

Instructions for Use

CuratOR™
EX190

1MP 19" LCD Monitor

Important

Please read the safety information and all information delivered with the product carefully to familiarize yourself with safe and effective usage.



Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that material damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Use of EIZO products

 WARNING
EIZO products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by EIZO. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of their respective owners. Please refer to the trademarks listed in the appendix. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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1 Introduction

1.1 Contents of this document

This document explains the functionality and the approved use of the CuratOR EX190. To ensure clarity, it does not contain all detailed information on this product.

The contents of this document are neither part of a previous or existing agreement, commitment or legal relationship, nor does it modify such.

Note
This documentation is available in electronic format only. It can be found on the CD-ROM provided and can be downloaded from www.eizo-or.com .

1.2 Intended use

Intended purpose

The CuratOR EX190 is intended for the display of still images and moving images from various commercially available devices commonly used in a medical environment, in particular radiology. The monitor is optimized for the reproduction of grayscale X-ray images. The monitor is not suitable for mammography.

Intended patient population and medical conditions

The EX190 can be used for the intended purpose irrespective of age, body weight and gender.

The EX190 is intended to be used in combination with or mounted on medical devices. The monitor therefore has no direct contact with the patient.

The EX190 is intended to display still images and moving images from various commercially available (medical) devices commonly used in a medical environment. The monitor cannot be used for direct diagnosis and as main device for monitoring live support equipment.

Intended users

The intended users for the EX190 are qualified healthcare professionals.

Intended environment

The EX190 is intended to be used in professional healthcare facilities such as clinics and hospitals. The monitor can be used in operating rooms (OR) or near patients, but is not limited to them. The monitor is not intended for direct patient contact!

The EX190 is not suited for the following environments:

- Home-based healthcare facilities.
- Near short-wave therapy devices.
- Near an MRI-System.
- Built into vehicles, including ambulances.

Note
Serious incident 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.

1.3 User groups

User

In the following, healthcare personnel such as surgeons or medical technicians are referred to as the "user".

Service / service personnel

"Service" or "Service personnel" identifies authorized personnel with knowledge of electrical and signal connection, local standards for image quality requirements, and safety of medical products, for example a hospital technician or manufacturer of medical devices.

Cleaning staff

"Cleaning staff" refers to personnel responsible for cleaning medical devices.

2 Safety information

2.1 General safety instructions

Correct and safe operation of EIZO devices assume professional transport, storage, installation, and connection, as well as careful operation and service.

The devices may only be used for applications for which they are intended.

For safety reasons, the following precautions must be observed:

 DANGER
Please observe all warning information present on the device and in the instructions for use. There is a danger to life if warnings are not obeyed. Severe personal injury or damage to property may occur.
Observe the safety requirements of EN 60601-1 (IEC 60601-1) To prevent injury to patients and users, connect the electrical system in accordance with the safety requirements of EN 60601-1 (IEC 60601-1) for "Safety requirements for medical electrical systems".
Connecting the protective earth conductor If the device is connected to line power, the device must be connected to a protective ground conductor. This is the only way to ensure that the touch leakage current in a first fault event does not exceed 500 µA. The interruption of the device's protective conductor is considered a first fault event in accordance with EN 60601-1. Use the following measures to ensure that the leakage currents remain below the specified limits: • Separators for signal input unit or signal output unit • Use of a safety isolating transformer • Use of the additional protective ground terminal
Mounting of the monitor: The monitor's suspension arm must have its own protective ground conductor. This protective ground conductor guarantees, together with the protective ground conductor of the monitor, that the housing leakage current always remains less than 500 µA, even in the event of a single fault condition.
No unauthorized opening of the device / no unauthorized service or maintenance work The device may only be opened by qualified personnel. Likewise, service or maintenance work may only be carried out by qualified personnel. There is a risk of electric shock. No liability is accepted for death and injury to persons or damage to property resulting from work carried out by non-qualified personnel.
Do not touch components in the device If the device is connected to the line power, components in the device are subjected to high voltages. Touching the components may be fatal.
No contact between device and patients The device is not suitable for direct contact with a patient. The device and patient must never be touched simultaneously. Otherwise there is a danger to life and limb.

 DANGER

Please observe all warning information present on the device and in the instructions for use.

There is a danger to life if warnings are not obeyed. Severe personal injury or damage to property may occur.

Never use defective power cables

If a damaged or unsuitable power cable is used, it could result in a fire or electric shock. Only use power cables with PE contacts approved by the manufacturer.

Disconnect the power cable correctly

When disconnecting the power cable, always do so by holding the plug. Ensure that your hands are dry. There is a risk of electric shock.

Do not insert any objects into the housing

Objects inserted into the housing may result in an electric shock or damage to the device.

Do not place any objects on top of the device

If you place objects on top of the device, this can lead to overheating and fire.

Avoid penetration of liquid

Liquids seeping into the device may result in electric shock or device failure.

 CAUTION

Extensive damage to property may result if the device is not connected correctly

That is why you should observe the warning information:

Connection must be carried out by specialists

Please ensure that all steps are taken to avoid injuries or incorrect diagnoses.

- Only use the video cables specified by the manufacturer for the connection.
- Only use power cables with PE contacts.
- Only use power outlets with PE contacts.
- Do not connect too many devices to a power outlet or extension cable.
- Observe the information provided by the respective manufacturer.
- If required by the application or local regulations, QA software must be used for quality control and documentation.

Connection in the USA and Canada

Molded power supply plugs must comply with the requirements for "hospital grade attachments" CSA Std. C22.2 No. 21 and UL 498.

Connection in China

Only use power cables approved for China. These power cables are identified by the labels "CCC" or "CQC".

Observe the country-specific regulations

Observe all regulations of the country in which the device is used.

NOTICE

Extensive damage to property may result if the device is not connected correctly

That is why you should observe the warning information:

- Desktop installation:
Place the device on a solid and level surface. The attached stand, as well as the installation surface, must be suitable for the weight of the device.
- For mounting on a wall or ceiling suspension:
The mount unit must be suitable for the weight of the device.
- For installation in a rack:
Observe the installation sequence, and provide ventilation for the device.

Provide adequate air circulation

When installing the device, ensure that there is adequate air circulation for operation. The permissible ambient temperature range must not be violated. Otherwise, the device could be destroyed by overheating.

Avoid sources of heat

Do not install the device in the vicinity of sources of heat, such as radiators, heating appliances or other devices that can generate or emit heat.

Do not subject the device to jolting or shocks

The device contains sensitive electronic components that could be damaged by jolting or shocks.

Only switch on a cold device following adaptation to room temperature

If the device is brought into a room with a higher or rising temperature, condensed water will form in and on the device. Do not switch on the device until the condensed water has evaporated. Otherwise, the device could be damaged.

NOTICE

Extensive damage to property may result if the device is not connected correctly

That is why you should observe the warning information:

Transportation only in original packaging

Use the original packaging for transportation, and transport in the correct shipping position. Be sure in particular to protect the monitor LCD modules from shocks.

Care of device / cleaning agents

- Remove water drops immediately; extended contact with water discolors the surface.
- Only clean the surfaces using the cleaning agents referred to in the Instructions for Use.
- Monitor: The screen is extremely sensitive to mechanical damage. Absolutely avoid scratches, shocks, etc.

What to do if the device is faulty

If the following conditions exist, the device must be disconnected from the line power supply and checked by qualified personnel:

- Damage to the plug or power cable.
- After liquid seeps into the device.
- If the device has been exposed to moisture.
- If the device does not function or if a fault cannot be eliminated using the Instructions for Use.
- If the device has been dropped and/or the housing damaged.
- If the device smells of burning or makes peculiar noises.

Be aware of the monitors aging

Note that monitors can fail as a result of aging, and that image properties such as brightness, contrast, and color value can change.

Do not touch the monitor screen

Due to mechanical pressure or electrostatic discharges, touching the screen can result in brief disturbances to the image.

2.2 Product-specific safety instructions

CAUTION

Check the gray levels

After each LUT recalculation performed in the "Adjust LUT" menu, it is absolutely necessary to apply an appropriate test pattern and check that all gray levels are displayed correctly.

CAUTION

Setting the monitor height / turning the display

When the monitor is installed on a stand, setting the monitor height or turning the display can result in injuries.

- Carefully change the monitor height.
- When changing the height of the monitor or turning the display, make sure that you do not trap your fingers or any other objects.
- To turn the display, move the monitor to the highest monitor position.

CAUTION

Tilting the monitor

Tilting the monitor can result in injuries or damage to the device.

- Ensure that the monitor is stable after installing a stand.

NOTICE

Subsequent installation of a stand

If a stand is subsequently attached to the monitor, the stand must meet the requirements of standard EN 60601 so that the system, comprising the stand and monitor, meets the requirements.

Note

No zero error rate

LCD monitors do not have a zero error rate. For this reason, the image parameters can change over time, e.g. reduced luminance or changing/fading colors.

Note

Image quality

To maintain constant image quality, EIZO recommends cleaning the monitor on a regular basis and checking image properties in accordance with all applicable local regulations.

3 Description

3.1 Scope of delivery

The device and various components are included in the scope of delivery. After unpacking, check the scope of delivery for correctness and completeness.

Note

Keep the packaging material for subsequent transport of the device.

Device

The CuratOR EX190 is a 1MP 19" LCD Monitor for installation in a ceiling or wall mount, or for installation in a stand. The CuratOR EX190-S version has a stand. Otherwise, the versions are identical.

Product	Order number	Description
CuratOR EX190	6GF62102EL10	Without stand
CuratOR EX190-S	6GF62102EL01	With stand

Components

Components

The following components are included in the scope of delivery:

- Signal cable
 - DVI single link cable
 - VGA-DVI-I adapter
 - DisplayPort cable
- General safety instructions (22 languages)
- CD-ROM with the documentation

3.2 Features

The CuratOR EX190 has the following features that permit a wide range of applications:

Perfect picture reproduction thanks to LCD technology

The use of LCD technology eliminates picture geometry distortions and color spots.

The monitor delivers flicker-free images even at low border rates (60 Hz). The monitor thus meets the strictest ergonomic requirements.

Screen resolution

The EX190 is equipped with an active 19" TFT display that has an extremely wide viewing angle. The monitor offers maximum gray scale contrast across a very wide viewing angle (in-plane switching (IPS) technology).

The optimum screen resolution is 1280 x 1024 pixels. Video signals with other resolutions, as are common in medical technology, are automatically adapted to the screen size. Alternatively, they can be displayed in original size (1:1).

Digital and analog video inputs

The monitor is connected to a digital video source using DisplayPort or DVI-I. Analog video sources can be connected via BNC (monochrome) or via DVI-I (analog).

Use the On Screen Display (OSD) to adapt the monitor if necessary.

Force Mode

Using the Force Mode function, the EX190 can be adapted to special timing settings.

Dynamic key help

Dynamic key help displays the functions of the keys, simplifying navigation in the OSD menu.

Adjustable LUT

The adjustable LUT functions allows manual recalculation of the lookup table. This allows users to modify the gamma model, luminance settings, or color parameters in accordance with local needs or preferences.

The LUT is recalculated via the OSD menu without having to access external calibration software. The reset LUT is calculated immediately, saved in the device, and used internally.

4 Setup and installation

CAUTION

Changes to device

Do not make any mechanical or electric changes to the device. Otherwise the device warranty becomes invalid.

The manufacturer is not liable for changes made to the device.

4.1 Installation site

Note the following conditions at the installation site.

NOTICE

The power switch and connections must be accessible at all times

When installing and connecting the monitor, ensure that the power switch and the connections are accessible at all times.

NOTICE

Condensation

If the device is brought into a warm environment from a cold one, condensation may form in the device. This could result in a short circuit when switching on the device, damaging it.

- Wait until the condensed water has evaporated, including that inside the device, before you switch it on. This can take several hours.

Sufficient ventilation

Ventilation holes are located on the rear of the housing.

If the ventilation holes are covered or closed, the heat generated in the monitor will not be dissipated sufficiently.

- Do not cover the ventilation holes.
- Do not close the ventilation holes.
- The minimum distance from the top, back, and side of the monitor to the wall must be at least 10 cm, and at least 15 cm from other heat-emitting devices.

Avoid dusty environments

The monitor is intended for use in the clean environment of medical diagnostics. In dusty environments, ventilation holes in the back can allow dust to penetrate into the monitor. In the worst case, deposits are possible which become evident as dark spots in a white picture and result in deterioration of the luminance.

- Protect the monitor from dust, for example through appropriate construction measures at the installation site.
- During transport, use the original packaging or service packaging.

Maintain the permissible ambient temperature

The ambient temperature should be in a range of +5 °C to +40 °C. If the ambient temperature exceeds this range it could result in overtemperature in the monitor. In this case the Operation LED initially flashes orange. If the temperature continues to rise the LED will flash red and brightness will be reduced to prevent overheating.

Avoid reflections on the screen

The monitor has an anti-glare surface that is only effective if the screen is clean and grease-free.

