NOTICE

Cable installation

Observe the following instructions:

- Only shielded cables are to be used for all signal connections.
- If the relevant facility is available on the connector, all plug connections must be screwed tight or locked.
- The connecting cables must not be kinked.
- The minimum bending radius of a connecting cable generally equals five times the cable diameter.
- Do not route signal cables and power cables next to one another. Otherwise, line power subject to heavy interference could result in reversible pixel errors.
- The device must not share a line power supply with motors or valves (interference!).
- Externally connected cables can represent a trip hazard. Make sure that all incoming cables are safely routed.
- If the device offers strain relief mechanisms for the cables, use them to prevent unintended loosening of connected cables.

5.2 Device connectors

⚠CAUTION

Opening the connector panel cover

Only service may open the connector panel cover. Patients must not be present when the cover is open.

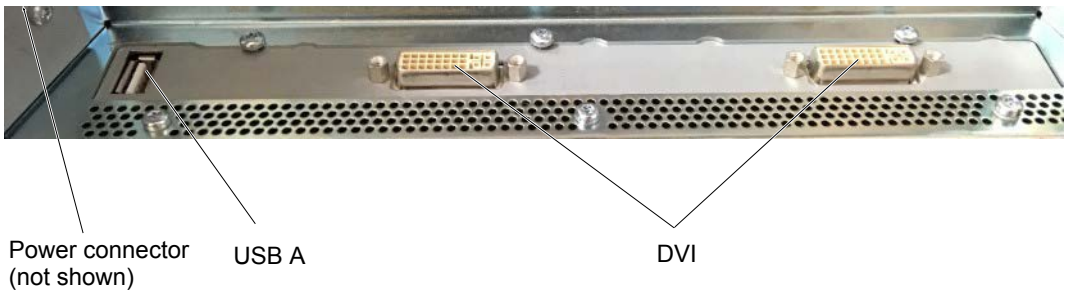


Fig.: Lower connection panel

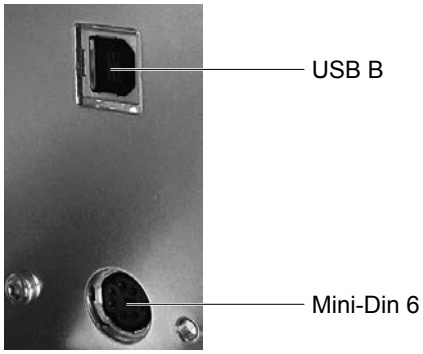


Fig.: Side connection panel

Power connector

The device's power supply is connected using an appliance plug.

DVI connectors

The monitor has two dual-link DVI connectors (A and B)

Grounding screw (not shown)

The additional protective conductor is connected to the grounding screw.

Service interface USB A and USB B

The service interfaces are used by Service for software updates.

Mini-DIN 6 serial interfaces for service and photometer

The serial interface can be used by Service, e.g. to connect a photometer.

NOTICE
Connecting a photometer • Only service can connect or disconnect a photometer. • Only photometers tested for calibrating the monitor may be connected to the serial interface. • A photometer must not be connected in the presence of the patient.

5.3 Description of connection procedure

⚠CAUTION

Opening the connector panel cover

Only service may open the connector panel cover. Patients must not be present when the cover is open.

⚠CAUTION

Connector

Connectors may only be plugged in or removed by Service when the device is switched off.

Prerequisite

The monitor must be installed correctly.

Connecting

1. Loosen the connection panel Combi-Torx screws.
2. Remove the connection panel cover.
3. Connect the appliance plug to the monitor power socket.
4. Secure appliance cable with cable ties to the lug to prevent unintentional loosening (marked with a circle).

5. Insert the DVI cable directly into the DVI socket. Only Dual Link DVI cables of a correspondingly high quality may be used.

6. If TDL3600-QL modules from EIZO are used:
   Connect the CAT cables to the DVI receiver module connectors and tighten the clamps. When connecting the cables, observe the color coding and customer-specific information.

7. Place the cover on the connection panel
8. Secure the cover with the Combi-Torx screws.

6 Commissioning

Note
Factory settings All monitors are optimally preset in the factory, such that changes are not usually required.

6.1 Switching on the monitor and video source

The monitor and connected video source can be switched on in any order.

Switching on the monitor before the video source

1. Switch on the monitor.

   The operation LED lights up yellow.

2. Switch on the video source.

   If the connected signal can be displayed on the monitor, the operation LED will light green.

Switching on the video source before the monitor

1. Switch on the video source.
2. Switch on the monitor.

   If the connected signal can be displayed on the monitor, the operation LED will light green.

⚠ **CAUTION**
Operation LED does not light green? If the operation LED does not light green after the equipment has been switched on and a video signal has been applied: • check the system for basic connection and operating errors before contacting service personnel.

6.2 Avoiding image sticking

Image sticking may occur with LCD monitors. Image sticking is an effect whereby a faint image of the previous screen contents can be seen after the display contents have changed.

The following measures can reduce or prevent image sticking:

- Use a screen saver with regularly changing images
- Switch off the monitor when it is no longer needed.
- The monitor has an energy saving mode:
  If the application in use supports the energy saving mode, activate it.

Note
Energy saving (Power Management) The monitor supports various energy saving settings, called Power Management (PM). When PM is active, the monitor backlight switches off automatically for example, if the monitor is without a video signal for an extended period. Also observe the operating system manufacturer's instructions regarding power management settings.

6.3 Graphics controller settings

Controlling the monitor with the Large Monitor Manager

No settings have to be made if a Large Monitor Manager is used to control the monitor. No configuration is required.

Controlling the monitor without the Large Monitor Manager

The monitor can be used as a high end PC monitor without the Large Monitor Manager. The following prerequisites must be met to be able to control the monitor without the Large Monitor Manager.

