of a typical commercial or hospital environment. If the user of the RadiForce series requires continued operation during power mains interruptions, it is recommended that the RadiForce series be powered from an uninterruptible power supply or a battery.
Power frequency magnetic fields IEC61000-4-8	30 A/m (50 / 60 Hz)	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. The product should be kept at least 15 cm away from the source of power frequency magnetic fields during use.



Electromagnetic immunity			
The RadiForce series has been tested at the following compliance levels (C) according to the testing requirements (T) for Professional healthcare facility environments defined in IEC60601-1-2. The customer or the user of the RadiForce series should assure that it is used in such an environment.			
Immunity test	Test level (T)	Compliance level (C)	Electromagnetic environment - Guidance
Conducted disturbances induced by RF fields IEC61000-4-6	3 Vrms 150 kHz - 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the RadiForce series, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2\sqrt{P}$  $d = 1.2\sqrt{P}$  $d = 1.2\sqrt{P}$ , 80 MHz - 800 MHz $d = 2.3\sqrt{P}$ , 800 MHz - 2.7 GHz  Where "P" is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and "d" is the recommended separation distance in meters (m).  Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey <sup>b)</sup> , should be less than the compliance level in each frequency range <sup>c)</sup> .  Interference may occur in the vicinity of equipment marked with the following symbol.  
Radiated RF fields IEC61000-4-3	6 Vrms ISM <sup>a)</sup> bands between 150 kHz and 80 MHz	6 Vrms	
	3 V/m 80 MHz - 2.7 GHz	3 V/m	
Note 1	U <sub>T</sub> is the a.c. mains voltage prior to application of the test level.		
Note 2	At 80 MHz and 800 MHz, the higher frequency range applies.		
Note 3	These guidelines regarding conducted disturbances induced by RF fields or radiated RF fields may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.		
a)	The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz, 13.553 MHz to 13.567 MHz, 26.957 MHz to 27.283 MHz, and 40.66 MHz to 40.70 MHz.		
b)	Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the RadiForce series is used exceeds the applicable RF compliance level above, the RadiForce series should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the RadiForce series.		
c)	Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.		

**Recommended separation distances between portable or mobile RF communication equipment and the RadiForce Series**

The RadiForce series is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the RadiForce series can help prevent electromagnetic interference by maintaining a minimum distance (30 cm) between portable and mobile RF communications equipment (transmitters) and the RadiForce series.

The RadiForce series has been tested at the following compliance levels (C) according to the testing requirements (T) of immunity to proximity fields from the following RF wireless communication services.

Test frequency (MHz)	Bandwidth <sup>a)</sup> (MHz)	Service <sup>a)</sup>	Modulation <sup>b)</sup>	Test level (T) <sup>c)</sup> (V/m)	Compliance level (C) (V/m)
385	380 - 390	TETRA 400	Pulse modulation <sup>b)</sup> 18 Hz	27	27
450	430 - 470	GMRS 460, FRS 460	FM ±5 kHz deviation 1 kHz sine	28	28
710	704 - 787	LTE Band 13, 17	Pulse modulation <sup>b)</sup> 217 Hz	9	9
745					
780					
810	800 - 960	GSM 800 / 900, TETRA 800, iDEN 820 CDMA 850, LTE Band 5	Pulse modulation <sup>b)</sup> 18 Hz	28	28
870					
930					
1720	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation <sup>b)</sup> 217 Hz	28	28
1845					
1970					
2450	2400 - 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation <sup>b)</sup> 217 Hz	28	28
5240	5100 - 5800	WLAN 802.11 a/n	Pulse modulation <sup>b)</sup> 217 Hz	9	9
5500					
5785					

a) For some services, only the uplink frequencies are included.

b) The carrier is modulated using a 50 % duty cycle square wave signal.

c) The test levels were calculated using the maximum power, separation distance of 30 cm.

The customer or the user of the RadiForce series can help prevent interference from proximity magnetic fields by maintaining the minimum distance (15 cm) between RF transmitters and the RadiForce series.

The RadiForce series has been tested at the following conformance levels(C) according to the testing requirements(T) of immunity to proximity magnetic fields in the table below.

Test frequency	Modulation <sup>a)</sup>	Test level (T) (A/m)	Compliance level (C) (A/m)
134.2 kHz	Pulse modulation <sup>a)</sup> 2.1 kHz	65	65
13.56 MHz	Pulse modulation <sup>a)</sup> 50 kHz	7.5	7.5

a) The carrier is modulated using a 50 % duty cycle square wave signal.

For other portable and mobile RF communication equipments (transmitters), minimum distance between portable and mobile RF communications equipment (transmitters) and the RadiForce series as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.7 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance “d” in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where “P” is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1	At 80 MHz and 800 MHz, the separation distance for a higher frequency range applies.
Note 2	These guidelines regarding conducted disturbances induced by RF fields or radiated RF fields may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

# FCC Declaration of Conformity

For U.S.A. , Canada, etc. (rated 100-120 Vac) Only

## FCC Declaration of Conformity

We, the Responsible Party

EIZO Inc.

5710 Warland Drive, Cypress, CA 90630

Phone: (562) 431-5011

declare that the product

Trade name: EIZO

Model: RadiForce MX242W

is in conformity with Part 15 of the FCC Rules. Operation of this product is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

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

### Note

Use the attached specified cable below or EIZO signal cable with this monitor so as to keep interference within the limits of a Class B digital device.

- AC Cord
- Shielded Signal Cable (enclosed)

## Canadian Notice

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.



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