- Comply with the specifications for [Cleaning](#) [► 54].
- Position the monitor to avoid reflections on the display area.
Reflections can be caused by lights, windows, furniture with shiny surfaces, or light-colored walls.
- In order to reduce reflections on the monitor, only use non-dazzling reflector bulbs for the ceiling lighting.

Avoid shocks and impacts

The monitor is sensitive to shock. Shocks and impacts on the panel surface can lead to total failure.

- Ensure that such mechanical influences are avoided.

Movable installation

If the monitor is installed such that it can move, make sure that persons or objects in the facility are not endangered by the monitor's range of movement.

4.2 Installing the monitor

Mounting on a pole or a monitor stand

Multiple monitors can be installed flush horizontally and vertically to one another. The monitor has a VESA 100 x 100 adapter.

Note the following during installation:

- The maximum torque for attaching to the holder is 3 Nm.
- The screws used for attaching to the holder must meet the following requirements:

Number	4
Thread	M4
Solidity class	8.8
Insertion depth	5 mm to 10 mm

- Mounts must be tested and approved by the manufacturer for the weight to be supported.
- An installed stand must be sufficiently stable to withstand tilting of up to 10° without toppling the monitor.

5 Connecting

5.1 Safety information for connection

All safety information and warnings for the device must be observed to ensure danger-free operation.

CAUTION
--

Changes to device

Do not make any mechanical or electric changes to the device. Otherwise the device warranty becomes invalid.
--

The manufacturer is not liable for changes made to the device.
--

CAUTION
--

Shielding measures

Follow all shielding measures in accordance with local EMC directives. If these guidelines are not observed, device malfunction may result.

CAUTION

Grounding

The permissible leakage current is not exceeded during the first fault event in accordance with EN60601-1. The device is grounded with an additional protective conductor to ensure the greatest possible electric safety.
--

CAUTION
--

Excessive currents, short circuits, and ground faults
--

In accordance with national standards and regulations, protection against excessive currents, short circuits, and ground faults must be incorporated into the building installation.
--

NOTICE

Changes to device settings

Device settings may only be adjusted by service personnel.
--

NOTICE

Disconnecting from line power

Always set the power switch to "Off" before disconnecting the device from power. Otherwise the device could be destroyed.

NOTICE

Cable installation

Observe the following instructions:

- Only shielded cables are to be used for all signal connections.
- 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

5.2.1 Connector locations

The connectors are located in the connection panel behind a cover on the back of the monitor. The power switch is not covered and is freely accessible.

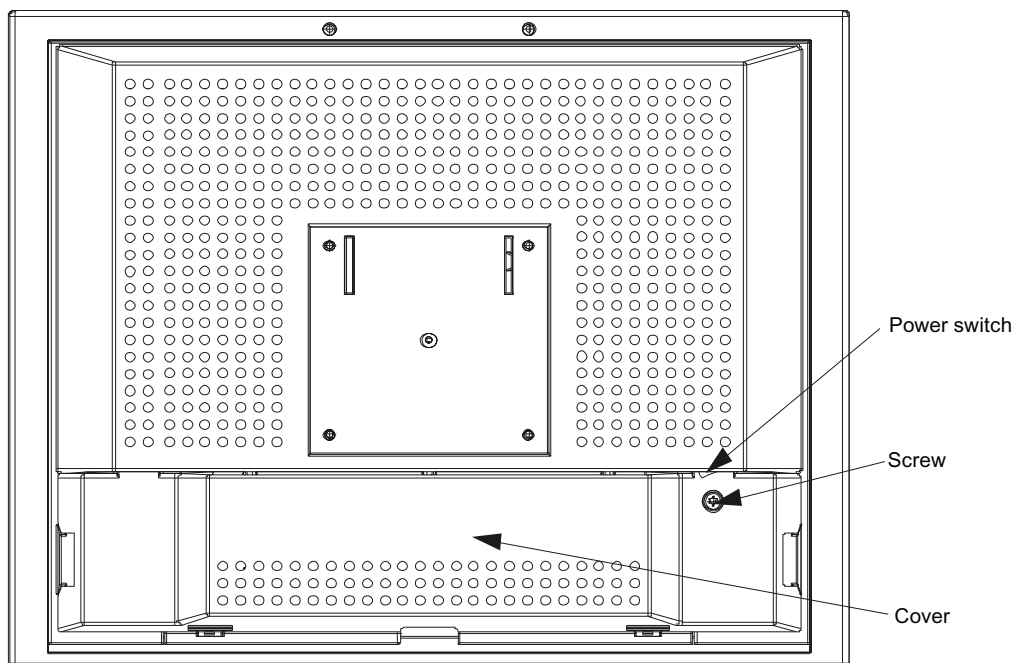


Fig.: Rear view with cover

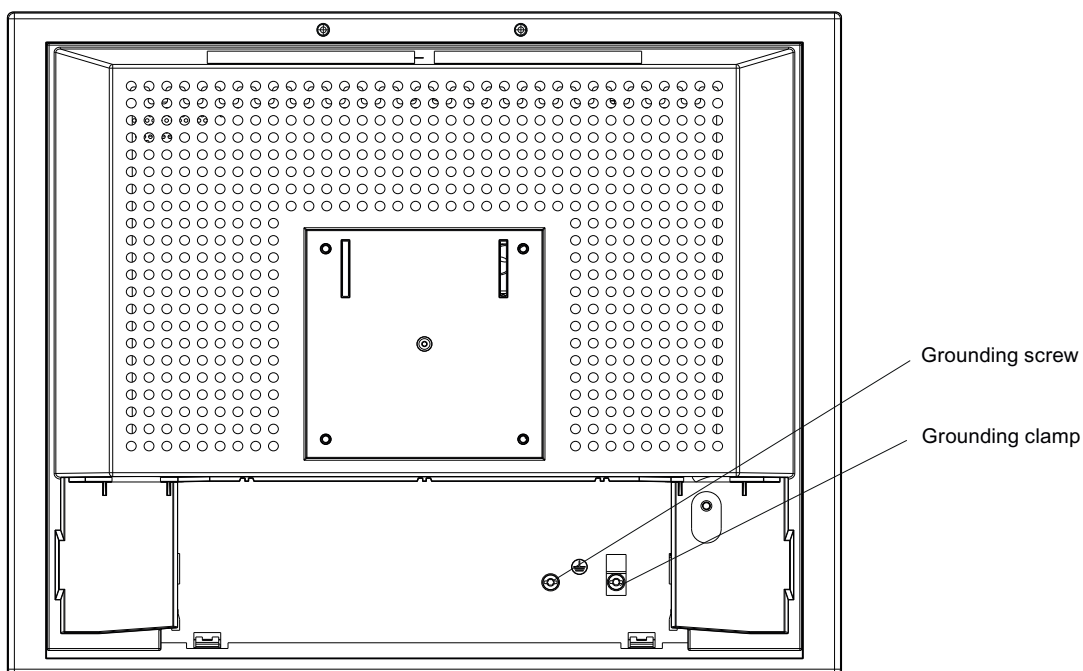


Fig.: Rear view without cover

5.2.2 Connection panel

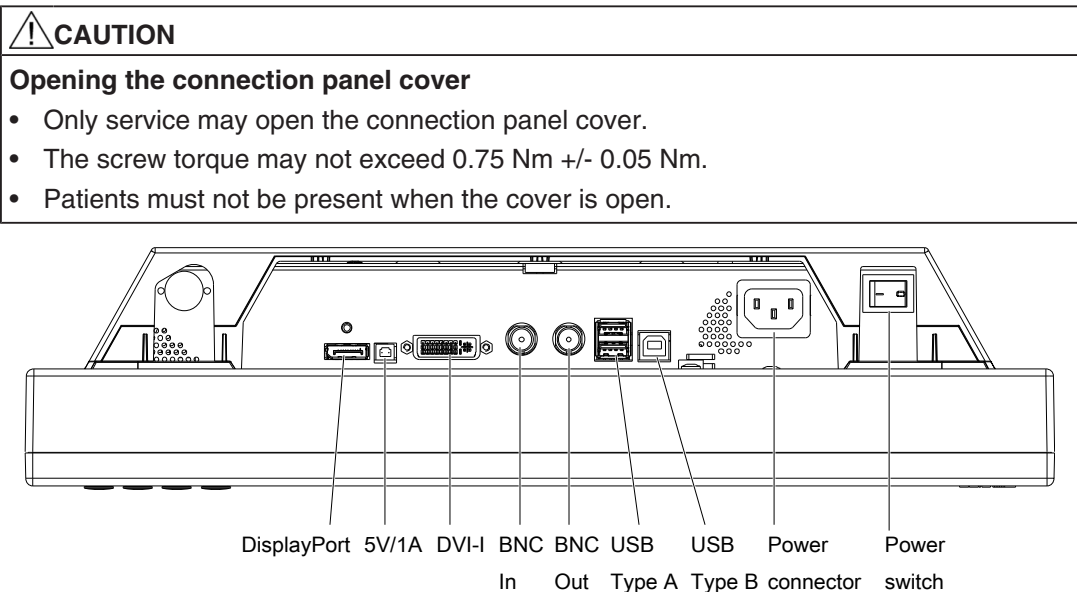


Fig.: EX190 connection panel

DisplayPort

The monitor has a DisplayPort connector.

5 V connector

The monitor has a 5 V output that can be used to supply external devices.

DVI interface

The monitor has a DVI-I connector.

BNC In

Input for BNC connector "G" for displaying gray scale images.

BNC Out

Output for BNC connector "G".

USB ports

The USB-A ports enable communication with external devices.

The USB-B port enables communication between the monitor and a connected PC, or can be used for service purposes.

Power connector

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

Power switch

The power switch is to the right next to the connection panel cover and is used to turn the device on and off.

5.3 Connecting the power cable

DANGER

Connecting to line power

- The device is designed for line power with a protective earth conductor.
- To avoid risk of electric shock, this device must only be connected to line power with a protective earth conductor.
- Contact the responsible building technician or a qualified electrician if you are uncertain whether the line power is equipped with a protective earth conductor.

CAUTION

Risk of damage to the device

- Only use power cables or connection cables with protective earth conductor and appliance plug according to DIN 49547, IEC 60320 (max. length 3 m, cable e.g. H05VV-F 3x1.0 mm²). The cable must comply with the safety regulations of the respective country.
- Device fuses may only be replaced by authorized repair centers. The failure of a device fuse may result in a defect in the device. Do not use any other fuse.

CAUTION

Connector

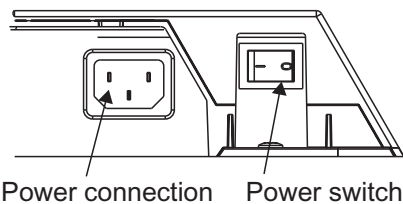
Connectors may only be plugged in or removed by Service when the device is switched off.

Prerequisite

The monitor has to be installed in the ceiling suspension, wall mount, or stand.

Procedure

1. Using a suitable tool, remove the cover from the connection panel on the back of the device.



2. Connect the appliance plug to the monitor power connector.
3. The power cable can be secured using a cable grip.
4. Place the cover back on the connection panel.

5.4 Connecting the signal cable

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

The following signal inputs are on the back of the monitor:

- DisplayPort input
- DVI-I input
- BNC input (with connecting cable "G", with composite synchronization)

Prerequisite

The monitor has to be installed in the ceiling suspension, wall mount, or stand.

Procedure

1. Using a suitable tool, remove the connection panel cover.
CAUTION: Patients must not be present when the cover is open.
2. Connect the signal cable to the monitor.
Note: All signal inputs can be connected simultaneously.
3. Tighten the screws to secure the signal cables.
4. If necessary, connect the USB cable to the upstream or downstream USB ports of the monitor.
5. Place the cover back on the connection panel.

6 Commissioning

The following sections describe how to make the settings for optimum operation of the system, comprising the monitor and video source.

The video source for example can be a PC with graphics card, or a diagnostic imaging device.

6.1 Switching on the monitor

To switch on the monitor, proceed as follows:

- Switch on the monitor using the power switch.

Note: The power switch is located on the back of the monitor, to the right next to the connection panel cover.

- Wait until the operation LED in the front panel of the monitor turns green.

6.2 Using a screen saver

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. This occurs in particular when the same image content is displayed over an extended period of time.

You can prevent image sticking by using a screen saver with image content that changes regularly.

6.3 Selecting the LUT

In the OSD LUT menu, you can select from among five predefined LUT settings and one "user" setting. The saved values are shown in a table in the OSD window.

The predefined LUT settings saved in the monitor can be changed or updated using QA software.

Note
Additional information is available in the QA software instructions for use.

6.4 Adapting the monitor to an analog video source

Note

- To achieve optimum picture quality, the monitor must be operated with a graphics resolution of 1280 x 1024 pixels. A corresponding setting for the graphics card of the video source must be made.
- To set the monitor optimally, allow it to warm up at least 30 minutes.

This section describes how to adapt the monitor to operate with an analog video source. The procedure is divided into the following steps:

- Adjust the position, phase and frequency.
- Adapt brightness and contrast.