- The graphics card of the PC supports communication via DDC (Display Data Channel).
- The graphics card has two dual link outputs. Both outputs must operate in synchronized mode.
- The graphics card must support a resolution of 3840 x 2160 pixels (8 MP) in stretched mode.
- To operate the monitor at the desired resolution, a driver for the graphics card used must be installed.

If these requirements are met, the monitor is recognized by Windows as a plug-and-play monitor when it is switched on and the EDID data (Extended Display Identification Data) of the monitor is transferred to the graphics card. You can now configure the resolution based on the driver or operating system settings.

NOTICE
Installation and parameterization of the video source Please refer to the video source manufacturer’s manual for detailed information about installation and configuration of the video source.

6.4 Check for pixel defects

Pixel defects (small bright or dark dots) can occur in LCD monitors. During the manufacturing process, all monitors are checked for the permitted number of defective pixels.

Defective pixels cannot be corrected.

7 Operation

Once installed, user operation of the monitor consists of switching the power on and off.

After switching on the monitor, the operation LED is lit green continuously. If the LED lights up with another color, the monitor is not operating within normal operation.

Measures in the event of a failure

Note
Device malfunction in operation If the device is not working properly, check the system for basic connection and operating errors before contacting service personnel.

8 Cleaning and check settings

8.1 Cleaning

NOTICE
Device maintenance, cleaning and disinfecting • Make sure liquids do not seep into the device. Liquids that seep into the device may result in an electric shock or failure of the device. • The screen is extremely sensitive to mechanical influences. Absolutely avoid scratches, shocks, etc. for this reason. • Clean the screen when dirty using a microfiber cloth and, if necessary, a recommended cleaning agent. Clean the housing parts with a recommended cleaning agent. • Use only tested disinfectants. • If a cleaning agent is sprayed directly onto the screen surface, use a microfiber cloth to remove drops which run down before they reach the edge of the panel. • Remove drops of liquid from the device immediately. Contact with liquids over a longer period can cause discoloration or allow calcium deposits to form on the surface.

Recommended cleaning agents and disinfectants

NOTICE
Maximum contact time Exceeding the maximum specified contact time could result in haze on the panel or fading / damage to the paint on the frame.

Cleaning / disinfection agents	Maximum duration of use
Terralin® protect; 2% by vol.	15 min
Meliseptol® rapid; direct	60 min
Mikrobac® Tissues; direct	30 min
Incidin® Plus; 8% by vol.	15 min
Melsitt®, 10% by vol.	120 min
Incidur spray, undiluted	120 min
perform®, 3% by weight	120 min
Lysoformin® 2% by vol.	120 min
Activ spray, undiluted	120 min
Terralin, 0.5% by vol.	120 min
Distilled water	120 min
Spray disinfection with Nocospray / Nocolyse	15 min. spray period and 60 min. duration of use
Ethanol, 96 % by vol.	120 min
Benzine, undiluted	120 min
Dishwashing detergent, 1 %, Tempo	120 min

Cleaning / disinfection agents	Maximum duration of use
Mikrozid liquid, undiluted	120 min
Mikrozid sensitive liquid, undiluted	120 min
Cidex undiluted , with acitvator	120 min
Sprint DS 5001, 0.5 %	120 min
Cleansinald, 0.5 %	120 min
Surfanios Fraicheur Citron 0.25 %	120 min
Tap water	120 min
Morning Mist (1:64)	120 min
Sodium hypochlorite 10 %	120 min
Isopropanol, 70 %	120 min
Ammonia solution 1.65 % by vol.	120 min
0.5 % Chlorhexidin in 70 % Isopropanol	120 min
Bio-AntiBact med	120 min

Note

Cleaning other components

Information on cleaning or disinfection of other system components can be obtained from the respective instructions for use.

8.2 Check the settings

⚠CAUTION

Checking the settings

- The settings may only be checked by service personnel.
- The settings must not be checked in the presence of patients.

The picture quality of the monitor changes due to aging of the LCD unit and the backlight.

- Check the monitor settings at regular intervals in accordance with the local guidelines.
- Correct the settings if necessary.

9 Troubleshooting

The LED continuously lights up green when operating normally. In the event of a fault, you can localize it as follows, based on the screen display and the operation LED.

1. Check the monitor for the possible causes listed in this table.
2. Carry out the remedial measures before contacting the service personnel.

No picture

LED	Cause	Remedy
Green	Video signal detected, but the monitor or graphics card is set up incorrectly	Check the monitor settings (e.g. LUT, brightness, no test pattern, etc.). Check and adapt the graphics card settings.
Yellow	Power Safe Mode Monitor has been switched actively to a power saving mode.	Deactivate Power Safe Mode
	No DVI signal	DVI cable is not connected
	Incorrect timing is set	Correct the timing
Red	Internal error	Inform servicing department
Dark	Switch is off	Switch on power switch
	Power cable is not inserted or incorrectly inserted.	Check the power cable
	Power cable is defective	Replace power cable

Picture displayed

LED	Cause	Remedy
Green	No error, correct operating status	-
Yellow	Lamp warm-up period: Setting is active, and the monitor is in the warm-up period.	Wait for the warm-up period to expire. The LED turns green when the lamp has reached the stabilized luminance level.
Yellow (flashing)	Monitor has reached an initial critical temperature level.	Select a lower brightness level for standard operation. Check the ventilation and improve these conditions if necessary.
	Lamp warm-up period: Setting is active, and the warm-up period has expired without the monitor having reached the stabilized luminance level.	Inform servicing department
Red	Internal error	Inform servicing department

10 Technical specifications

Note
Applicability of technical specifications All technical specifications are valid after a warm-up period of 30 minutes.

