

Instructions for Use

SCD 19102

1.3MP 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.

Table of contents

Legal information	2
1 Introduction.....	5
1.1 Contents of this document	5
1.2 Intended use	5
1.3 User groups	6
2 Safety information	7
2.1 General safety instructions	7
2.2 Product-specific safety instructions	11
3 Description	12
3.1 Scope of delivery	12
3.2 Performance features	12
4 Setup and installation	14
4.1 Installation site	14
4.2 Installing the monitor.....	15
5 Connecting.....	16
5.1 Safety information for connection	16
5.2 Connector location	17
5.3 Connection panel.....	18
5.4 Connecting the signal cable.....	18
5.5 Connecting the power cable	20
5.6 Installing the base and cable	21
5.7 Serial interface.....	23
6 Start-up.....	25
6.1 Switching on the monitor	25
6.2 Operator controls	25
6.3 Overview of the OSD menu	26
6.4 Menu functions	27
6.5 Exit OSD	38
6.6 Service level 2 functions	38
6.7 Lock/unlock OSD menu	48
6.8 System settings	48
6.8.1 Avoiding image sticking	48
6.8.2 Setting the image geometry	49
6.8.3 Setting the brightness and contrast	49
6.8.4 Monitor adjustment – video source/graphics card	50
6.8.5 Monitor adjustment – LUT	51
6.8.6 Monitor adjustment - Force Mode	51

7 Operation.....	63
7.1 Note for users	63
8 Cleaning	64
8.1 Cleaning.....	64
9 Troubleshooting	66
9.1 Troubleshooting	66
10 Technical specifications	67
10.1 Graphic display	67
10.2 Voltage supply	67
10.3 Electronics	68
10.4 Inputs/Outputs	68
10.5 Controls and connectors.....	69
10.6 Mechanical design	69
10.7 Climatic conditions	70
10.8 Safety specifications	70
11 Dimensioned drawings	71
11.1 SCD 19102 D (with stand)	71
11.1.1 View from front and side	71
11.2 SCD 19102 C/CP (without stand)	72
11.2.1 View from front and side	72
11.2.2 Rear view	72
12 Spare parts / accessories	73
12.1 Multifunctional base	73
12.2 DVI transmission path and cable	73
13 Appendix	74
13.1 Markings and symbols	74
13.2 Information on electromagnetic compatibility (EMC)	75
13.3 FCC Declaration of Conformity	80
13.4 China RoHS (Restriction of Hazardous Substances)	81
13.5 Declaration of compliance with India RoHS.....	83
13.6 Environmental protection	83
13.7 Warranty	83
13.8 Repairs	83
13.9 Additional devices.....	83
13.10 Contact	83
13.11 Trademarks.....	84
Index	85

1 Introduction

1.1 Contents of this document

This document explains the functionality and the approved application of the 1MP 19" LCD Monitor SCD 19102

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 SCD 19102 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 SCD 19102 can be used for the intended purpose irrespective of age, body weight and gender.

The SCD 19102 is intended to be used in combination with or mounted on medical devices. The monitor therefore has no direct contact with the patient.

The SCD 19102 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 SCD 19102 are qualified healthcare professionals.

Intended environment

The SCD 19102 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 SCD 19102 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
If the SCD 19102 is installed on a stand: Adjust the monitor height carefully, otherwise there is a risk of injury When adjusting the height of the monitor, make sure that you do not trap your fingers or any other objects.
 CAUTION
Ensure monitor stability The stability of the monitor must be ensured following installation of the stand/holder. The screw insertion depth into the monitor must be between 7 and 9 mm.
 CAUTION
Subsequent installation of a stand The SCD 19102 C and SCD 19102 CP monitors are delivered without a stand. To ensure that a system comprising a monitor and base meet the requirements of standard EN 60601, select a stand for subsequent installation that meets this standard.

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 1MP 19" LCD Monitor is a SCD 19102. The monitor is offered in the following versions.

Product	Order number	Description
SCD 19102 C	6GF62102EE10	Version without protective front pane, without multifunctional stand
SCD 19102 CP	6GF62102EE20	Version with protective front pane, IPx2 at front
SCD 19102 D	6GF62102EE01	Version without protective front pane, with multifunctional stand

Components

- DVI-D video cable
- CD-ROM with the documentation
- Printed safety information

3.2 Performance features

The SCD 19102 has the following features that permit a wide range of applications:

Compact design

The monitor benefits from low weight and a small foot print, as well as improved performance, when compared to conventional CRT monitors. Thanks to the equally narrow border on each edge, the monitor fits into any environment, and is ideally suited to both desktop and ceiling suspension.

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 fulfills the strictest ergonomic requirements.

Modification of gray scale setting

In medical applications (e.g. for radiography, computed tomography, and MRI), where pictures are usually displayed in shades of gray, the gray values can be adapted to the user's eye. This calibration is performed at the factory and is therefore available when shipped (factory calibrated monitor). In addition, five different settings (Look Up Table – LUT) are saved in the monitor. To switch to a different LUT, please speak to service personnel, who will make the change using the On-Screen Display (OSD) or the QA software.

Screen resolution

The monitor is equipped with an active 19" TFT display that has an extremely wide viewing angle. The monitor offers maximum grayscale 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 enlarged or reduced to fit the screen size optimally. Alternatively, they can be displayed in their original size (1:1).