6.4.1 Adjusting the position, phase, and frequency

Analog video sources deliver signals that have to be converted into digital signals by the LCD monitor using a video digitizer. Depending on the source, cable length, and video mode (e.g. VGA, SVGA, XGA), this conversion may cause certain deviations which cannot be corrected fully automatically by the monitor.

Comparison of position, frequency and phase

Note

The auto function for adjusting brightness and contrast is only available for analog signals. The picture quality for digital video signals is already optimized, and adjustment is not required.

If the image geometry is not shown correctly, proceed as follows:

1. Use the SMPTE test pattern for the display.
2. For the "Configuration auto" function in the "Geometry" OSD menu, set the "Position/Phase/Frequency" parameter to "On".
3. Select the "Perform auto adjustment" function the "Geometry" menu.
4. For the "Configuration auto" function in the "Geometry" menu, set the "Position/Phase/Frequency" parameter to "Off".
 - ⇒ The monitor automatically recognizes the standard used, and has preprogrammed set-up values for each standard. However, depending on the graphics card used, fine adjustment may still be required for the selected standard.

Fine adjustment of the monitor

During fine adjustment, the monitor is adjusted manually to the respective video source.

Fine adjustment includes settings such as image position, phase, frequency, and picture sharpness. The settings are performed in the OSD "Geometry" menu.

By adjusting the image position and size, you ensure the full picture is displayed on the active area of the monitor, down to the last pixel. If the horizontal position is shifted 1 pixel too far to the right for example, a 1 pixel-wide edge on the right side of the picture is lost, and a 1 pixel-wide black column is displayed on the left side.

6.4.2 Adapting brightness and contrast

The brightness and contrast must be adjusted for the respective graphics card in the system on site due to different output levels.

Note

The exact brightness and contrast settings are only possible with a photometer.

Perform the following steps unless a specific procedure is specified for the system.

Adjustment of brightness and contrast

Note

The auto function for adjusting brightness and contrast is only available for analog signals. The picture quality for digital video signals is already optimized, and adjustment is not required.

1. Use the SMPTE test pattern for the display.
2. For the "Configuration auto" function in the "Geometry" menu, set the "Brightness/Contrast" parameter to "On".
3. Select the "Perform auto adjustment" function the "Geometry" menu.
4. For the "Configuration auto" function in the "Geometry" menu, set the "Brightness/Contrast" parameter to "Off".
 - ⇒ The automatic values for brightness and contrast are set. Optimization of brightness and contrast may be necessary depending on the graphics card. Therefore, perform the following steps.

Optimizing the values for brightness and contrast

1. Direct the photometer toward the black level (0% field) of the SMPTE test pattern.
2. Change to the "Image" menu in the OSD.
3. Using the "Brightness" function, reduce the brightness value until the measured luminance no longer falls.
4. Increase the brightness value a little:
 - ⇒ This is the optimum brightness value.
5. Direct the photometer toward the white level (100 % field) of the SMPTE test pattern.
6. Using the "Contrast" function, find the contrast value at which the luminance remains constant.
7. Lower the contrast value until there is an initial change in brightness.
 - ⇒ This is the optimum contrast value.
8. Exit the OSD to save the values.
 - ⇒ You have set the brightness and contrast for optimized display of the 5% and 95% squares of the SMPTE test pattern.

6.5 Adapting the monitor using Force Mode

NOTICE
Force Mode is a service tool
Force Mode should only be used by service personnel to determine an unknown timing and implement it in the monitor.

6.5.1 Introduction to Force Mode

Various factory-set timings are saved in the monitor. As soon as a video signal is connected, an appropriate timing is sought. "Auto In Process" is displayed during this phase. These timings are compatible with the standard video signals provided by current graphics cards.

If no image or only an unclear image is displayed on the monitor, the signal is outside the standard supported range. Such signals are common with older medical equipment. A timing of this sort can be set using the Force Mode function.

In many cases, a signal outside the standard range is displayed correctly without having to use Force Mode. This is possible because a large number of known timings are saved in the monitor.

6.5.2 Basic information on timing

Scanning with interlaced and non-interlaced procedures

There are two different scanning systems. They differ in the technology used to display the image on the screen. TV signals, and monitors which are compatible with them, generally use the interlaced procedure; computer signals, and monitors compatible with them, generally use the non-interlaced procedure. These two formats are not compatible; one of them must first be converted before the signals can be processed together.

In the case of interlaced scanning, each image is divided into two separate fields. An image therefore comprises two fields. An interlaced image is output on the screen in two scans. The horizontal lines of the first field are scanned first, and then, again starting at the top of the image, the horizontal lines of the second field are scanned between the first set of lines. Field 1 consists of the lines 1 to 262 1/2, and field 2 of the lines 262 1/2 to 525. Only a few lines are displayed at the top and bottom of each field.

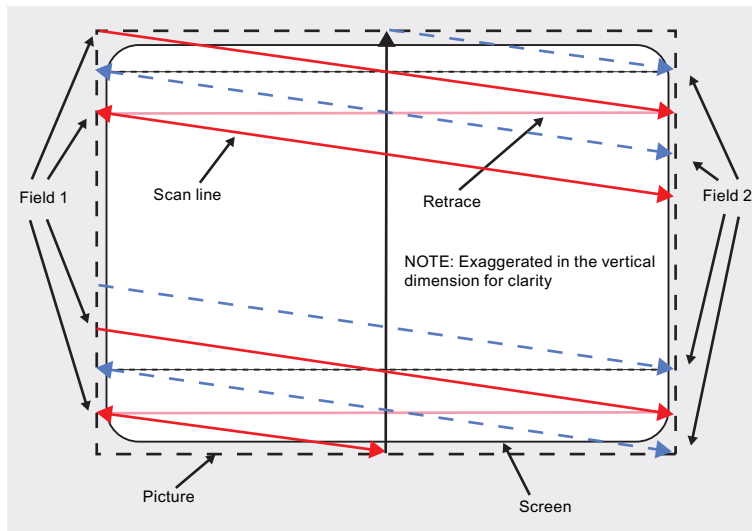


Fig.: Interlaced scanning system

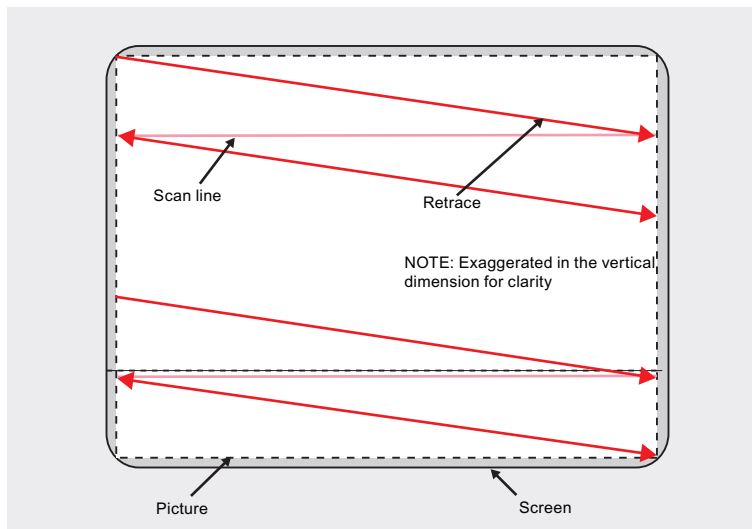


Fig.: Non-interlaced scanning system

A non-interlaced image is output to the screen such that all horizontal lines are scanned from top to bottom in a single scan.

Horizontal timing diagram (the vertical timing diagram is identical)

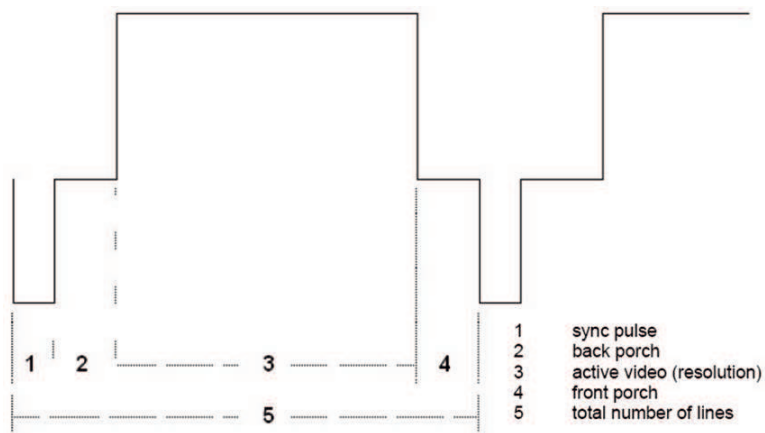


Fig.: Timing diagram

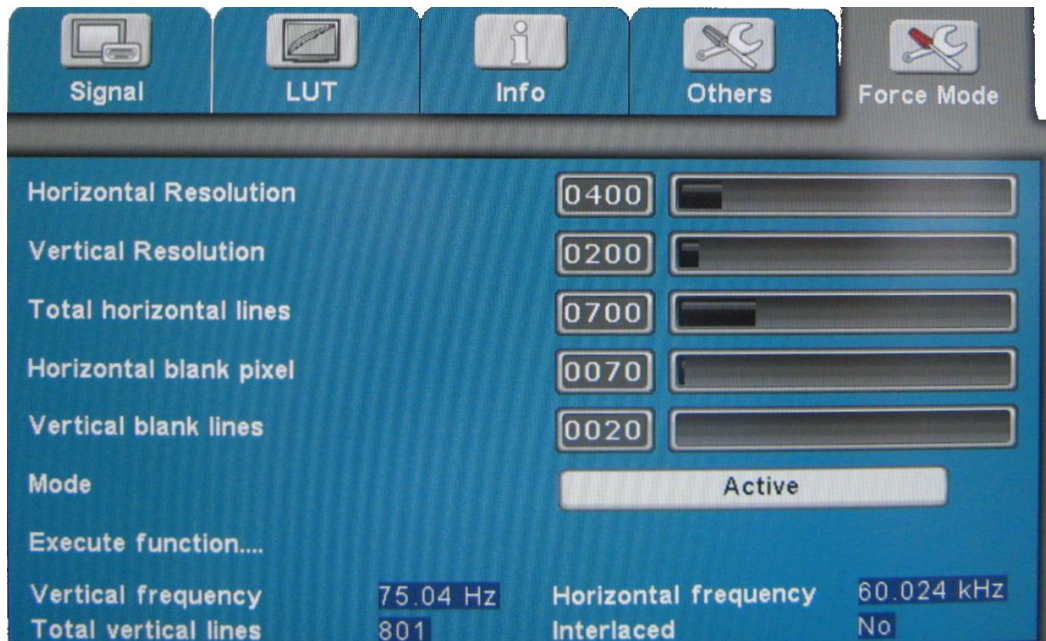
Force Mode menu	Timing diagram
Horizontal resolution	3 - Active video (horizontal resolution)
Vertical resolution	3 - Active video (vertical resolution)
Total horizontal lines	5 – Total number of lines (horizontal)
Horizontal blank pixels	4 – Front Porch (horizontal)
Vertical blank pixels	4 – Front Porch (vertical)

6.5.3 Entering timing data

If you know or have already determined the timing data, you can enter it directly in the OSD "Force Mode" menu.

Entering known timing data

1. Open a test pattern with a clearly defined border (e.g. SMPTE image).
2. Open the "Force Mode" menu in the OSD.



3. Use the keys to enter the timing data in the input fields.
4. Set the "Mode" to "Active".
5. Apply the entered data by selecting "Execute function..."

Note

Always save the data with "Execute function...".

The timing data are only entered into memory with the "Execute function..." command, and the image is then displayed with the new parameters.

6.5.4 Determining the timing data

If you know none or only part of the timing data, you can determine the data incrementally in the "Force Mode" menu.

Note

All settings must be implemented with the zoom factor "1 to 1" ("Geometry" menu).

Sequence for determining a timing

1. Determine the start values using the auto function.
2. Enter the known data.
3. Optimize the scanning frequency.
4. Optimize the geometry and resolution.

Step-by-step instructions for setting a timing can be found in the next sections.

Determine start values using auto function

The following commands can be used to trigger automatic determination of the timing data, and provides rough approximation of the applied timing.

1. Open a test pattern with a clearly defined border (e.g., SMPTE image).
2. Open the "Force Mode" menu in the OSD.

The screenshot shows the 'Force Mode' menu with the following settings and options:

Parameter	Value	Slider
Horizontal Resolution	0400	
Vertical Resolution	0200	
Total horizontal lines	0700	
Horizontal blank pixel	0070	
Vertical blank lines	0020	

Mode: Start

Execute function....

Parameter	Value	Parameter	Value
Vertical frequency	75.04 Hz	Horizontal frequency	60.024 kHz
Total vertical lines	801	Interlaced	No

3. Set "Mode" to "Start".
4. The start values are determined when you select "Execute function..."
Note: The timing data are only entered into memory with the "Execute function" command, and the image is then displayed with the new parameters.

After the "Execute function..." "Mode" switches to "Active" and you can optimize the start values.