10.1 Monitor characteristics

Type	Color, TFT (MVA)
Active Area	1270 mm x 721 mm
Screen diagonal	57.5" (1460 mm)
Resolution	3840 x 2160 (QFHD)
Refresh rate	60 Hz
Pixel arrangement	24 bit (3 x 8 bit): 3 subpixels per pixel
Pixel spacing	0.331 mm (H) x 0.334 mm (V)
Contrast ratio	3500:1 (minimal), 5000:1 (typical)
Horizontal viewing angle	178° typical; 160° minimum(for contrast ratio >=20)
Vertical viewing angle	178° typical; 160° minimum(for contrast ratio >=20)
Response time (gray to gray)	9.5 ms (typically)
Backlighting	LED
Screen brightness	Typically 500 cd/m², uncontrolled

10.2 Power supply

Power connector	C14 power cord connector with protective conductor, IEC 60320
Line voltage	AC 100 - 240 V (± 10%)
Line frequency	50 - 60 Hz (± 5%)
Current consumption	< 0.7 A @ 240 V / 1.7 A @ 100 V
Maximum power consumption	200 W
Energy saving mode	< 30 W

10.3 Inputs/outputs

DVI input	2x dual link DVI-I socket (analog pins are not used) - 3840 x 2160 (QFHD) at 60 Hz Service and communication over DDC of DVI socket B
USB A, USB B	Service or software update
Mini-DIN 6 socket (serial connection)	Service or connecting a photometer

10.4 Controls and connectors

Front	Operation LED
Back	Power switch
Rear panel (without cover)	Lower connection panel: • Power connection socket • USB A Service • 2 DVI, Dual Link Side connection panel • USB B Service • Mini DIN 6 sockets for service or photometer connection

10.5 Mechanical design

Housing components	Metal
Ventilation openings	In rear panel
Degree of protection	IP20 according to EN 60529
Connector panel	On rear panel, under cover
Weight	41.2 kg +/- 2 kg
Dimensions (W x H x D) in mm	1319 x 776 x 146

10.6 Climatic conditions

In operation	
Temperature range	+5° C - +40° C Ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Air pressure	700 - 1060 hPa, up to 3000 m height

Transport and storage (packed)	
Temperature range	-20 °C ... +55 °C ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Air pressure	200 - 1060 hPa, up to 12000 m height
Humidity	10 % - 90 %, non-condensing

10.7 Safety regulations

CE

This device bears a CE mark in accordance with the provisions of Council Directive 93/42/EEC and 2011/65/EU.

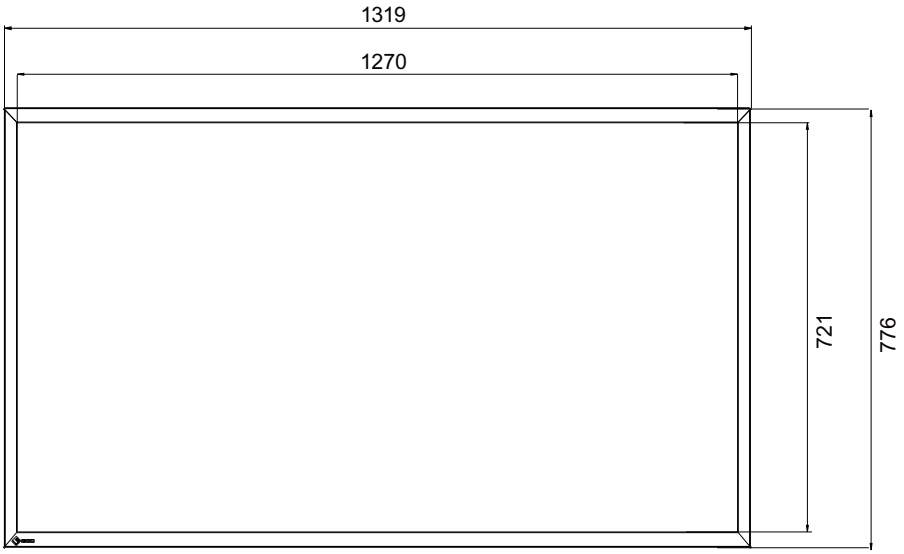
Safety regulations	
Safety standards	• IEC/EN 60601-1 • CAN/CSA - C 22.2 No. 60601-1-14 • CAN/CSA 22.2 No. 601.1-M90 • GB4943.1 (non-tropical, altitude< 2000 m), Safety specification T8AL, 250 V
Protection class	Protection class I
Degree of protection	IP20
Medical device classification	Class I according to 93/42/EEC, Appendix IX

11 Dimension drawings

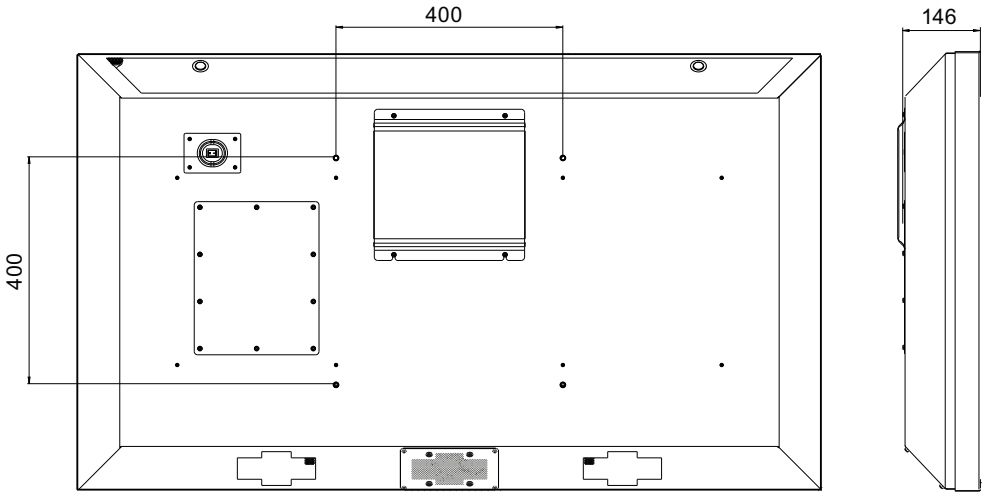
All dimensions in mm

11.1 Monitor dimensions

Front view



View from behind and to the side - with cover



12 Appendix

12.1 Markings and symbols

The markings and symbols on the device indicate the following:

Marking / symbol	Meaning
	Symbol for "Caution, observe accompanying documents".
	CE marking (EU conformity mark).
	MET marking, in accordance with U.S. and Canadian national regulations.
	U.S. FCC marking for communication devices.
	CCC marking, in accordance with Chinese national regulations.
	BIS marking, in accordance with Indian national regulations.
	RCM marking for conformity with Australian and New Zealand EMC standards.
	Symbol for the manufacturer of medical devices, supplemented by the date of manufacture.
	WEEE marking: Product must be disposed of separately; materials may be recycled.
	Marking according to ACPEIP (China-RoHS).
IP20	Symbol for degree of protection according to DIN EN 60529.
	"On" symbol (voltage).
	"Off" symbol (voltage)
	Input for service calls.
	Symbol for "Comply with the instructions for use".
	Symbol for "Authorized service personnel only".
	Symbol for "Hazardous electrical voltage".

12.2 Information on electromagnetic compatibility (EMC)

EIZO monitors were designed for the display of images and normal monitor operation.

⚠WARNING

Special EMC provisions are required for use of the RadiForce LL580W. Installation, assembly, and use must take place in compliance with the following instructions.

- Only use the cables included in the scope of delivery or recommended by the manufacturer. The use of other cables can result in increased electromagnetic radiation and reduced electromagnetic interference immunity of the device, as well as improper use. Cable length: max. 3 m
- The monitor should not be placed on other devices or positioned in their immediate vicinity. If devices have to be operated on or in the immediate vicinity of one another, the monitor or system must be monitored to ensure proper operation for the defined configuration.
- When using a portable RF communications device, maintain a distance of at least 30 cm from all parts of the monitor, including cables. Otherwise, problem-free function of the device cannot be guaranteed.
- Persons connecting additional devices to the signal input or output when configuring a medical system are responsible for ensuring compliance with standard IEC/EN 60601-1-2.

Electromagnetic radiation		
The RadiForce LL580W is intended for use in the electromagnetic environments noted below. Customers and users of the RadiForce LL580W have to ensure that the device is used in such an environment.		
Radiation test	**Conformity**	**Information regarding the electromagnetic environment**
RF radiation CISPR11/EN 55011	Group 1	The RadiForce LL580W generates RF for its internal function only. For this reason, the RF radiation is very low and is therefore unlikely that it will result in interference in electronic devices in the immediate vicinity.
RF radiation CISPR11/EN 55011 GB9254	Class B	The RadiForce LL580W is approved for use in a number of environments. This includes residential areas and areas connected directly to the public low-voltage grid, such as private homes.
Harmonic currents IEC/EN 61000-3-2 GB17625.1	Class D	
Voltage fluctuations / flicker IEC/EN 61000-3-3	fulfilled	

Electromagnetic interference immunity			
The RadiForce LL580W was tested with the following compliance levels in accordance with the test requirements for professional healthcare facilities, as established in IEC/EN 60610-1-2. Customers and users of the RadiForce LL580W have to ensure that the monitor is used in such an environment.			
Interference immunity test	**Measurement level**	**Compliance level**	**Information regarding the electromagnetic environment**
Electrostatic discharge (ESD) IEC/EN 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	It is recommended to use the device on wood, concrete, or ceramic floors. If the floor is made of synthetic material, the relative humidity should be at least 30%.
Fast transient electric disturbances (bursts) IEC/EN 61000-4-4	±2 kV power lines ±1 kV input / output lines	±2 kV power lines ±1 kV input / output lines	The power supply quality has to correspond to that of typical industrial environments or hospitals.
Surge voltage IEC/EN 61000-4-5	±1 kV line against line ±2 kV line against ground	±1 kV line against line ±2 kV line against ground	The power supply quality has to correspond to that of typical industrial environments or hospitals.
Voltage dips, brief interruptions, and fluctuations of power supply lines IEC/EN 61000-4-11	0 % V_T for 0.5 periods and 1 period 70 % V_T for 25 / 30 periods at 50 / 60 Hz 0 % V_T for 250 / 300 periods at 50 / 60Hz	0 % V_T for 0.5 periods and 1 period 70 % V_T for 25 periods at 50 Hz 0 % V_T for 250 periods at 50 Hz	The power supply quality has to correspond to that of typical industrial environments or hospitals. If the monitor has to continue operation even if the power supply is interrupted, it is recommended to connect the device to an uninterruptible power supply or battery.
Magnetic fields with energy technology frequencies IEC/EN 61000-4-8	30 A/m (50 / 60 Hz)	30 A/m (50 Hz)	The magnetic fields with energy technology frequencies must be in an area that is representative of a typical location in a typical industrial environment or hospitals. The device should be used at least 15 cm away from the source of magnetic fields with energy technology frequencies.
Note: V_T is the alternating current voltage before application of the measurement level.			