RGB input (15-pin Sub-D/DVI/BNC)

The monitor is connected to the computer system using either the 15-pin Sub-D input socket or the DVI-I input socket.

If necessary, the monitor display is adjusted using an OSD (On Screen Display) menu.

Video inputs

The SCD 19102 has two additional analog video inputs. As a result, the monitor can operate with standard analog video signals (PAL/NTSC). The RGB and video inputs can be connected simultaneously to different signal sources.

Force Mode

Using the Force Mode function, the SCD 19102 can be adapted to special timing settings.

Protective screen

The SCD 19102 CP has anti-glare protective screen fitted over the top of the LCD panel to protect the surface of the panel against bumps and scratches. The front of the monitor is protected against moisture (IPx2 protection). The space between the protective screen and the panel is sealed to prevent dust from entering, thus helping ensure the internal surfaces remain clean.

Landscape and portrait modes

The device can be used in landscape and portrait modes. The image rotation for portrait mode is made on the graphics card.

In portrait mode, the keyboard is positioned at the top right and the OSD is not rotated (i.e. the OSD inscription "Dynamic help for keypad function" is still positioned above the keys).

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

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 permissible ambient temperature range must not be violated.

Desktop installation

If the monitor is installed on a stand, it must be positioned on a hard, horizontal surface.

Avoid reflections on the screen

The SCD 19102 has an anti-glare surface that is only effective if the screen is clean and grease-free.

The SCD 19102 CP display includes an optically coated protective glass pane, which is well suited for use in a germ-free environment when cleaning agents are used.

- If the screen surface is dirty, clean it using a suitable microfiber cloth.
- Comply with the specifications for [Cleaning](#) [► 64].
- The monitor should be positioned so that reflections of lights, windows, furniture with shiny surfaces, or light-colored walls do not appear on the screen.
- In order to reduce reflections on the monitor, only use non-dazzling reflector bulbs for the ceiling lighting.

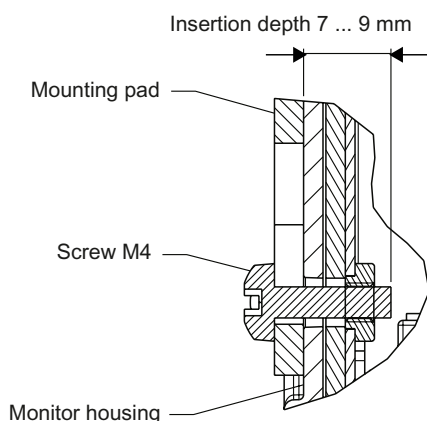
4.2 Installing the monitor

Ceiling suspension

Multiple monitors can be installed flush horizontally and vertically to one another.

Comply with the following when fastening (100 mm hole spacing according to VESA standard):

Fastening screw specifications	
No.	4
Thread	M4
Strength	8.8
Insertion depth	Min. 7 mm / max. 9 mm
Torque	Max. 3 Nm



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

5.2 Connector location

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.

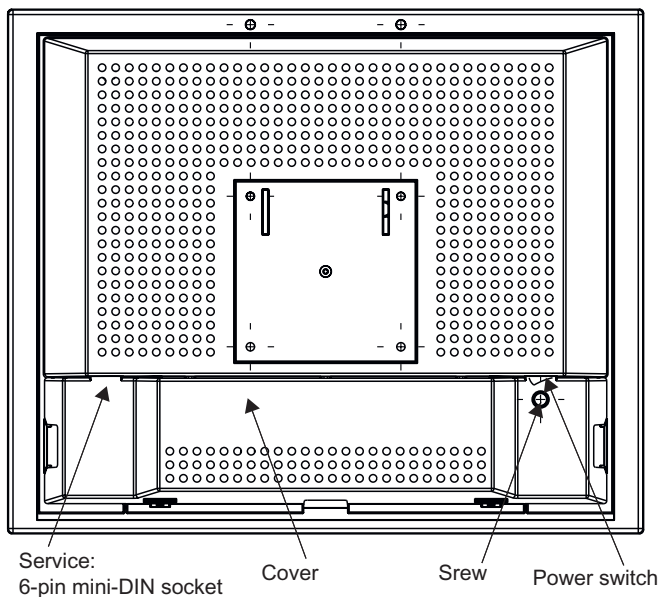


Fig.: Rear view of the SCD 19102

5.3 Connection panel

A connection panel for the signals and power supply is located on the back of the monitor

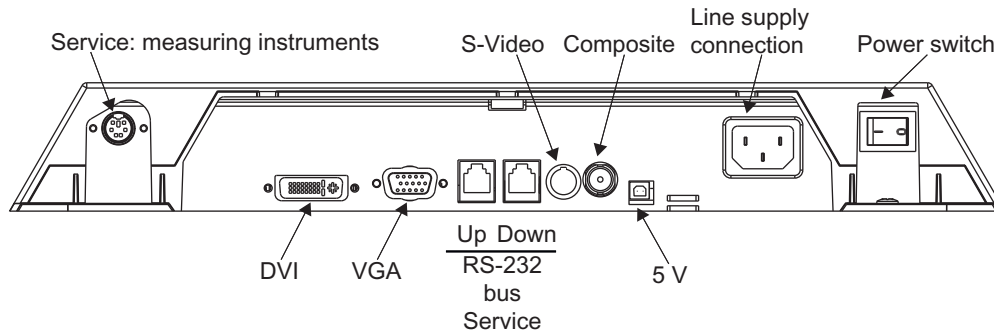


Fig.: Connection panel of the SCD 19102

15-pin Sub-D socket

Analog input with 15-pin sub-D connector (female) for a VGA cable with 15-pin sub-D connector (male).