Entering known data

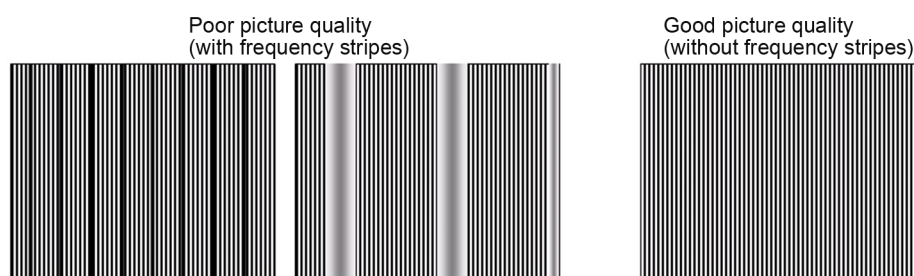
If some of the timing data are known they can be entered after determining the start values in order to simplify the subsequent steps.

If the resolution is known for example, it can be used for the approximation of "Total horizontal lines". In this case, "Total horizontal lines" has to be greater than "Horizontal Resolution". If "Total horizontal lines" is less than "Horizontal Resolution" during setting, that latter has to be reduced. A larger "Horizontal Resolution" can result in the image being split vertically.

Optimize scanning frequency

The correct signal frequency now has to be set with "Total horizontal lines".

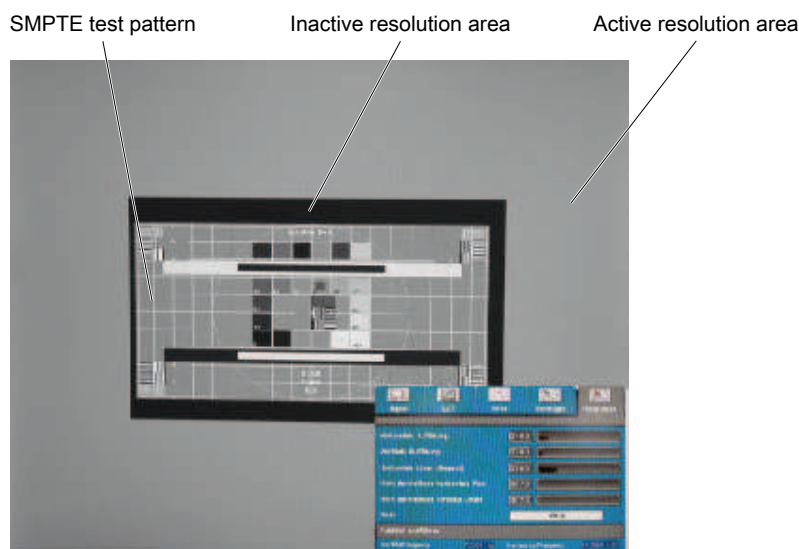
1. To set "Total horizontal lines" correctly, open a test pattern with a clearly defined border (e.g., SMPTE image).
2. Correct the signal frequency so that no interference is present in the picture. If the distance between interferences becomes larger, and these therefore also become fewer, you are changing the values in the correct direction.



Optimize geometry/resolution

The active resolution range is defined by the values of the "Horizontal Resolution" and "Vertical Resolution" input fields. This range is displayed in the center of the monitor in black.

The inactive resolution range is the unused range between the active resolution and the maximum resolution of the monitor. In Force Mode, this range is displayed gray (gray scale monitors) or blue (color monitors).



To adapt the active resolution range to the actual video signal resolution, perform the following steps:

1. Open a test pattern with a clearly defined border (e.g., SMPTE image).
2. In the "Force Mode" menu, use the "Horizontal blank pixel" input field to shift the left edge of the SMPTE image pixel-exact to the left inside edge of the gray/blue area.
3. Correct the values in the "Horizontal Resolution" input field until the right internal border of the gray/blue area is pixel-exact at the right edge of the SMPTE image.
4. Use the "Vertical blank lines" input field to shift the top edge of the SMPTE image pixel-exact to the top internal border of the gray/blue area.
5. Correct the values in the "Vertical Resolution" input field until the bottom internal border of the gray/blue area is pixel-exact at the bottom edge of the SMPTE image.
6. Apply the entered data by selecting "Execute function..."

Note: Gray/blue range not visible

If no gray/blue area is visible on the left and right sides of the image, reduce the "Horizontal Resolution" until the gray/blue area becomes visible. If no gray/blue area is visible on the top and bottom sides of the image, reduce the "Vertical Resolution" until the gray/blue area becomes visible.

Timing successfully set

The timing was set successfully. You can now exit the OSD menu. The monitor will recognize the newly set timing and select it whenever connected.

Note
• Only one timing can be saved in Force Mode itself. • Once all settings in Force Mode have been performed, the zoom factor can be changed in the "Geometry" menu.

7 Operation

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

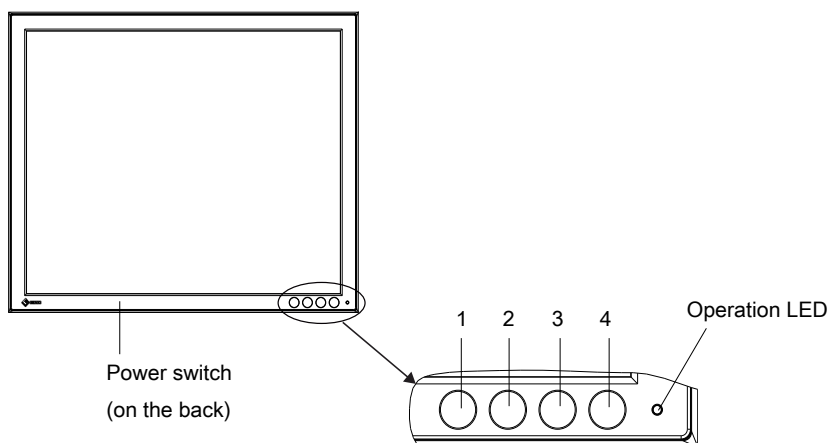
After switching on the monitor, the operation LED is lit green continuously. If the LED lights up with another color, the monitor is not operating within normal parameters.

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.

7.1 Operator controls

NOTICE
OSD operation by service personnel only
The following sections describe the operating elements and the OSD menu. The description is directed exclusively to service personnel.



The four keys and the operation LED are located on the front of the monitor in the lower right corner.

The operation LED illuminates when power is supplied to the device and the power switch is turned on.

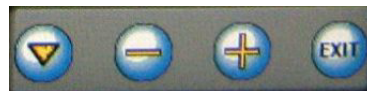
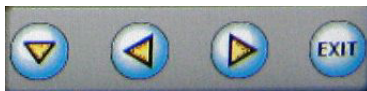
Key functions

In the OSD menu, the keys have the following functions:

Key	Function
1	• Open OSD menu • Open main menu • Change between submenus • When the OSD is blocked: Select video source.
2	• Change between main menus • Decrease/change values
3	• Change between main menus • Increase/change values
4	• Exit OSD or submenu (settings are retained)

Dynamic key help

To simplify operation, when the OSD menu is open the symbols of the currently available key functions are displayed above the keyboard.



Examples of dynamic key help

7.2 Locking or unlocking the OSD menu

⚠ CAUTION

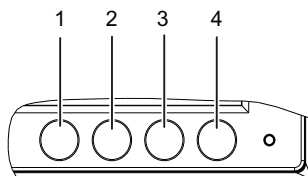
Locking and unlocking the OSD menu

Only authorized service personnel may lock or unlock the OSD menu.
The OSD must be locked if inappropriate operation by the user can impact the intended use of the monitor.

When the OSD is locked, the message "OSD is locked" is displayed.

To lock or unlock the OSD menu, press the following keys:

- Key 4 once and Key 2 three times.

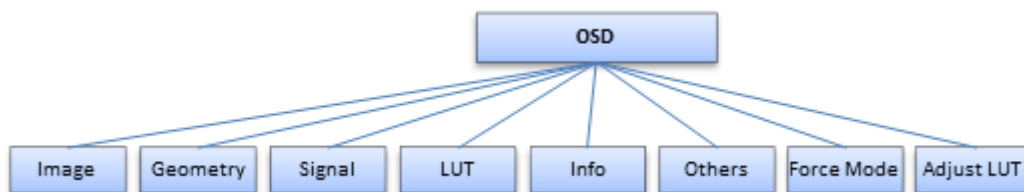


7.3 Overview of the OSD menu

You can use the OSD menu to change monitor settings or display information about the monitor.

Note

- Only a reduced OSD is available if a video source is connected.
- All signal inputs may be connected simultaneously.

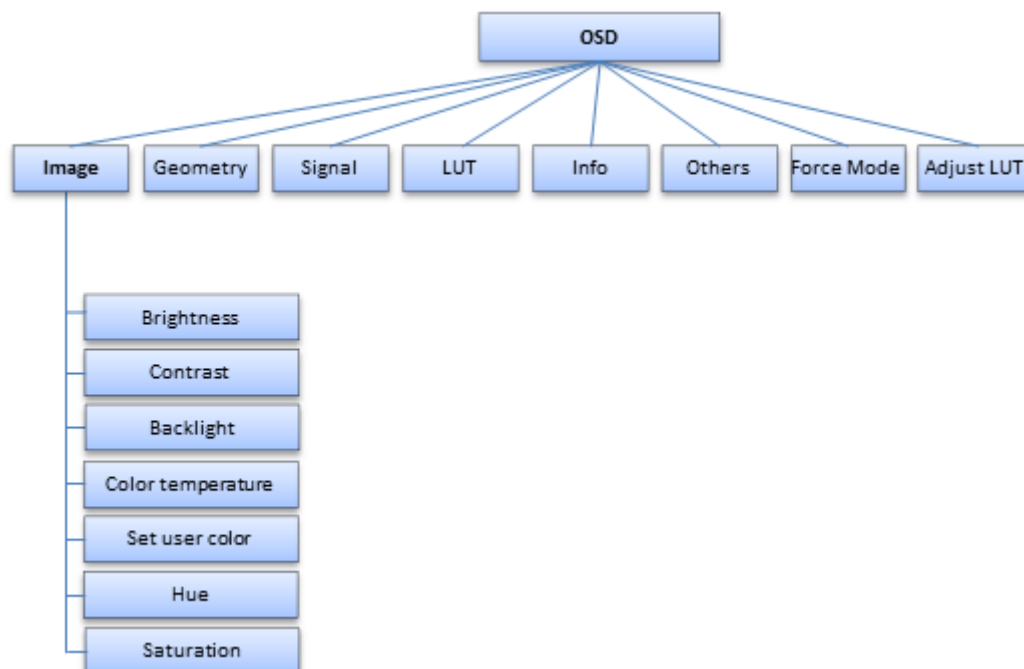


The menu shown in the figure can be opened from the OSD menu using the operating keys. The following sections present the menu and available settings.

Note

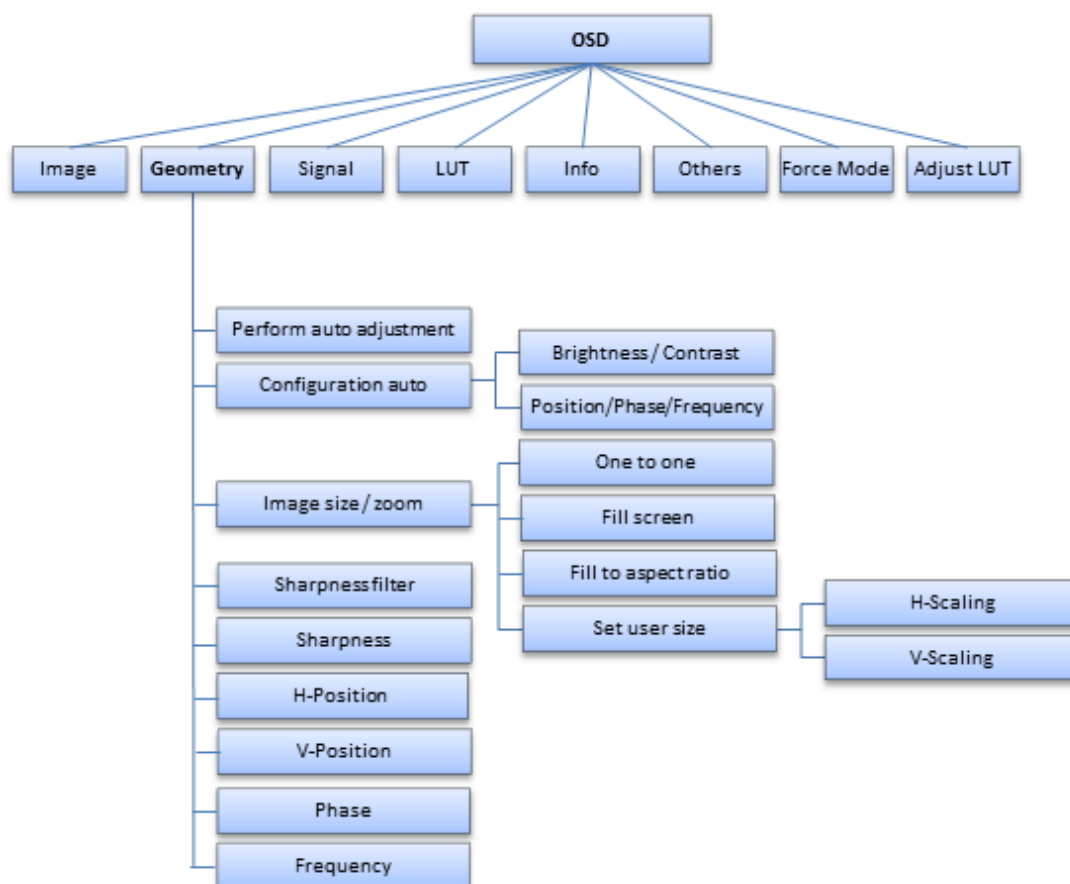
The "Adjust LUT" menu is displayed only if the "User" setting is selected in the "LUT" menu