<table>
<tr><th colspan="4">Electromagnetic interference immunity</th></tr>
<tr><td colspan="4">The RadiForce LL580W was tested with the following compliance levels in accordance with the test requirements for professional healthcare facilities, as established in IEC/EN 60601-1-2.
Customers and users of the monitor have to ensure that the monitor is used in such an environment.</td></tr>
<tr><th>Interference immunity test</th><th>Measurement level</th><th>Compliance level</th><th>Information regarding the electromagnetic environment</th></tr>
<tr><td rowspan="2">Line-based disturbances caused by RF fields
IEC/EN 61000-4-6</td><td>3 V_{rms}
150 kHz to 80 MHz</td><td>3 V_{rms}</td><td rowspan="2">Portable and mobile RF communications devices may only be operated in the vicinity of the monitor and its components (including cables) when in compliance with the recommended minimum distance. It is determined using the formula for calculating the frequency of the transmitter.
Recommended minimum distance
d = 3.5/3 √P = 1.2 √P, 150 kHz to 80 MHz
d = 2 √P, ISM bands between 150 kHz and 80 MHz
d = 3.5/3 √P = 1.2 √P, 80 MHz to 800 MHz
d = 7/3 √P = 2.3 √P, 800 MHz to 2.7 GHz
In this case, "P" stands for the measured maximum nominal output power in watts (W) of the transmitter recommended by the transmitter manufacturer, and "d" for the recommended minimum distance in meters (m).
The field strengths of fixed transmitters according to electromagnetic location measurement[a)] have to be less than the compliance level in each individual frequency range.
Interference can occur when used in the vicinity of devices identified with the following symbol.
  </td></tr>
<tr><td>6 V_{rms}
ISM bands between 150 kHz and 80 MHz</td><td>6 V_{rms}</td></tr>
<tr><td>Electromagnetic RF fields
IEC/EN 61000-4-3</td><td>3 V/m
80 MHz to 2.7 GHz</td><td>3 V/m</td></tr>
<tr><td colspan="4">Note: The higher frequency range applies at 80 MHz and 800 MHz.
Note: Guidelines with respect to line-based interference due to RF fields or electromagnetic RF fields may not apply in all situations. Absorption and reflection by structures, objects, and people impact the propagation of electromagnetic waves. .</td></tr>
<tr><td colspan="4">a) The field strengths of fixed transmitters, for example the base station for cordless and mobile telephones, radio, land mobile radio, ham radio, and television cannot be determined precisely in advance. To evaluate the electromagnetic environment using fixed transmitters, an electromagnetic location measurement should be included. If the measured field strength in the environment where the device is used exceeds the applicable RF compliance level, observe the monitor to ensure its proper operation. If improper operation is observed, in some circumstances additional measures may be necessary, such as reorienting or repositioning the device.</td></tr>
</table>

Recommended minimum distance between portable or mobile RF communications devices and the RadiForce LL580W

The RadiForce LL580W is intended for use in an electromagnetic environment in which interference due to electromagnetic radiation is controlled. For other portable and mobile RF communication devices (transmitters), the recommended minimum distance between the portable and mobile RF communication devices (transmitters) and the monitor applies as listed below. This is based on the maximum output power of the communication device.

Maximum nominal output power of the transmitter (W)	**Recommended minimum distance according to the frequency of the 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 whose maximum nominal output power is not shown above, the recommended minimum distance "d" in meters (m) can be determined using the formula for calculating the frequency of the transmitter. "P" here stands for the transmitter's maximum measured nominal output power in watts (W), as recommended by the transmitter's manufacturer.

Note: For 80 MHz and 800 MHz, the recommended minimum distance for the higher frequency range applies.
Note: This information may not be applicable in all situations. Absorption and reflection by structures, objects, and people impact the propagation of electromagnetic waves.

Recommended minimum distance between portable or mobile RF communications devices and the RadiForce LL580W

The RadiForce LL580W is intended for use in an electromagnetic environment in which interference due to electromagnetic radiation is controlled. The customer or user of the monitor can help prevent electromagnetic interference by maintaining the recommended minimum distance between portable and mobile RF communications devices (transmitters) and the monitor.
The interference immunity regarding adjacent fields has been confirmed for the following wireless RF communications devices:

Test frequency (MHz)	**Bandwidth[a] (MHz)**	**Service[a]**	**Modulation[b]**	**Maximum power (W)**	**Minimum distance (m)**	**Measurement level (V/m)**	**Compliance level (V/m)**
385	380 - 390	TETRA 400	Pulse modulation[b] 18 Hz	1.8	0.3	27	27
450	430 - 470	GMRS 460 FRS 460	FM ±5 kHz deviation 1 kHz sine	2	0.3	28	28
710	704 - 787	LTE band 13, 17	Pulse modulation[b] 217 Hz	0.2	0.3	9	9
745							
780							
810	800 - 960	GSM 800/900 TETRA 800 iDEN 820 CDMA 850 LTE band 5	Pulse modulation[b] 18 Hz	2	0.3	28	28
870							
930							
1720	1700 - 1990	GSM 1800; CDMA 1900 GSM 1900 DECT LTE band 1, 3, 4, 25 UMTS	Pulse modulation[b] 217 Hz	2	0.3	28	28
1845							
1970							
2450	2400 - 2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE band 7	Pulse modulation[b] 217 Hz	2	0.3	28	28
5240	5100 - 5800	WLAN 802.11 a/n	Pulse modulation[b] 217 Hz	0.2	0.3	9	9
5500							
5785							

[a] For some radio services, only the frequencies for the radio contact from the mobile communications device to the base station ("Uplink") is included in the table.
[b] The carrier is modulated by a square wave with 50 % duty cycle.

12.3 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: +1 (562) 4 31 50 11

declare that the product

- Trade name: EIZO
- Model: RadiForce LL580W

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 comforme à la norme NMB-003 du Canada.