DVI socket

DVI input for a DVI cable with DVI-I or DVI-D connector.

4-pin mini-DIN socket (S-Video)

S-Video input (Y/C signal) for a video cable with 4-pin Mini-DIN connector.

BNC socket (composite)

Analog input for a video cable with composite connector

5.4 Connecting the signal cable

⚠ CAUTION

Opening the connector panel cover

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

⚠ CAUTION

Connector

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

NOTICE

Cable

- The picture quality, interference immunity, and emitted interference of the entire system depend on the cable quality and length.
- When using a BNC to VGA adapter cable, the signal cables, for example, red, green, and blue, must be of the same length to prevent a loss in image quality.
- Use only the cables specified by EIZO or the transmission links available from EIZO.

Note

- The video signals coming from a graphics card are referred to in the following as RGB signals, and those coming from a camera, DVD player, video recorder etc. as video signals.
In the OSD menu, some of the menu displays are also identified by RGB or video accordingly in the header.
- At least one signal source must be connected in order to activate the OSD.
- All signal inputs may be connected simultaneously.
- The Up and Down keys can be used to select which RGB or video source is to be displayed when the OSD is not active. Selection is also possible in the OSD.

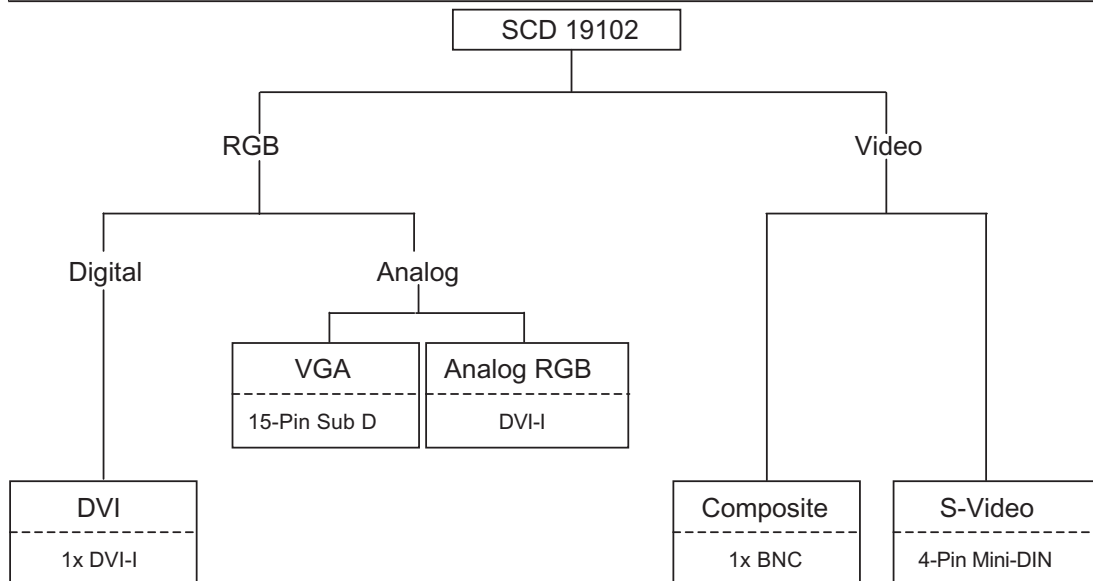


Fig.: Overview of signals and connections

The connection panel for the signal cables and power supply is located on the back of the monitor. All signal inputs can be connected simultaneously.

Prerequisite

- The monitor is installed in the ceiling suspension or wall mount unit, or on a stand.

Procedure

1. Using a suitable tool, remove the connection panel cover.
2. Connect the signal cables to the monitor.
3. Tighten the screws to secure the signal cables.
4. Place the cover back on the connection panel.

5.5 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.

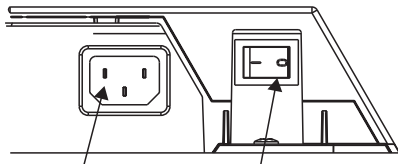
CAUTION

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. cable length 3 m, cable type e.g. H05VV-F 3 x 1.0 mm²). The cable must comply with the safety regulations of the respective country.

The power cable socket is located on the back of the monitor. The monitor's power supply is connected using an appliance plug.

- Open and close the connection panel using an appropriate tool.
- Insert the appliance plug of the power cable into the line power socket.
- The power cable can be secured using a cable grip.



Power connection Power switch

5.6 Installing the base and cable

CAUTION

Do not use screws of excessive length

Screws which are too long can damage mechanical and electronic components of the device.



1. Attach the connecting cable before installing the stand on the monitor.
2. Slightly tighten the screws on the mounting plate.