7.4 "Image" menu



Function	Values	Description
Brightness	0 - 100 <i>Default: 50</i>	Set brightness Adapting the representation of darker picture areas. Note: The brightness settings are already optimized for digital signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).
Contrast	0 - 100 <i>Default: 50</i>	Set contrast Adapting the representation of brighter picture areas. Note: The contrast settings are already optimized for digital signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).
Backlight	0 - 200	Set the brightness of the monitor backlight Manual adjustment of overall brightness to ambient lighting. Note: The function is displayed only if the "LUT backlight command" function in the "LUT" menu is not active. See also "LUT" menu [► 42] .
Color temperature	1: Native 2: 9300 K 3: 7500 K 4: User <i>Default: Native</i>	Set the color temperature required Three fixed and one adjustable color temperatures can be selected.
Set user color	Red 0 - 100 Green 0 - 100 Blue 0 - 100	Change values for the red, green, or blue component Note: The function for variable adjustment of the color components can be used only when "Variable" is selected in the "Color temperature" menu.
Hue	0 - 100 <i>Default: 50</i>	Set the hue Note: The hue can only be set for a CVBS signal source.
Saturation	0 - 100 <i>Default: 50</i>	Set the saturation values Note: Saturation can be set only if the "Saturation in the menu Image" function in the "Signal" menu is active. See also Menü "Signal" [► 40] .

7.5 "Geometry" menu

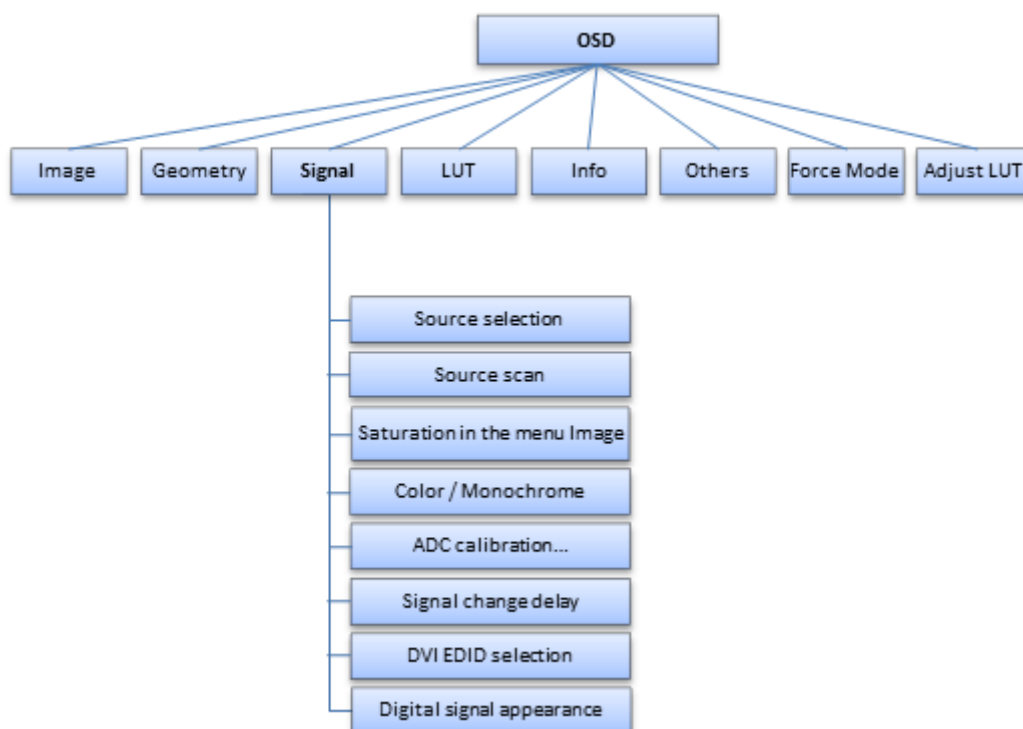


Function	Values	Description
Perform auto adjustment	Note: The function is displayed only if one analog input signal is present and at least one auto function has been activated under "Configuration auto".	Perform selected auto function Auto functions are used to automatically set the image parameters of analog signals. The quality of settings depends on the image content and type of synchronization. When you perform the function, the auto functions selected in the "Configuration auto" menu are set to the optimal value. Note: Digital image signals are always set optimally. For this reason, performing auto functions has no effect on them. Note: We recommend displaying SMPTE test patterns.

Function	Values	Description
Configuration auto	Note The function is available for analog input signals only.	
	Brightness/Contrast <i>Default: Disabled</i>	Select the "Brightness/Contrast" parameter for the auto function When you select "Enabled", the brightness and contrast are set automatically when the auto functions are executed. When you select "Disabled", the brightness and contrast are not changed when the auto functions are executed.
	Position/Phase/Frequency <i>Default: Disabled</i>	Select the "Position/Phase/Frequency" parameter for the auto function When you select "Enabled", the position, phase, and frequency are set automatically when the auto functions are executed. When you select "Disabled", the position, phase, and frequency are not changed when the auto functions are executed.
Image size / zoom	One to One Fill screen Fill to aspect ratio Set user size	Select image size • One to One: The picture is displayed on screen in its original resolution. • Fill screen: The picture is displayed to fill the complete screen (1280 x 1024 pixels). • Fill to aspect ratio: The picture is zoomed to the maximum screen area with retention of the aspect ratio. • Set user size: You can set the size required. The picture can be stretched accordingly by changing the H-scaling or V-scaling.
Sharpness filter	Only visible when "Sharpness" is set to "Normal". 0 - 24	Select filter to set sharpness Use this function for "softer" or "harder" display of the picture, or to reduce scaling artifacts. You have to determine the most suitable sharpness setting visually. A smaller value generates a "softer" impression, a higher value a "harder" one. Common filters are available for RGB image sources (DVI, DP). Note: The filter depends on the input resolution. At lower resolutions, the filter calculates the value for the non-controlled pixels.
Sharpness	Enhanced Normal	Select sharpness When you select "Enhanced", the picture is displayed with greater sharpness. When you select "Normal", The filter set under "Sharpness filter" is used for the display.

Function	Values	Description
H-position	0 - 100	Shift the picture in the horizontal direction Note: The function is available for analog input signals only. With identical monitor and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
V-position	0 - 100	Shift the picture in the vertical direction Note: The function is available for analog input signals only. With identical monitor and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
Phase	0 - 100	Set the input signal phase Note: The function is available for analog input signals only. If vertical lines blur easily, this can be corrected by adjusting the phase. Note: To correct the phase, we recommend displaying a vertical line from the "Pixel On/Off" test pattern.
Frequency	0 - 200	Set the input signal frequency Note: The function is available for analog input signals only. If vertical lines blur easily, this can be corrected by adjusting the frequency. Note: To correct the frequency, we recommend displaying a vertical line from the "Pixel On/Off" test pattern.

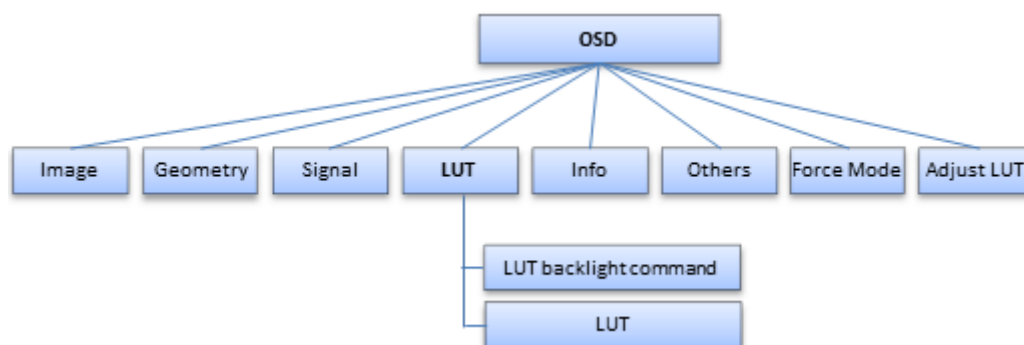
7.6 "Signal" menu



Function	Values	Description
Source selection	DVI Analog DVI Digital DisplayPort CVBS BNC	Select signal source Note: The function is displayed only when "Source scan" is set to "Enabled". The selected signal source is displayed. Note: A CVBS signal source can only be displayed when "Source scan" is set to "Disabled" and "Source selection" to "CVBS".
Source scan	Enabled Disabled <i>Default: Enabled</i>	Set the source scan When " Enabled" is selected the signal source is set automatically. When " Disabled" is selected, the signal source can be set under "Source selection". Note: A CVBS signal source can only be displayed when "Source scan" is set to "Disabled" and "Source selection" to "CVBS".
Saturation in the menu Image	Inactive and hidden Active and adjustable <i>Default: Inactive and hidden</i>	Change the saturation of the input signal Note: The function is displayed only when an analog video source is selected. If "Active and adjustable" is selected, the "ADC Calibration..." entry is hidden and "Saturation" is displayed in the "Image" menu.

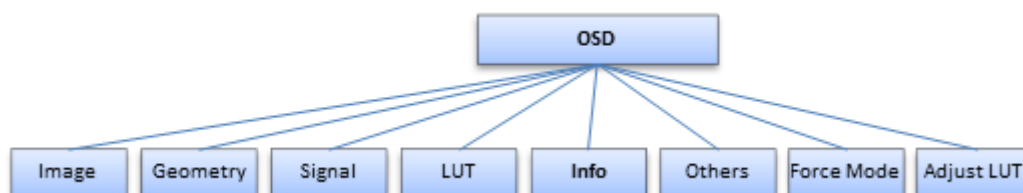
Function	Values	Description
Color / Monochrome	Color Monochrome <i>Default: Color</i>	Switch signal between monochrome and color If "Color" is set, a monochrome signal is displayed green. To obtain the correct gray scale display, you have to switch the function to "Monochrome".
ADC calibration...		Starts calibration of the A/D converter for the applied video level Note: The function is displayed only when an analog video source is displayed, the "Color / Monochrome" function is set to "Color", and "Saturation in the menu Image" is set to "inactive and hidden". Note: A suitable test pattern is required. The video level range of the system is checked, and the monitor set accordingly. This results in optimum adjustment of the individual RGB A/D converters to the video source. A more flexible and larger video level range can be achieved through calibration; for example, full brightness is also achieved when the video level is limited to a value of 700 mV. Note: The A/D converters have been factory-set and need not be readjusted.
Signal change delay	0 - 25 <i>Default: 1</i>	Setting the signal change display Note: The function is displayed only when "Source scan" is set to "On". Adjusting to a higher value causes the change is signal source to run more slowly.
DVI EDID Selection	Auto DVI Analog DVI-TDL support <i>Default: Auto</i>	Select the EDID data of the DVI device • Auto: EDID data are detected automatically using the active connection. • DVI Analog: Only analog EDID data are selected. • DVI-TDL: Digital EDID data are selected and a 5 V power supply is provided for the TDL digital transmission link.
Digital signal appearance	Normal Enhanced <i>Default: Enhanced</i>	Displaying with or without mode tables Note: The function is displayed only when a digital signal source is connected. The "Normal" setting causes the saved mode table parameters to be used to display the digital signals. The "Enhanced" setting causes the parameters required to display the digital signals are determined respectively. This means that all signal information is displayed and, for example, the image is not cropped if the "Fill" value is selected for the "Image size/Zoom" function in the "Geometry" menu.