12.4 China RoHS (Restriction of Hazardous Substances)

液晶显示器 LCD Monitor
型号 Model: 6GF62008A$## ($ = A...Z; ## = 00…99)

根据SJ/T11364-2014《电子电气产品有害物质限制使用标识要求》特提供如下有关污染控制方面的信息。
The following product pollution control information is provided according to SJ/T11364-2014 Marking for the restriction of the use of hazardous substances in electrical and electronic product.

电子电气产品有害物质限制使用标志说明
Explanation of Marking for Restriction of Hazardous Substances

该标志表明本产品含有超过中国标准GB/T26572-2011《电子电气产品中限用物质的限量要求》中限量的有毒有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。

为保证所申明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。

产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所申明的整个产品的环保使用期限。

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T26572-2011 Requirements of concentration limits for certain restricted substances in electrical and electronic products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.

This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

有毒有害物质或元素的名称及含量 Name and Concentration of Hazardous Substances

部件名称 Component Name	有毒有害物质或元素 Hazardous substances' name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
液晶纯平屏幕 LCD Flat Screen	O	O	O	O	O	O
控制板 Controller Board	O	O	O	O	O	O
电源 Power Supply	X	O	O	O	O	O
其他 电路板 Other Circuit Boards	O	O	O	O	O	O
其他（电缆等） Others (cables, etc.)	O	O	O	O	O	O
机架、底盘 Housing, Chassis	O	O	O	O	O	O
附件（信号电缆、输电线等） Accessories (signal cable, power line, etc.)	O	O	O	O	O	O

本表格依据SJ/T 11364 的规定编制。
O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 标准规定的限量要求以下
X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 标准规定的限量要求

- 此表所列数据为发布时所能获得的最佳信息.
- 由于缺少经济上或技术上合理可行的替代物质或方案，此医疗设备运用以上一些有害物质来实现设备的预期临床功能，或给人员或环境提供更好的保护效果。

This list is based on SJ/T 11364.
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

- Data listed in the table represents the best information available at the time of publication.
- Applications of hazardous substances in this medical device are required to achieve its intended clinical uses, and/or to provide better protection to human beings and/or to environment, due to lack of reasonably (economically or technically) available substitutes.

产品中有毒有害物质或元素的名称及含量 Table of hazardous substances' name and concentration.

12.5 Environmental protection

Comply with all local requirements and laws pertaining to the disposal of devices.

The device is in compliance with directive 2011/65/EU for limiting the use of specific hazardous materials in electric and electronic devices.

12.6 Warranty

Opening of the housing, or electrical or mechanical changes on or in the device, result in cancellation of the warranty. For warranty details, please contact the sales partner from whom you purchased the product. These warranty conditions are neither extended nor limited by the contents of this instruction manual.

12.7 Additional devices

Connected devices such as PCs must meet the relevant safety standards.

12.8 Trademarks

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RadiForce LL580W
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Part 1: Overview of Volume Viewer Dynamic Shuttle

User Guide

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Revision 5

General User Documentation.
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Table of Contents

Introduction

Refer to the **Volume Viewer applications** user guide addendum[1] to check the following (including regulatory) information[2]:

- Year of first CE marking
- Manufacturer address
- Reporting of serious incidents
- How to access user guides
- Prerequisite software applications
- Hardware requirements
- Maintenance
- IT networks characteristics and security measures
- Technical description
- Symbols used in documentation and labeling
- User Interface regulatory information (including Unique Device Identifier)
- Importer offices of GE HealthCare

[1] Always check on the **Customer Documentation Portal** (https://www.gehealthcare.com/support/documentation) the latest revision of this user guide addendum.

[2] The list may be non-exhaustive.

This User Guide is available in 3 parts.

You are now in **Part 1: Overview** which reviews the different functionalities of the software user interface.

Additional information on these products is also available in:

- **Part 2: Deep Dive in Volume Viewer** which gives a detailed description of the main functionalities.
- **Part 3: Clinical Scenarios** which is a step by step description of how to post process most common clinical exams.

As with any medical imaging process, only qualified personnel should use this equipment.
You must be aware of the limitations of the basic imaging modality and of ensuing image processing. This includes understanding the limitations of the initial series acquisition, image processing technology used, and image display methods.

User Interface note

Please note that the screen captures in this document are intended for demonstration purposes only and may not always be fully identical to the actual user interface (e.g., in color scheme). Use these screen captures as guides.

Product Description

Volume Viewer is a post-processing application. Data acquired with CT, MR, PET, PET/CT, AdvantX and Innova™ 3D X-Ray systems can be processed using Volume Viewer.

Dynamic Shuttle is a post-processing application intended to be used with CT GE Volume Shuttle (Axial), Volume Helical Shuttle acquisitions and any axial dynamic CT acquisition. There are no limitations on the patient population.

The above products run on different platforms. On the AW Server, there are no reporting features. On the Seamless Integration, only one PACS viewport can display a 3D session.

Safety

To assure an efficient and safe use of Volume Viewer Dynamic Shuttle, it is essential to read this chapter before attempting to use the packages.

To avoid usability error, the user must have a good knowledge and understanding of the software application (including prerequisite applications if any), and its primary operating functions. This will be accomplished through the correct knowledge and application of User Guide content. Please contact your GE HealthCare representative to benefit from recommended training.

Ensure that the correct versions of your User Guides are readily available at all times. Make a point to review the procedures and safety precautions periodically. Additional safety concerns are addressed in the AW VolumeShare/AW Server user documentation.

Safety notice legends:

WARNING

This indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

CAUTION

This indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.

NOTICE

This indicates a non–hazardous situation, which, if not avoided, could result in equipment damage, lost time, or reduced image quality.