3. First insert two screws into the bottom two drilled holes of the stand.
4. Then insert the remaining screws into the top two drilled holes.
5. Slowly lower the monitor.



6. First tighten the top two screws.



7. Then carefully turn the monitor 90° clockwise and tighten the lower screws.



8. Route the connecting cable in the cable duct.

CAUTION: Do not route the connecting cable too tightly in the cable duct

When the monitor turns on its axis there is a risk of bending or crushing the connecting cable. For this reason, the connecting cable must not be routed too tightly in the cable duct.



9. Then install the cable duct cover or press it down.

Fully installed stand with cables



5.7 Serial interface



WARNING

Connection to service socket

- Only suitable photometers may be connected to the service socket.
- Connection and removal of a device may only be carried out by servicing personnel or those trained by them.
- Photometers must not be connected in the presence of the patient.

The monitor has three serial RS 232 interfaces:

- **Downstream RJ11 socket:**

identified in the Fig. "Possible configuration – serial bus mode" by "2". The socket is located **on the right** (landscape version) **or at the bottom** (portrait version) on the back of the monitor.

- **Upstream RJ11 socket:**

identified in the Fig. "Possible configuration – serial bus mode" by "1". The socket is located **on the left** (landscape version) **or at the top** (portrait version) on the back of the monitor, right next to the VGA plug.

- **6-pin mini-DIN socket (downstream):**

identified in the Fig. "Possible configuration – serial bus mode" by "3".

This serial interface (also called the "service socket") is easily accessible on the back of the monitor. The 6-pin mini-DIN socket is available for connecting a suitable photometer.

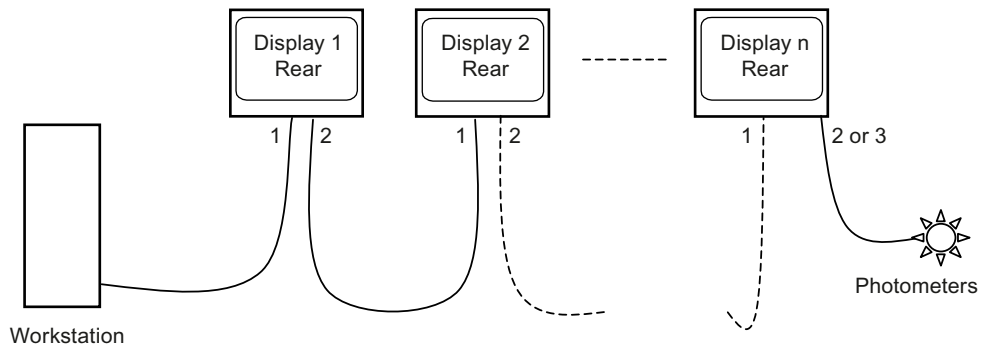


Fig.: Possible configuration – serial bus mode

If the monitor connection is made via the serial bus, the setting "Serial bus" must first have been activated using "On Screen Display → Service level 2 → Others". In this case (also under "On Screen Display → Service level 2 → Others") the bus address has to be assigned for each device (1, 2, 3, etc. - assign different numbers for the monitors connected via the same bus connection).

Settings, measurements, calibration, and automated quality tests can be performed using QA software.

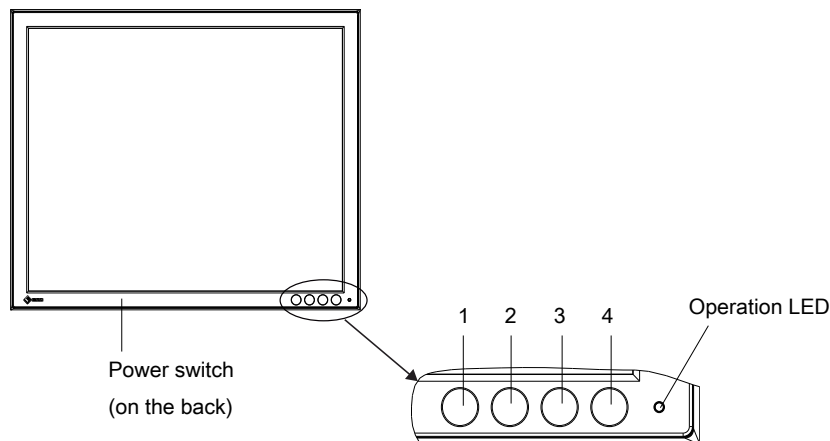
6 Start-up

6.1 Switching on the monitor

- Switch on the monitor using the power switch.

The green operation LED must now light up permanently.

6.2 Operator controls



The four keys and the status LED are located on the front in the bottom right-hand corner of the monitor.

The status LED is lit when power is supplied to the device and the power switch is set to On.

Key functions

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

Key	Situation	Action
1	Always	Scrolling
2	Submenu is selected	Select submenu
	Function is selected	Increase/change value
3	Function is selected	Decrease/change value
4	All menus except the "Exit OSD" menu	Return to previous menu level (settings are retained)
	"Exit OSD" menu	Return to main menu (settings are retained)

6.3 Overview of the OSD menu

The OSD menu is used to make settings for operation of the monitor with a source.