7.7 "LUT" menu



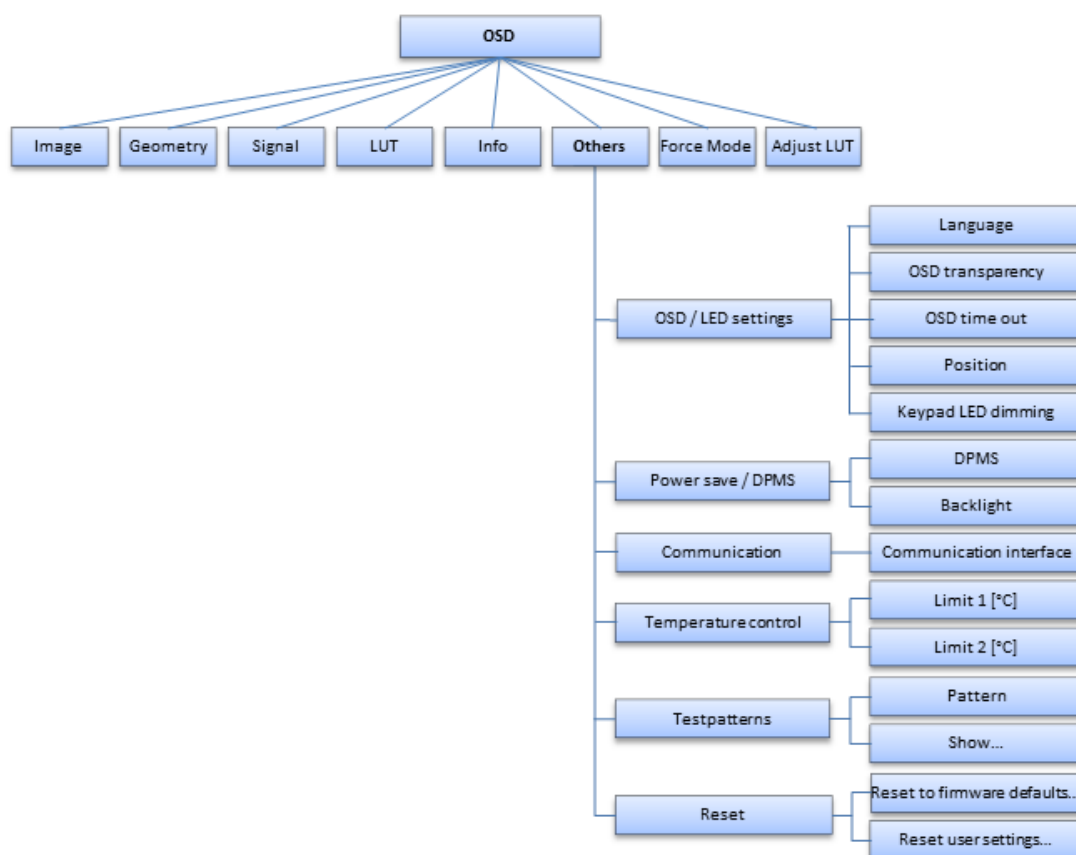
Function	Values	Description
LUT backlight command	On Off <i>Default: On</i>	Set the backlight control When you select "On", the backlight setting is determined by the selected LUT. The "Backlight" function is deactivated and not available in the "Image" menu. If you select "Off", the "Backlight" setting in the "Image" menu applies. Note: The backlight retains this value even if you change the LUT.
LUT	LUT 1-5, LUT User <i>Default: LUT 1</i>	Select the Look Up Table (LUT) The LUT determines the monitor's gamma curve. By using a different LUT for example, you can highlight specific grayscale levels. When LUT "User" is selected, the LUT can be set individually in the "Adapt LUT" OSD menu. See also "Adjust LUT" menu. Note: Select a DICOM LUT to view radiographic images.

7.8 "Info" menu



Function	Values	Description
Information	for display only	Displays the current monitor and operating data in the respective picture mode • Serial number • Temperature [°C] • Operation time [h:m] • Backlight operation time [h:m] • Backlight operation time over 480 cd/m² [h] • Source • Mode • Source signal • FW type • FW version • OSD version • Config version • SDK version

7.9 "Others" menu



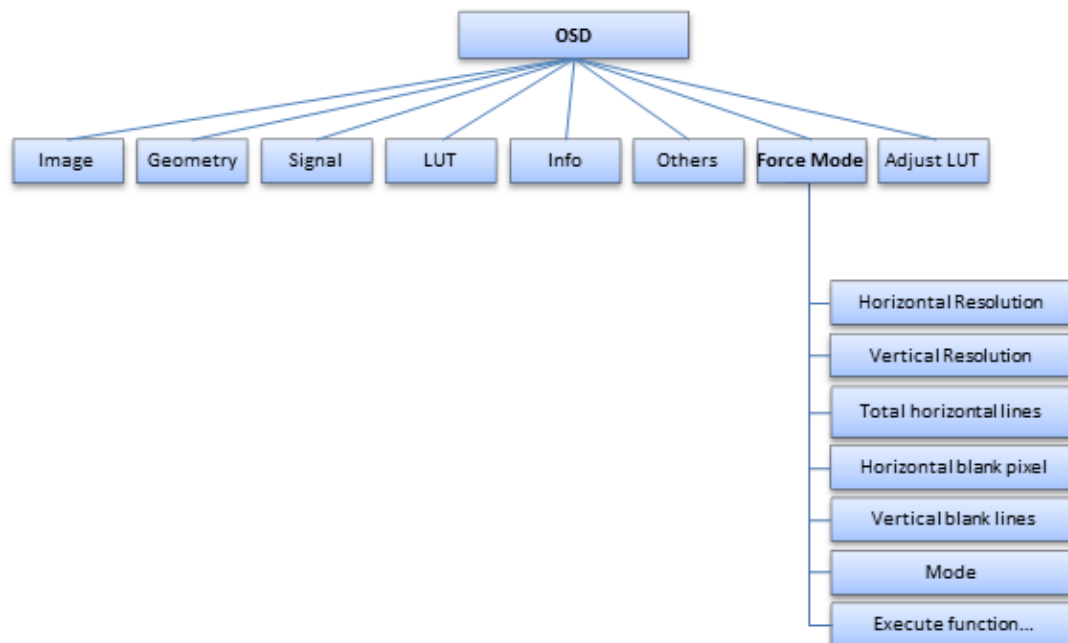
Function	Values	Description
OSD / LED settings		
Language	German / English <i>Default: English</i>	Set the OSD menu language.
OSD transparency	Covering / Transparent / Semi-transparent <i>Default: Opaque</i>	Set OSD transparency.
OSD time out	Off / 5 s / 10 s / 30 s / 1min <i>Default: Disabled</i>	Time after which the OSD menu closes automatically.
Position	Top - left Top – centered Top – right Middle – left centered Middle – right Bottom – left Bottom – centered Bottom – right <i>Default: Top - right</i>	Select the OSD menu position on the screen.

Function	Values	Description
Keypad LED dimming	0 - 255 <i>Default: 40</i>	Set the brightness of the operation LED. At "0". the operation LED is switched off, at "255" it lights with maximum brightness.
Power save / DPMS		
DPMS	Enabled Disabled <i>Default: Enabled</i>	Turn the DPMS (Display Power Management Signaling) on or off . When the DPMS is activated, the backlight is switched off or dimmed according to the setting in "Backlight", as long as there is no input signal. This reduces energy consumption and increases the service life of the backlight.
Backlight	Dimmed Off <i>Default: Off</i>	Backlight with active DPMS Set whether the backlight is switched off or dimmed when the DPMS is activated and there is no input signal.
Communication		
Communication interface	DDC / DVI digital USB <i>Default: USB</i>	Communication interface selection You can select between the USB and DDC interfaces.
Temperature control		
Limit 1 [C°]	0 - 120° C <i>Default: 59</i>	Set the first threshold value for internal overtemperature The operation LED begins to flash orange when the set temperature is exceeded.
Limit 2 [C°]	0 - 120° C <i>Default: 63</i>	Set the second threshold value for internal overtemperature When the set temperature is exceeded, the operation LED flashes red and the brightness is reduced.
Test Images		
Pattern	White / color bars / gray bars / black <i>Default: White</i>	Select the test pattern to be displayed.
Show...		The selected pattern is displayed.

Function	Values	Description
Reset		
Reset to firmware defaults...		Reset all values set in the OSD.
Reset user settings...		All automatically saved timing data and the following settings are deleted: • Brightness • Contrast • Backlight • Position (horizontal and vertical) • Zoom • Frequency • Phase • Interpolation filters • Color temperature

7.10 "Force Mode" menu

Force Mode is used to set the timing of video sources that cannot be displayed with the timings saved in the monitor.

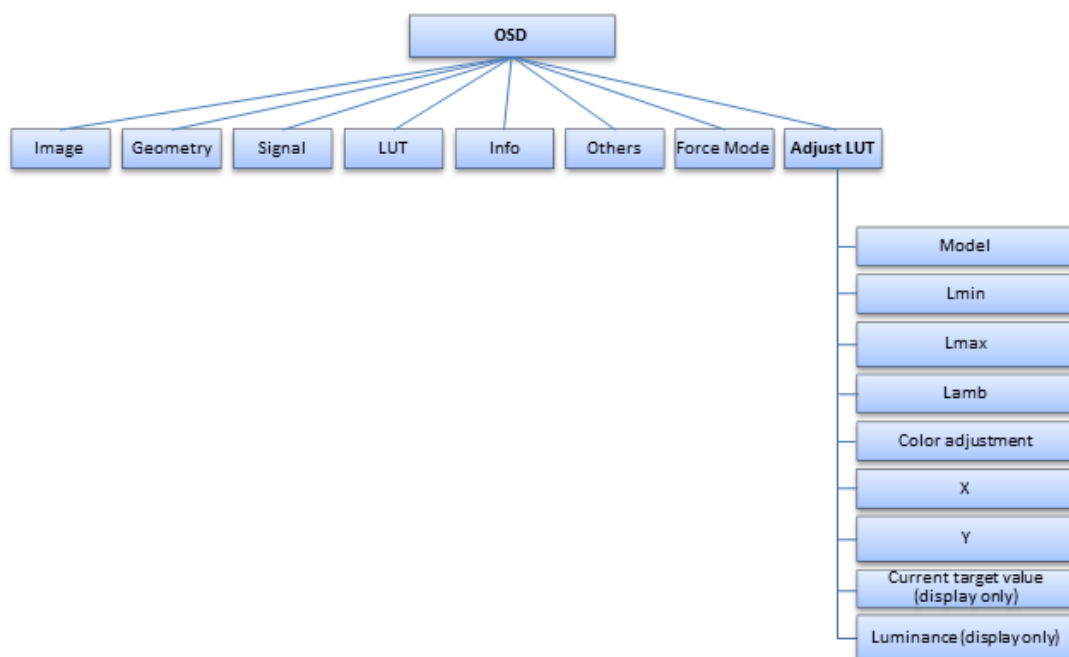


Function	Values	Description
Horizontal Resolution		Set the horizontal resolution in the active resolution range.
Vertical Resolution		Set the vertical resolution in the active resolution range.
Total horizontal lines		If the resolution is known, this can be used as the approximation value. The following applies: "Total horizontal lines" > "Horizontal resolution". A larger "Horizontal resolution" can result in the image being split vertically.
Horizontal blank pixel		Set the horizontal blanking interval.
Vertical blank pixel		Set the vertical blanking interval.
Mode	Active / Start / Inactive <i>Default: Inactive</i>	Set Force Mode - When "Active" is selected, the specified timing values are applied with "Execute function". - Force Mode is switched off when "Inactive" is selected. - When "Start" is selected, the start values for the timing are determined using "Execute function". See also Determining the timing data [► 30]
Execute function...		When "Start" is selected in Mode, the set video resolution is executed.

7.11 "Adjust LUT" menu

Note

- The "Adjust LUT" menu is displayed only if the "User" setting is selected in the "LUT" menu
- After each parameter change, the LUT in the device is immediately recalculated. This is indicated in the OSD menu by the message: "Gamma table being recalculated". When the calculation is complete, the message disappears from the OSD.



⚠ CAUTION

Check the gray levels

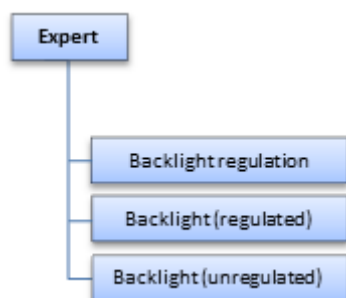
After each LUT recalculation performed in the "Adjust LUT" menu, it is absolutely necessary to apply an appropriate test pattern and check that all gray levels are displayed correctly.

Function	Values	Description
Model	• Natural • CIE 1976 • CIE (DIN 6174) • CRT • DICOM • Gamma 2.0, 2.2, 2.5, 2.7, 3.0, 3.3 • Log.Lum.linear <i>Default: DICOM</i>	The gamma model, which serves as the basis for recalculating the LUT, can be selected here. Note: When "Natural" is selected, only the value for Lmax can be changed. All other functions are hidden.