Disclosure of Residual Risks

The disclosure of residual risks, according to EN ISO 14971, is providing relevant information so the users can make informed decisions on the use of the product.
Residual risk disclosure is covered in this Safety chapter listing the Cautions and Warnings of the product.

Intended Use / Indications for Use

Volume Viewer is a medical diagnosis software that allows the processing, review, analysis, and communication of 3D reconstructed images and their relationship to originally acquired images from CT, MR, X-Ray Angio, and PET scanning devices. The combination of acquired images, reconstructed images, annotations, and measurements performed by clinicians are intended to provide referring physicians with clinically relevant information for diagnosis, surgery, and treatment planning.

Dynamic Shuttle is intended to facilitate segmentation of bony structures from head and neck, body, and extremity data. When used with dynamic data, it facilitates visualization of vessel features.

User Profile

The intended users of Volume Viewer and Dynamic Shuttle shall be radiologists, oncologists, physicians educated in the reading and the quantitative analysis of one or multiple imaging modalities, or technologists educated in the preparation of the study for the reading and the quantitative analysis of one or multiple imaging modalities, with skills in multiple clinical care areas.

Patient Population

There are no limitations on the patient population.

Cautions and Warnings

1. Image reliability

CAUTION

Images acquired on devices from other manufacturers can be loaded in Volume Viewer, but GE HealthCare does not guarantee the quality or reliability of any reconstruction, segmentation, or measurements performed on these images due to variability in implementation of DICOM standard across manufacturers. Non-GE HealthCare images can easily be identified by the corresponding image annotation.

Follow the DICOM acquisition parameter guidelines listed in each application user guide.

Consult the GE HealthCare published DICOM conformance statement of Volume Viewer, which is available on the GE HealthCare website at https://www.gehealthcare.com/products/interoperability/dicom/workstations-dicom-conformance-statements, to understand the specifics of GE HealthCare implementation.

Consult other device's DICOM conformance statements to understand compatibility between products.

CAUTION

Always correlate any information (cursor position, image orientation, measurements, image quality, etc.) in any 3D reconstruction (reformatted plane, oblique, MPVR, MIP, volume rendering, navigator endoluminal views, curved, segmentations, measurements, tracking, saved images, etc.) with the original data (acquisition or baseline images) in order to avoid misinterpretation due to artifacts or missing structures on displayed views.

WARNING

When reloading a processed object such as a segmented structure, a tracked vessel or a deposited measurement, check that it is consistent with the content of the original datasets to avoid misinterpretation in case of corrupt restored object file.

CAUTION

A 3D view is a two-dimensional projection on the screen of the 3D volume. There is no indication on a 3D view of the depth of the 3D cursor inside the 3D volume. Always check the accuracy and consistency of 3D coordinates by checking the cursor position on original data (acquisition images) in order to avoid misinterpretation due to artifacts or missing structures on 3D views.

CAUTION

Always use original acquisition images for diagnosis and take into account generated secondary captures (SCPT) only as a supplementary tool in order to avoid using wrong measurements for diagnosis or treatment planning.

CAUTION

JPEG images can be generated using export tools available in Volume Viewer. The file header might not contain patient information. Patient information can be burnt into images pixels. In any case, JPEG are not intended for diagnosis. Original series must be used to perform a diagnosis.

1.1 Window Width and Level (W/L)

CAUTION

The window width and level (W/L) determine how clearly pathologies and other anatomical structures can be discerned. Incorrect W/L settings may result in pathologies and other essential anatomical structures not being displayed correctly. As a single W/L cannot display all features present in an exam, use several different settings, when necessary, to explore all exam data.

1.2 Volume Rendering

CAUTION

When using volume rendering, incorrect settings of opacity curves, opacity thresholds, and transparency settings when merging VR objects can result in pathology or essential anatomies not being visible. Always correlate volume rendering images with original images.

1.3 Navigator

CAUTION

When using navigator images, an incorrect threshold setting or incorrect threshold mode can result in pathologies or other essential anatomy not being visible.
Navigator views use conical projections (perspectives) that can introduce distortions, especially with fish eye views. For this reason the assessment of dimensions and distances tend to be subjective. Navigator views and measurements should always be correlated with original and reformatted images.

1.4 Curved

CAUTION

Curved reformation can introduce distortions in the shape of objects. To avoid misinterpretation, user should always correlate the cursor position in curved reformation views with acquired images.

1.5 Lumen

CAUTION

Lumen. This transformation results in geometrical distortion of the displayed anatomical features because the successive intersections are not parallel. For this reason the Lumen view should NOT be used for diagnostic purposes by itself, but always in combination with other views.

1.6 Dynamic Shuttle

CAUTION

Calcifications may be removed along with bones when using the DSA bone subtraction technique.

CAUTION

The shuttle review protocols are designed only for visualization of vascular kinetics. The processed images should not be used to perform measurements of any kind. Due to relatively high noise content, these images should not be used for quantitative vascular analysis. Moreover, bone removal techniques used in conjunction with these protocols may result in partial removal of vessels.

CAUTION

The bone removal techniques used in conjunction with shuttle review protocols may result in partial removal of vessels. This is likely to happen when vessels are already opacified in phase 1. It is advised to always check the results of bone segmentation.

1.7 Filter

CAUTION

Filtered images (saved and reloaded) are derived images from original series. Filter applied might impact measurement accuracy. Always rely on original series to perfom measurements. Refer to the Measurement Accuracy chapter.

2. Image quality

CAUTION

At all times, it remains the responsibility of the physician to determine whether the inter-slice distance used for a particular exam is acceptable in order to avoid missing structures or small pathologies.