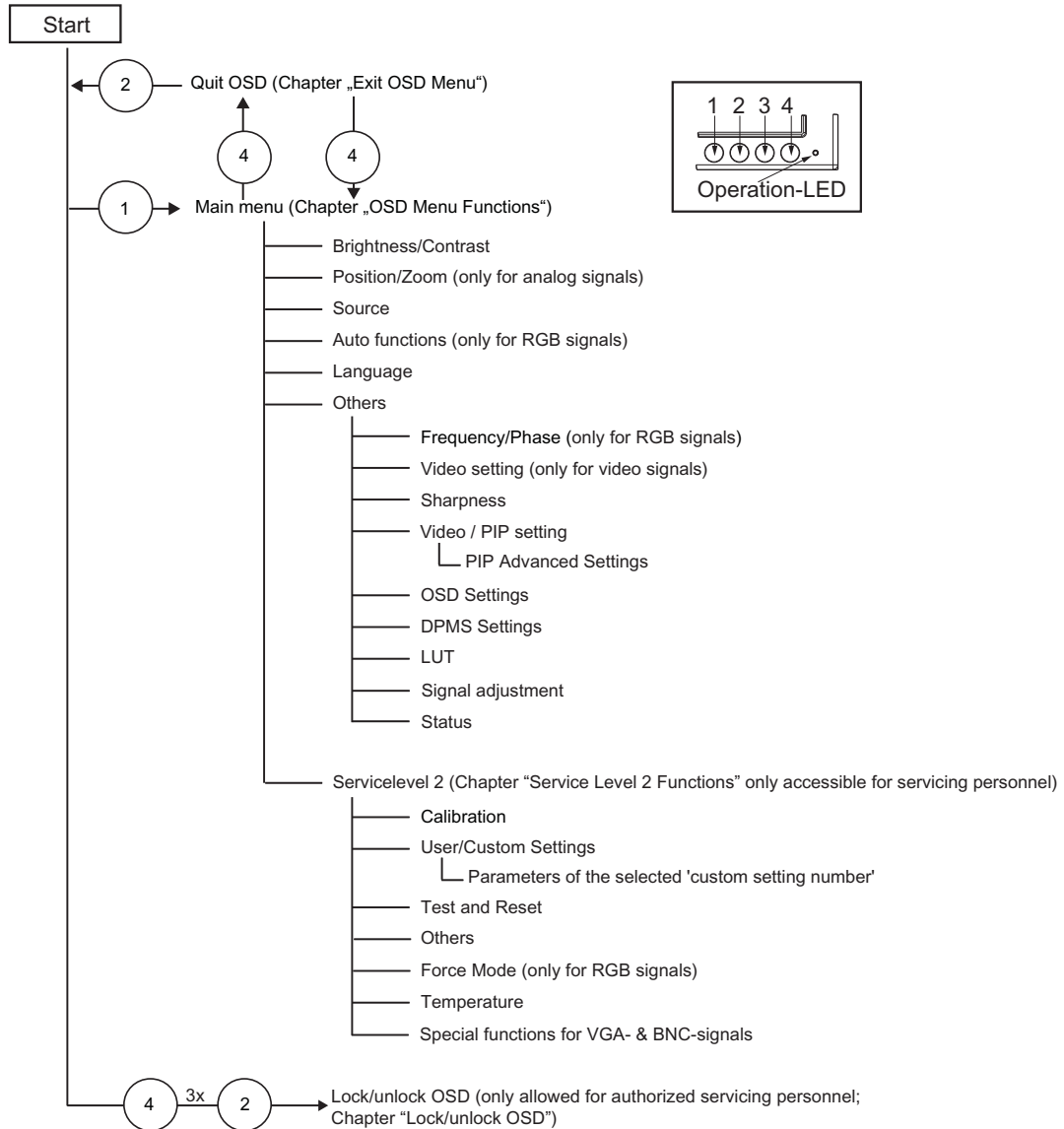


Fig.: Overview of OSD menu

6.4 Menu functions

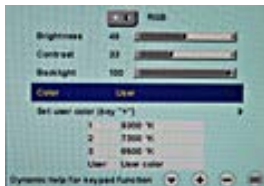
Program levels

Printed/identified in bold type

Menu title (main menu or first sub-menu level)

Main menu



Main menu	Function	Adjustment / setting range	Description
Brightness/Contrast 	Brightness	0 ... 100 %	Set brightness Adapting the representation of darker picture areas. Note: The brightness settings are already optimized for digital DVI 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 %	Set contrast Adapting the representation of brighter picture areas. Note: The contrast settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).

Main menu	Function	Adjustment / setting range	Description
	Backlight	0 ... 100 % Recommended: max. 80 %	Adjust brightness of monitor backlight Adjustment of overall brightness to ambient lighting. Note: If the function "Backlight Command" is activated in the "Others → LUT" menu, the backlight setting cannot be changed.
	Color	1, 2, 3, User 1: 9300°K 2: 7300°K 3: 6500° K (native) User factory setting: "6500 °K (native)". (This color can be set by the user) <i>Default: 1 (6500°K)</i>	Set the desired color temperature or hue Three predefined and one adjustable color temperatures can be selected. Color locations 1 and 3 cannot be saved. They only remain active while the timing is applied. Note: The user color setting can be changed when "User" is selected.
	User color	Define user color temperature The color setting defined here can be subsequently selected using the color function (selection "User"). Note: If the color location setting is corrected with "User Color", some color levels may be lost.	
	Red color temp.	-32 ... +32	Select red component of display.
	Green color temp.	-32 ... +32	Select green component of display.
	Blue color temp.	-32 ... +32	Select blue component of display.