Function	Values	Description
Lmin	0 - 250 <i>Default: 40 (0.8 cd/m²)</i>	Adapt the minimum black value between 0 and 5 cd/m ²
Lmax	0 - 250 <i>Default: 80 (400 cd/m²)</i>	Adapt the maximum white value between 200 and 600 cd/m ²
Lamb	0 - 250 <i>Default: 25 (0.5 cd/m²)</i>	Takes into account the ambient light between 0 and 5 cd/m ² when recalculating the LUT.
Color setting	• Bluish • Intrinsic • Typical <i>Default: Bluish</i>	Set the color location to the following predefined values • Bluish: x = 0.272; y = 0.308. • Intrinsic: No color location correction • Typical: x = 0.300; y = 0.315.
X	-100 - +100 <i>Default: 0 (x = 0.272)</i>	When using the color setting based on the existing defaults, it is also possible to individually modify the color location. The X color coordinate can be adapted using the "X" function.
Y	-100 - +100 <i>Default: 0 (y = 0.308)</i>	When using the color setting based on the existing defaults, it is also possible to individually modify the color location. The Y color coordinate can be adapted using the "Y" function.
Current target value (display only)		
Luminance (display only)		

7.12 "Expert" menu

Note
Opening and closing the "Expert" menu - Open the "Expert" menu by pressing keys 1 and 3 in the open "Info" menu in sequence. - The "Expert" menu closes automatically upon exiting the OSD.



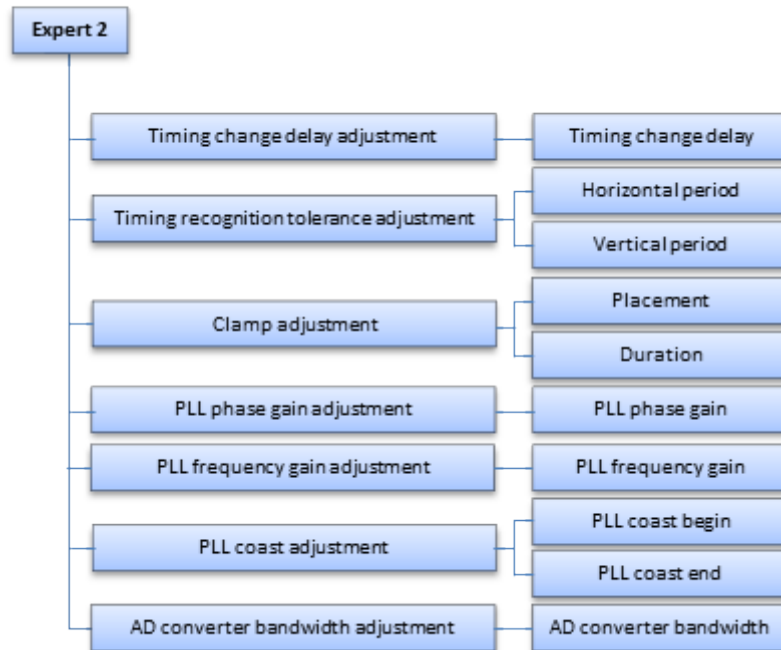
Function	Values	Description
Backlight regulation	Enabled Disabled <i>Default: Enabled</i>	Switches backlight regulation on or off CAUTION: Regulation must be switched on for the monitor to keep the set luminance stable.
Backlight (regulated)	0 - 200	Set the nominal value for backlight regulation Note: The function is displayed only if the "Backlight regulation" function is set to "On". By continuous measurement of backlight brightness within the display, the brightness can be kept constant and does not change with aging. When the ambient light sensor is active, the total brightness is adapted to the ambient lighting.
Backlight (controlled)	578 - 4095 <i>Default: 4095</i>	Set the backlight control value Note: The function is displayed only if the "Backlight regulation" function is set to "Off". The control value is kept constant during operation. This means that the image becomes darker as the backlight ages.

7.13 "Expert 2" menu

Note

Opening and closing the "Expert 2" menu

- Open the "Expert" menu by pressing keys 1 and 3 in the "Info" menu in sequence.
- Navigate with operation key 3 to the "Expert 2" menu.
- The "Expert 2" menu closes automatically upon exiting the OSD.



Function	Values	Description
Timing change delay adjustment	Active Inactive <i>Default: Inactive</i>	When "Active" is selected, the timing change delay can be set. The following four parameters are relevant to this function: • H frequency • V frequency • V total • Interlaced/non Interlaced Changing one of these parameters corresponds to a timing change, and the monitor begins to resynchronize ("Auto in progress" display). To prevent this from happening as a result of each and every signal disturbance, the value representing the permissible number of faulty or changed borders can be increased in the case of unstable signal sources using the "Signal change delay" function. This is required in the case of unstable signal sources, for example. Note: The disadvantage of the function is a delay of several milliseconds even for a desired timing change. The higher the value of the function, the greater the delay.

Function	Values	Description
Timing change delay	0 - 1000 <i>Default: 0</i>	Note: Can only be set when "setting the timing change delay" is active.
Timing recognition tolerance adjustment	Active Inactive <i>Default: Inactive</i>	When "Active" is selected, the horizontal and vertical periods of timing detection tolerance can be set.
Horizontal periods	0 - 3000 <i>Default: 10</i>	Note: Can only be set when "setting the timing detection tolerance" is active.
Vertical periods	0 - 200 <i>Default: 3</i>	Note: Can only be set when "setting the timing detection tolerance" is active.
Clamp adjustment	Active Inactive <i>Default: Inactive</i>	Clamping pulse When "Active" is selected, the placement and duration of the clamping pulse can be set. The default is "20" (placement) and "200" (duration). Note: If "Setting the clamping pulse" is set to "inactive", the clamping pulse is set to the default values. The clamping pulse establishes the placement and duration of a black screen signal. The corresponding value for the black signal is saved during this period as an offset value. The offset value is kept during signal level changes in order to avoid offset errors. Clamping usually takes place during the back porch of an HSYNC because a good reference value for black can be prepared during this time. If the clamp pulse duration is set too high a black border appears because the back porch was left and the clamping is reaching the active video signal.
Placement	0 - 255 <i>Default: 20</i>	Note: Can only be set if an analog signal is present and "Setting the clamping pulse" is active.
Duration	0 - 255 <i>Default: 200</i>	Note: Can only be set if an analog signal is present and "Setting the clamping pulse" is active.
PLL phase gain adjustment	Active Inactive <i>Default: Inactive</i>	PLL phase gain When "Active" is selected, the PLL phase gain can be set. Note: If "Setting the PLL phase gain" is set to "inactive", the phase gain is set to the default values. The PLL phase gain controls the level of phase error returned to the digital PLL. Each key figure has double the weight of the previous key figure. • 0000: (minimum gain) • 0111: [default] • 1111: (maximum gain) If the "PLL phase gain" is set too low or too high, distorted images will be displayed. Note: The best PLL phase gain can be obtained with the Pixel On/Off test pattern from a video test generator.

Function	Values	Description
PLL frequency gain adjustment	Active Inactive <i>Default: Inactive</i>	PLL frequency gain When "Active" is selected, the PLL frequency gain can be set. Note: If "Setting the PLL frequency gain" is set to "inactive", the frequency gain is set to the default values. The PLL frequency gain controls the level of frequency error returned to the digital PLL. Each key figure has double the weight of the previous key figure. • 0000: (minimum gain) • 0111: [default] • 1111: (maximum gain) If the "PLL frequency gain" is set too low or too high, distorted images will be displayed. Note: The best PLL frequency gain can be obtained with the Pixel On/Off test pattern from a video test generator.
PLL coast adjustment	Active Inactive <i>Default: Inactive</i>	PLL coast If "Active" is selected, the beginning and end of the PLL coast can be set. The default for each is "4",
PLL Coast Begin	0 - 63 <i>Default: 4</i>	Note: Can only be set when "Setting the PLL coast" is active.
PLL Coast End	0 - 63 <i>Default: 4</i>	Note: Can only be set when "Setting the PLL coast" is active.
AD converter bandwidth adjustment	Active Inactive <i>Default: Inactive</i>	AD converter bandwidth When "Active" is selected, the AD converter bandwidth can be set.
AD converter bandwidth	9 - 14 MHz / 16 MHz / 18 MHz / 20 MHz / 22 MHz / 25 MHz / 30 MHz / 38 MHz / 50 MHz / 75 MHz / 105 MHz / 149 MHz / 475 MHz <i>Default: 475 MHz</i>	Note: Can only be set when "Setting the AD converter bandwidth" is active. Adjustable signal bandwidth for analog signals to filter out high-frequency interference signals.

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.

8.1.1 Recommended cleaning agents and disinfectants

Agent class	Tested cleaning agents and disinfectants	Further examples
Alcohol	Ethyl alcohol, 96% by vol. Isopropyl alcohol 70 % 0.5 % Chlorhexidine in 70 % isopropyl alcohol	Hospiset cloth Mikrozid liquid
Aldehyde	Melsitt	Aldasan 2000 Kohsolin
Chlorine derivatives	Terralin Sodium hypochlorite (bleaching agent), 10%	Quartamon Med
Disinfectants	TaskiDS5001 (Diverseylever Labs) Morning Mist Surfanios Fraicheur Citron (Anios Labs) Misty Multi-Purpose Disinfectant Cleaner I and II Misty Disinfectant and Deodorant RTU (Amrep Inc.) Virex II 256 Precise Hospital Foam Cleaner Disinfectant "Green Soap" (soft soap)	
Water	Tap water Demineralized water 1.6% liquid ammonia solution	

Note

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

8.1.2 Prohibited cleaning agents and disinfectants

The following cleaning agents and disinfectants can bleach the paint after a longer period of application:

Agent class	Tested cleaning agents and disinfectants	Further examples
Peroxide compounds	Perform	Dismozon pur
Petroleum spirit	Petroleum spirit close to boiling	Petroleum ether

8.2 Check 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.

Check the settings on a regular basis

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

9.1 Fault correction

Fault	Cause	Remedy
Operation LED dark	Blown fuse	Contact service.
No picture appears on the monitor	Power cable not connected or connected incorrectly	Check the power cable. Is the power switch in the "On" position?
Operation LED flashes green	No sync signal or video signal	Check the video cable.
No picture appears on the monitor	Sync cable connected incorrectly	Exchange the sync cable connectors.
	The video source is not sending a video signal, or is sending an unknown timing.	Check the video source.
	The video source is sending an unknown timing	Set a different timing for the video source.
Operation LED flashes green Fuzzy picture, interference in vertical lines	Scanning frequency or phase incorrectly set.	Set the frequency and phase.
Operation LED flashes orange	Overtemperature: Temperature limit value 1 has been exceeded	Check the following: - Are the temperature limit values set correctly? Open the OSD "Others" menu. - Is the ambient temperature in the acceptable temperature range? - Are the housing cooling fins free and open? - Was the required distance between the monitor and other objects maintained during installation? - Is there a heat source near the monitor?
Operation LED flashes red, no image on the monitor	Overtemperature: Temperature limit value 2 has been exceeded. Brightness is reduced. Brightness returns to the regular value as soon as the temperature falls sufficiently.	
Picture is without contrast and has a strong green shading	The video source is only transmitting a green signal	In the OSD "Signal" menu, switch from "Color" to "Monochrome".
Other	Loose plug	Connect the loose plug and secure it.
	Defective cable	Replace the defective cable.

9.2 Additional information

LED	Monitor status
LED green	No error. The applied video signal was recognized.
LED orange	No video signal available. There are two possible causes: - No error. The monitor is in energy saving mode. - Error: The video source or video cable is damaged.

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

Feature	Value
Type	Color, TFT (IPS)
Active Area	376.32 mm x 301.06 mm
Screen diagonal	480 mm (19")
Resolution	1280 x 1024 pixels
Pixel arrangement	3 subpixels per pixel
Contrast ratio	Typically 900:1 Minimal 600:1
Screen brightness	Min. 600 cd/m ² ... Typically 700 cd/m ²
Horizontal viewing angle	Typically $\pm 89^\circ$
Vertical viewing angle	Typically $\pm 89^\circ$
Backlight	White LEDs

10.2 Voltage supply

Power connector	Non-heating appliance socket
Line voltage	AC 100 - 240 V ($\pm 10\%$)
Line frequency	50 ... 60 Hz ($\pm 5\%$)
Current consumption	max. 1.5 A
Maximum power consumption	< 58 W
Energy saving mode	< 10 W

10.3 Electronics

Multi-standard technology	Video modes with resolutions less than 1280 x 1024 can be expanded to the TFT resolution, and thus utilize the full display area.
Timing recognition	H frequency, V frequency, interlaced, number of horizontal lines

10.4 Inputs/Outputs

Analog signal input

DVI-I	Via DVI-I socket (analog pins are used)
BNC	Via BNC socket (SoG or CVBS signal)

Digital signal input

DisplayPort	Via DisplayPort connector
DVI-D	Via DVI connector, single link
DDC	Via DVI connector

USB interface

Upstream	Via USB-B socket
Downstream	Via USB-A socket

10.5 Controls and connectors

Front	• Four keys for OSD menu • Operation LED
Back	• Power switch • Power connection socket • 1 Display Port connector • 1 DVI-I socket • 2 BNC sockets • 1 USB-B • 1 USB-A

10.6 Mechanical design

Housing components	ABS
Ventilation openings	In rear panel
Degree of protection	IP20 according to DIN 40050 Tested in accordance with IP21
Connection panel	On the back (covered)
Weight in kg	5.1 +/- 0.5 kg (CuratOR EX190) 8.1 +/- 0.5 kg (CuratOR EX190-S)
Dimensions (W x H x D) in mm	423 x 349 x 95 (CuratOR EX190) 423 x (447 ~ 529) x 208 (CuratOR EX190-S)