NOTICE

For a two monitor configuration, check the monitor calibration regularly to avoid a bad PET image quality when displayed in inversed grey scale and to ensure images displayed as inverse grey are identical on both monitors.

3. Segmentation Tools

CAUTION

Volume Viewer provides a set of segmentation tools (such as threshold, scalpel, autoselect, paint on slices, quick paint, etc.) and several imaging filters (such as Edge, Smooth, etc.). When using these tools and/or applying filters, make sure no anatomical structure nor pathology is removed and/or check contours are surrounding structures appropriately to avoid wrong sizing estimation and to prevent misinterpretation.

CAUTION

When dealing with PET images, check that the segmented volume generated from the contours match the drawn ones in order to avoid wrong SUV measurements.

4. Measurements

CAUTION

Do not use 3D or slab views only to perform measurements (distance, angle, region of interest, report cursor, area, volume, etc.). Always check the position of measurement points and refer to 2D baseline views (acquisition images or reformatted images of minimal thickness) to confirm measurements in order to avoid wrong measurement which can impact treatment planning or diagnosis.

CAUTION

Depending on WW/WL settings, objects may display differently, and some structures could be missed or not distinguishable. Check WL/WW before depositing measurement points.

CAUTION

The software calculates and displays measurements with a resolution of one decimal (such as 0.1mm, 0.1 degree, etc.).

Measurement accuracy relies on various factors such as, but not limited to: acquisition conditions, image resolution, display matrix size, user precision in graphical object deposition, conditions of visualization, user environment.

Refer to the Measurement Accuracy chapter. To prevent wrong interpretation of measurements that may impact diagnosis or treatment planning, keep in mind that displayed measurements are computed estimation of structures size and associated metrics.

CAUTION

Due to different nature in voxel acquisition and spatial resolution, volume measurements performed on CT, MR and PET can be significantly different.
User should not compare those volumes directly as this could lead to a misunderstanding of the tumor volume evaluation.

CAUTION

While ROI statistics are calculated on displayed volumes in volume viewer (segmented or not), the summary table only displays statistics calculated from original volumes (non-segmented) in order to avoid confusion between measurements on different similar images (segmented vs non-segmented).

CAUTION

When comparing PET exams, it is recommended to use the original images and to verify the following parameters which may affect SUV calculations: Acquisition method, Uptake time, Scanner calibration, Reconstruction parameters.

CAUTION

For NON-GE HealthCare PET images, the acquisition time used for SUV calculation may be overwritten if the original PET images are post processed as it might impact SUV measurements accuracy. The user should re-examine the parameters in the SUV (Standard Uptake Values) Calculation panel and update if necessary.

5. Measurements on centerline for Quick Vessel Trace

⚠CAUTION

After Quick Vessel Trace vessel tracking, perform a visual check of the segmented vessel. It is the user's responsibility to verify the consistency of results with the original acquisition images, in order to avoid wrong measurements on tracked vessels.

⚠CAUTION

In difficult situations, such as a vessel with a complex trajectory, or vessels touching each other in the images, the automatic vessel tracking algorithm may not always follow the correct trajectory. The user should always examine the computed trajectory, and if necessary correct the result either by modifying the centerline trace or by correcting the tracking points and/or adding intermediate points, then repeating the centerline detection process.

⚠CAUTION

The vessel centerline detection algorithm (vessel identification) relies on the user correctly marking the start and end points of the vessel branches to be tracked. It is the responsibility of the user to verify that all vessel branches to be analyzed have been identified correctly by the software. This verification is more reliable when done on a MIP view.

⚠CAUTION

When reloading saved centerlines, measurements based on it can slightly vary from original review. User should review each measurements using the bookmark navigation to avoid using inaccurate measurements for diagnosis or treatment planning.

⚠CAUTION

The geometric transformations necessary to "unfold" the vessel, or in other words, to transform the three dimensional centerline into a straight line, results in a degree of geometric distortion of the anatomic features displayed in this view, so that the view does not represent the real orientation or trajectory of the vessel. For these reasons, the lumen view should be used for orientation purposes only, not for diagnostic purposes. Use the correlated 2D views to verify findings.

⚠CAUTION

In some conditions of use (vessels analysis), Volume Viewer calculates and displays measurements with a precision factor [value +/- xx mm^2, mm^3].
The precision factor relies on various parameters such as, but not limited to: slice thickness, pixel size, anatomical structure tortuosity, user precision in graphical object deposition.
Refer to the Measurement Accuracy chapter.
To prevent wrong interpretation of measurements that may impact diagnosis or treatment planning, keep in mind that displayed measurements are a computed estimation of structure size and associated metrics.

6. Filming and Saving Images

WARNING

When filming or saving images for diagnostic purposes, always make sure the patient name and geometry information is displayed on all views and match the information on the reference views in order to avoid mix of patients or exams and reporting erroneous findings.

WARNING

When exporting images using batch filming (filmer, printer, screensave), check the accuracy and consistency of geometry, FOV, RAS, localization according to the prescribed parameters (geometry, FOV, RAS, localization) in order to avoid reporting wrong information for diagnosis or treatment planning.

7. Patient confidentiality

NOTICE

The equipment on which the Volume Viewer application runs includes one or more hard disk drives which may hold medical data related to patients. Such equipment may in some countries be subject to regulations concerning the processing of personal data and the free circulation of such data. It is strongly recommended that access to patient files be protected from all the persons not in medical attendance.

8. Fused images

WARNING

Check visually that fused images are correctly displayed for both reformatted and 3D views in order to avoid reporting wrong information for diagnosis or treatment planning.

WARNING

When comparing PET-CT exams, it is strongly recommended to load both native studies in the dedicated protocol PET-CT compare in order to avoid reporting wrong information for diagnosis or treatment planning.