Main menu	Function	Adjustment / setting range	Description
Position / zoom (not for analog picture signal) 	H position	0 ... 100 %	Shift picture in horizontal direction 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 picture in vertical direction 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.
	Zoom	1 to 1 Fill screen Fill ratio Fill to square <i>Default: Fill screen</i>	Selection between different picture size settings: 1 to 1: 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 ratio. The picture is zoomed to the maximum screen area with retention of the aspect ratio. Fill to square. The picture is zoomed to square format.
Image source 	Select source for main display Selection of picture source for full format image. If you call this OSD menu, the current source is displayed.		
		VGA / DVI Digital / Composite / S-Video / DVI Analog	After switching the monitor off and on again, the image sources are queried in sequence. Note: Alternatively, the source can be selected through a hot key (see the OSD menu → Others → OSD setting).

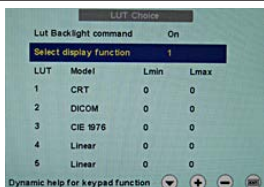
Main menu	Function	Adjustment / setting range	Description
Auto functions (only for analog signal) 	The auto functions are used to automatically set parameters. The quality of settings depends on the image content and type of synchronization. All settings can of course also be optimized manually using the corresponding items in the OSD menu. Note: We recommend that an SMPTE test picture is displayed		
	Auto brightness/contrast	On / Off <i>Default: Enabled</i>	This parameter can be selected for the auto function With "On", the brightness and contrast are set when the "Auto functions" are executed. With "Off", the brightness and contrast are not set when the "Auto functions" are executed. Note: This function is not available for "Sync on green signals".
	Auto position/phase/frequency	On / Off <i>Default: Enabled</i>	This parameter can be selected for the auto function With "On", the position, phase, and frequency are set when the "Auto functions" are executed. With "Off", the position, phase, and frequency are not set when the "Auto functions" are executed.
	Execute selected auto functions	Execute	The selected auto functions are executed This sets brightness, contrast, position, frequency and phase to their optimum values. The quality of the function depends on the applied image contents.
Language 		German, English <i>Default: English</i>	Use the "Language" menu to select the language of the OSD menu German or English can be selected. English is the delivery default setting.
Others 			

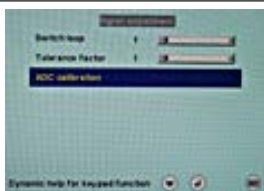
Main menu	Function	Adjustment / setting range	Description
	Frequency / phase (only for analog signal)		
	Frequency (only for RGB signals)	1638 - 1738	You can set the frequency and phase of the input signal If the vertical lines are still slightly fuzzy, adjust the "Frequency/Phase" setting. Note: We recommend displaying a vertical line from the "Pixel On/Off" test pattern.
	Phase (only for RGB signals)	0 - 255	
	Video setting (only for video signals)		
	Saturation	1 - 255 <i>Default: 128</i>	Adjusting the saturation for video signals
	Sharpness		
	Interpolation filters	1 ... 5	One of 5 filters can be selected for setting the sharpness to reduce scaling artifacts. You must visually determine which sharpness setting is best. Common filters are available for the RGB sources (VGA, DVI). The interpolation filters depend on the input resolution. A filter is not normally used with 1280 x 1024 since each physical pixel can be controlled individually by its own pulse. At lower resolutions, the filter calculates the value for the non-controlled pixels. The larger the filter number (No. 1, 2, ...5), the finer/deeper the calculation, i.e. the picture appears smoother and more details are lost. Users should individually set the filter depending on the application: Filter No. 1 produces the "sharpest" picture, as it does the least filtering. Filter No. 5 filters the most; the greatest danger exists with this filter that details can no longer be recognized.

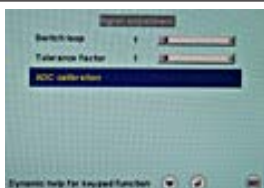
Main menu	Function	Adjustment / setting range	Description
	Video/PIP setting		
	PIP size	Disabled 1 2 3 <i>Default: Disabled</i>	Activating and deactivating the PIP window and setting the PIP window size
	PIP source	Auto VGA DVI Digital Composite S-Video DVI Analog <i>Default: Auto</i>	The source is selected that is to be shown in the PIP window. "VGA" and "DVI" cannot be displayed simultaneously. Note: When an RGB signal is displayed in the PIP window, resolutions of up to 1280 x 1024 can be displayed in PIP size 3 and 800 x 600 in PIP size 2. The PIP window remains black if the signal cannot be displayed. To display the signal, select one of the following actions: • Reduce the resolution of the signal. • Change the PIP window size using the "PIP size" function.
	PIP horizontal position	Slider control	Shift the PIP window in the horizontal direction
	PIP vertical position	Slider control	Shift the PIP window in the vertical direction
	Brightness	0 ... 100 %	Set the brightness of the PIP window Adapting the representation of darker picture areas. Note: The brightness settings are already optimized for digital DVI 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 %	Set the contrast of the PIP window Adapting the representation of brighter picture areas. Note: The contrast settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).