10.7 Climatic conditions

In operation

Temperature range	5 °C - 40 °C ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Air pressure	1060 - 700 hPa
Humidity	20 - 80 %

For transport and storage (packed)

Temperature range	-20 °C - +70 °C ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Air pressure	1060 - 200 hPa
Humidity	10 - 95 %

10.8 Safety specifications

Safety standards	• IEC/EN 60601-1 • CAN/CSA - C22.2. No. 60601-1 • UL60601-1 • GB 4943.1, fuse T3.15A 250V
Protection class	Protection class I
Degree of protection according to DIN 40050	IP20
Medical device classification (EU)	Class 1

11 Dimension drawings

All dimensions in mm

11.1 Monitor without stand

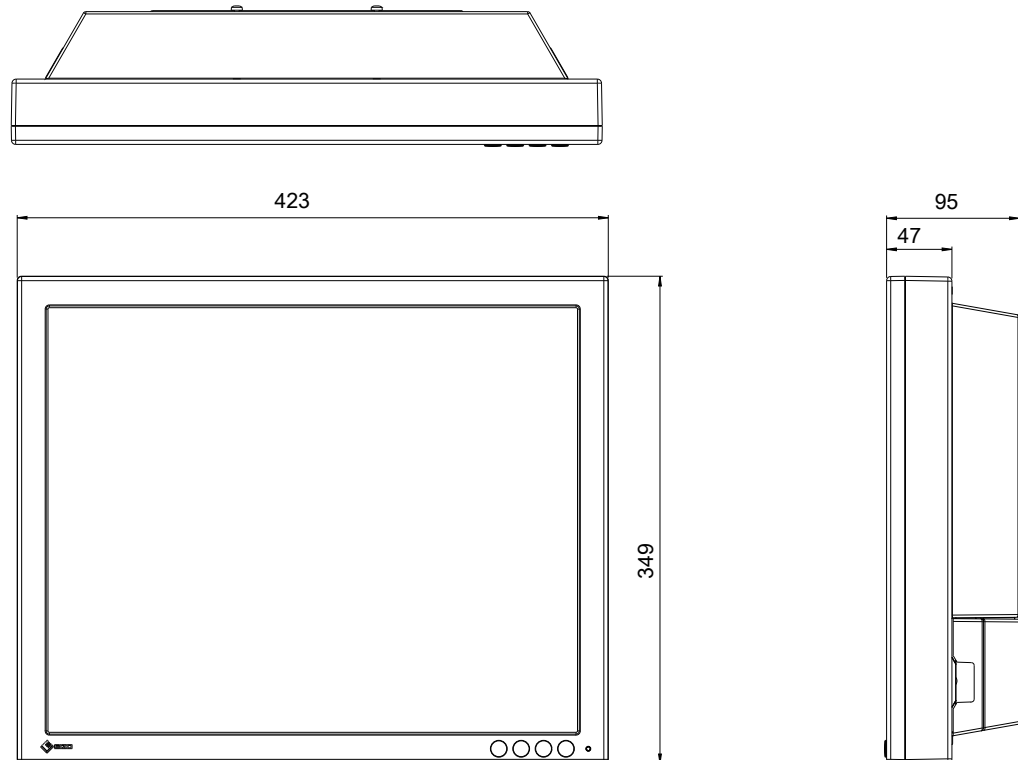


Fig.: Views from front, top, and side

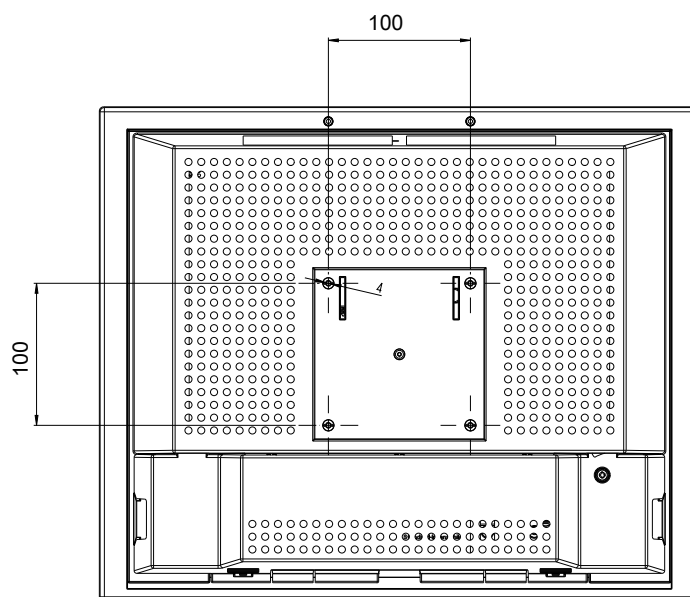


Fig.: Rear view

11.2 Monitor with stand

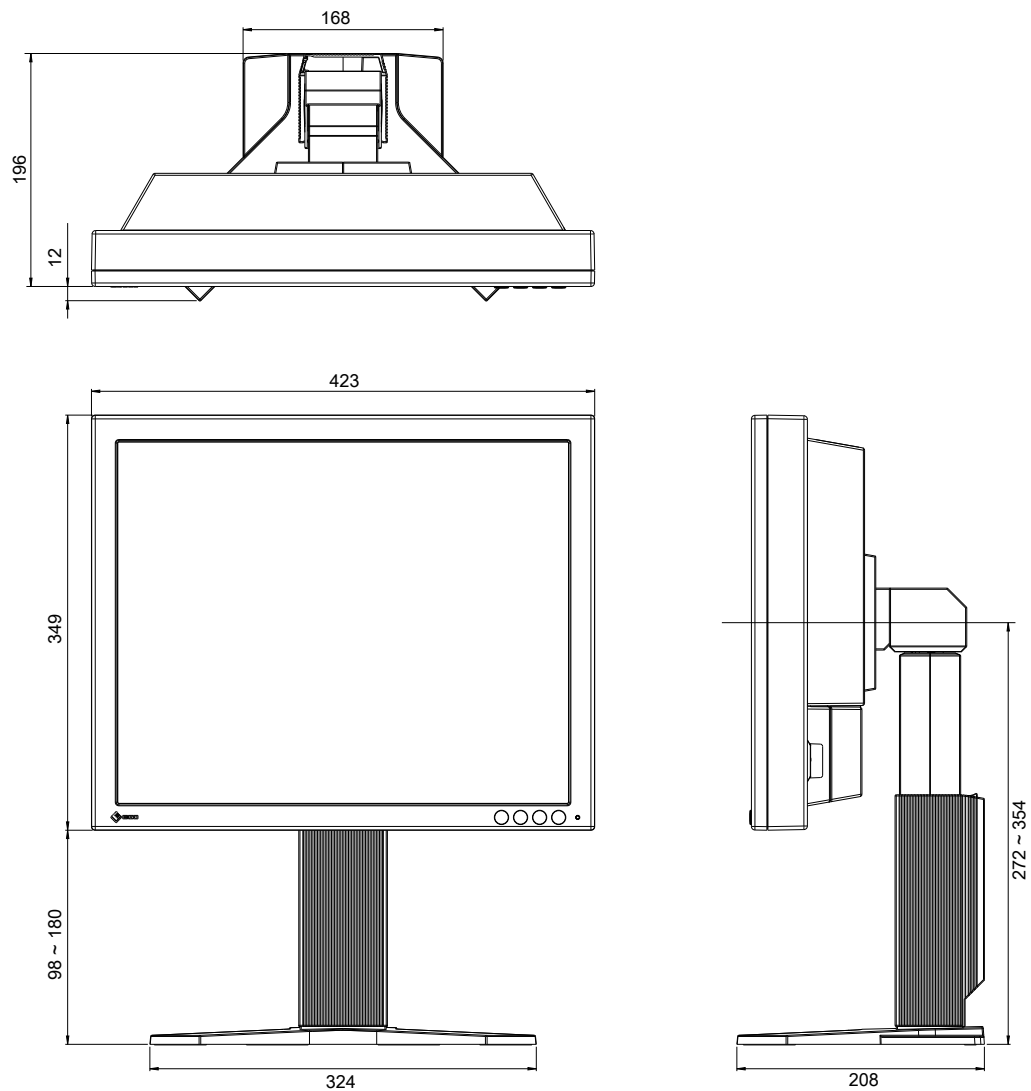
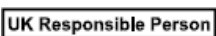


Fig.: Views from front, top, and side

12 Appendix

12.1 Markings and symbols

Marking/symbol	Description
	Symbol for "Caution, observe accompanying documents".
	CE marking (EU conformity mark).
	UKCA marking (UK conformity mark).
	Medical device in accordance with the European medical device regulation.
	MET marking, in accordance with U.S. and Canadian national regulations.
	CCC marking, in accordance with for Chinese national regulations (pending).
	BIS marking, in accordance with Indian national regulations.
	RCM marking for conformity with Australian EMC standards (pending).
	U.S. FCC marking for communication devices.
	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)
	Symbol "Comply with the instructions for use".
	Symbol for "Dangerous voltage".
	UK Responsible Person
	Swiss authorised representative (CH-REP)

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 CuratOR EX190. 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 CuratOR EX190 is intended for use in the electromagnetic environments noted below. Customers and users of the CuratOR EX190 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 CuratOR EX190 uses RF radiation for internal operation only. For this reason, the RF radiation is very low and is therefore unlikely that the monitor will cause interference in electronic devices in the immediate vicinity.
RF radiation CISPR11/EN 55011 GB9254	Class B	
Harmonic currents IEC/EN 61000-3-2 GB17625.1	Class D	
Voltage fluctuations/ flicker IEC/EN 61000-3-3	fulfilled	

Electromagnetic interference immunity			
The CuratOR EX190 was tested with the following compliance levels in accordance with the test requirements for professional healthcare facilities, as established in IEC/EN 6061-1-2. Customers and users of the CuratOR EX190 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	±3 kV power lines ±2 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	±2 kV line against line ±4 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 product should be kept at least 15 cm away from the source of power frequency magnetic fields during use.
Note: V_T is the alternating current voltage before application of the measurement level.			

Electromagnetic interference immunity			
The CuratOR EX190 was tested with the following compliance levels in accordance with the test requirements for professional healthcare facilities, as established in IEC/EN 60611-1-2. Customers and users of the monitor have to ensure that the monitor is used in such an environment.			
Interference immunity test	Measurement level	Compliance level	Information regarding the electromagnetic environment
Line-based disturbances caused by RF fields IEC/EN 61000-4-6	3 V _{rms} 150 kHz to 80 MHz	6 V _{rms}	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 $d = 0.6 \sqrt{P}$, 150 kHz to 80 MHz
	6 V _{rms} ISM bands between 150 kHz and 80 MHz	6 V _{rms}	
Electromagnetic RF fields IEC/EN 61000-4-3	3 V/m 80 MHz to 2.7 GHz	10 V/m	$d = 2 \sqrt{P}$, ISM bands between 150 kHz and 80 MHz $d = 0.35 \sqrt{P}$, 80 MHz to 800 MHz $d = 0.7 \sqrt{P}$, 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. 
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. .			
^{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.			

Recommended minimum distance between portable or mobile RF communications devices and the CuratOR EX190

The CuratOR EX190 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 $d = 0.6 \sqrt{P}$	80 MHz to 800 MHz $d = 0.35 \sqrt{P}$	800 MHz to 2.7 GHz $d = 0.7 \sqrt{P}$
0.01	0.06	0.04	0.07
0.1	0.19	0.11	0.22
1	0.60	0.35	0.70
10	1.90	1.11	2.21
100	6.00	3.50	7.00

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 CuratOR EX190

The CuratOR EX190 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: CuratOR EX190 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 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
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.

12.4 China RoHS (Restriction of Hazardous Substances)

液晶显示器 LCD Display

型号 Model: 6GF621#-2E\$# (#=0..1 ; \$=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。

为保证所声明的环保使用期限，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，以保证所声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.

产品中有害物质的名称及含量 Name and Concentration of Hazardous Substances

部件名称 Component Name	有害物质 Hazardous substances					
	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
背光逆变器 Backlight LED Driver	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 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.						

产品中有害物质的名称及含量 Table of hazardous substances' name and concentration.

12.5 Declaration of compliance with India RoHS

We, EIZO Corporation, hereby declare and guarantee that this product has been designed and manufactured in compliance with the E-Waste management rule 2016 which prohibit the inclusion of the following substances except for the exemptions listed in schedule II.

- Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls or Polybrominated Diphenyl Ethers exceeding a concentration of 0.1% by weight in homogeneous materials
- Cadmium exceeding a concentration of 0.01% by weight in homogeneous materials

For information on proper disposal and recycling of the product, please refer to the following website.

eizo.co.in/e-waste.php

12.6 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.

12.7 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.

12.8 Repairs

Please contact the sales partner from whom you purchased the product.

12.9 Additional devices

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

12.10 Contact

Support during installation and for technical questions

www.eizo-or.com

12.11 Trademarks

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Instructions for Use, 06/2022
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