Main menu	Function	Adjustment / setting range	Description
	PIP advanced settings		
	Saturation	1 - 255 <i>Default: 128</i>	Setting the saturation for video signals displayed in PIP
	PIP sharpness (only for analog signal)	1 ... 5	One of 5 filters can be selected for setting the sharpness of the PIP image to reduce scaling artifacts. You must visually determine which sharpness setting is best. See "Sharpness" in the "Others" menu: Description of details via the filters.
	PIP image horizontal position (only for analog signal)	Slider control	Shift the image in the horizontal direction in the PIP window
	PIP image vertical position (only for analog signal)	Slider control	Shift the image in the vertical direction in the PIP window

Main menu	Function	Adjustment / setting range	Description
	OSD settings		
	Horizontal position	Slider control <i>Default: Right</i>	Setting the horizontal position of the OSD menu
	Vertical position	Slider control <i>Default: Down</i>	Setting of vertical position of OSD menu
	Background	Opaque Transparent <i>Default: Opaque</i>	Selection of OSD background (Opaque or Transparent).
	LED	Dimmed Lit <i>Default: Dimmed</i>	Adjust the brightness of the status LED.
	OSD lock/hotkey	Hotkey brightness / contrast Hotkey backlight Hotkey select source <i>Default: OSD available</i>	Selection of different OSD lock/hotkey settings: <i>Brightness / contrast hotkey:</i> Only brightness and contrast can be changed by each user via the OSD keys without a key combination. All other OSD menu functions are locked. <i>Hotkey backlight.</i> Only the backlight can be changed by each user via the OSD keys without a key combination. All other OSD menu functions are locked. <i>Hotkey select source</i> Only the image source can be changed by each user via the OSD keys without a key combination. All other OSD menu functions are locked. Note: See Lock/unlock OSD menu [▶ 48]
	Hotkey for the PIP activation	Active Inactive <i>Default: Inactive</i>	Activating and deactivating the PIP window with key 4 on the front If "Active" is selected, the PIP window can be opened or closed with the saved settings using key 4 on the front without opening the OSD menu.

Main menu	Function	Adjustment / setting range	Description
	DPMS setting		
	DPMS	Enabled Disabled <i>Default: Enabled</i>	The DPMS (Display Power Management System) can be switched on/off When the DPMS is activated and there is no input signal, the backlight is switched off or darkened (depending on the parameter for the "DPMS Off mode": see below). This saves power, and increases the service life of the backlight.
	DPMS Off mode (backlight)	Dimmed Disabled <i>Default: Dimmed</i>	"DPMS Off mode" can be set to "Dimmed" or "Off". The backlight is then either dimmed or switched off when the DPMS mode is active.
	LUT selection		
	LUT backlight command	Enabled / Disabled <i>Default: Enabled</i>	Permits access to the backlight - When "On" is set, the backlight cannot be changed in the "Brightness/contrast" menu. - When "Off" is set, the backlight can be changed in the "Brightness/contrast" menu.
	Select gamma curve	1 ... 5 <i>Default: LUT 1</i>	Gamma curve selection: information on the selected curve The LUTs that can be selected are displayed in the table in the OSD menu. See Monitor adjustment – LUT [▶ 51]

Main menu	Function	Adjustment / setting range	Description
	Signal setting		
	Switch loop	1 - 20 <i>Default: 1</i>	The following four parameters are of relevance for this tool: • H frequency • V frequency • V total • Interlaced/non Interlaced If one of these parameters changes, the monitor treats it as a timing change and initiates resynchronization via "Auto in progress". To prevent this from happening as a result of each and every minor signal disturbance, the value representing the permissible number of faulty or changed borders must be increased in the case of unstable signal sources. Note: The higher the tab setting, the longer it will take for a desired timing change to occur (delayed by a number of milliseconds).
	Tolerance factor	1 - 20 <i>Default: 1</i>	This tool only considers the H and V frequencies. An increase in the tab value results in a larger tolerance band being defined. Minor frequency fluctuations within this range will not result in resynchronization ("Auto in progress").
	Signal (only for analog signal)	RGB Monochrome <i>Default: RGB</i>	Switch over signal between b/w and color operation • If a monochrome signal arrives, it is green on the color monitor. • To obtain correct b/w images, set the "Signal" parameter to "Monochrome".

Main menu	Function	Adjustment / setting range	Description
	ADC calibration	Execute	Automatically calibrate A/D converter for the applied video level 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. The calibration results in a larger and more flexible video level range (e.g., the full brightness is also achieved at 700 mV if the video level is limited at the value of 700 mV). Note: A specific test pattern and timing are prerequisites. The A/D converters have already been factory-set and need not be readjusted.
	DVI enhancer		Enhances the DVI-D signal quality over long distances, even when standard cable is used
	Status	Information	Current monitor settings in the respective picture mode can be selected here. • Operating hours of the monitor • Temperature in the housing (actual and maximum temperature over the complete service life of the monitor) • Firmware type and version • OSD version • Configuration version • Current timing • Current source • Screen resolution • Frequency of the input signal (line frequency and refresh rate)
Service level 2	Settings in this menu must only be carried out by service personnel. See Service level 2 functions ► 38		

6.5 Exit OSD

Exit OSD menu 	Accept changes Reject changes	You exit the OSD and can save or reject any changes. Press key 2 if you unintentionally entered this menu and want to return to the main menu. Note: If the OSD menu is exited by changing the timing or switching off the monitor, the changes made are saved.
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6.6 Service level 2 functions

NOTICE

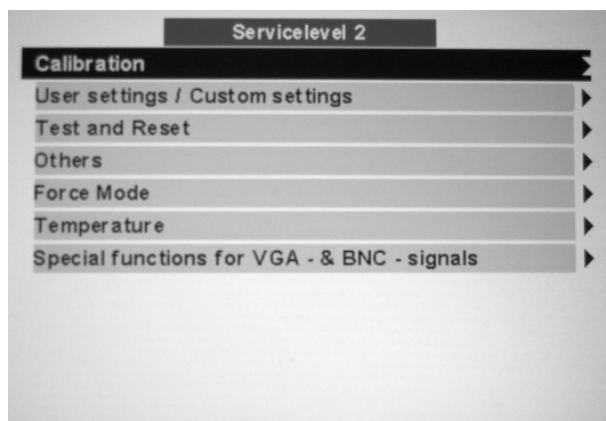
"Service level 2" is restricted to service personnel trained by EIZO GmbH Display Technologies.

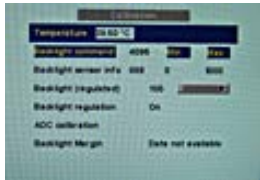
The "Service level 2" menu can be accessed from the OSD main menu.

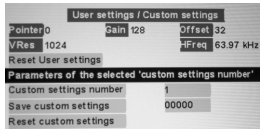
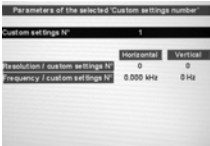
Key combination for opening "Service level 2"

- Briefly press the Up key and immediately keep the Down key pressed.

Menu structure

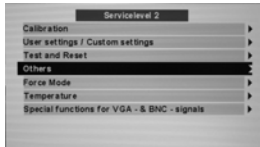


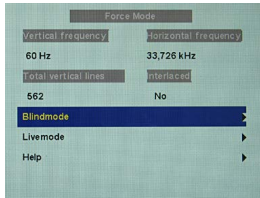
Service level 2	Function	Adjustment / setting range	Description
Calibration 	Temperature	Information	Specified as info in °C
	Backlight command	Information	Facility for reading out the current tab value of the backlight
	Backlight sensor info	Information	- Backlight sensor regulation - Minimum and maximum regulation
	When backlight regulation is "On": Backlight (regulated)	0 ... 100 %	Set brightness of monitor backlight Adjustment of overall brightness to ambient lighting.
	When backlight regulation is "Off": Backlight (controlled)	0 - 3360	Backlight inverter value
	Backlight regulation	Enabled Disabled <i>Default: Enabled</i>	The backlight regulation (backlight sensor) is switched on or off
	ADC calibration	Execute	Automatically calibrate A/D converter for the applied video level 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. The calibration results in a larger and more flexible video level range (e.g., the full brightness is also achieved at 700 mV if the video level is limited at the value of 700 mV). Note: A specific test pattern and timing are prerequisites! The A/D converters have already been factory-set and need not be readjusted.
	Backlight margin	Information	Remaining margin of backlight that can be used for regulation Note: The data is only displayed when the panel has warmed up (after approx. 20 min). The displayed value is for information only.

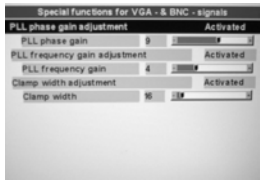
Service level 2	Function	Adjustment / setting range	Description
User / custom settings 	Reset User settings	Execute	All automatically stored timing data are deleted
	Parameter of set "Custom settings number" 	1 - 5	Display of stored values A total of 5 custom settings can be generated.
	Custom settings number	1 - 5	Custom settings can be saved here A total of 5 custom settings can be generated. The digit is the code number for the memory location.
	Save custom settings		Press the "Up" key to save the current picture settings and timing data to the memory addresses specified via the "Custom settings number". The 5-digit combination indicates which individual memory addresses have been allocated. <i>Example:</i> 10010 ⇒ Addresses 1 and 4 have been allocated.
	Reset custom settings	Execute	Clears the content of the five memory locations

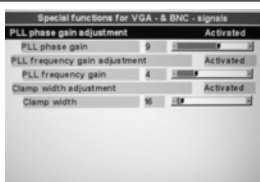
Service level 2	Function	Adjustment / setting range	Description
Test and Reset 	Test pattern	Disabled Color bars Gray bars Calibration picture <i>Default: Disabled</i>	Fixed test patterns are available The test patterns are generated directly in the monitor's processor. The test patterns can be used to analyze whether a fault is present in the control electronics or has to be searched for in the plugs/cables or video source. 1. If the test pattern is displayed without faults, one should first check the connections and video sources. 2. If the video source and the connections are OK, and if the test pattern is displayed perfectly, the fault must be searched for in the video input range of the monitor. The test patterns can also be used to check the panel quality: • Proof of the contrast with gray scales and color channels (independent of picture, picture program, graphics card and connectors). • All the pixels on the display area are activated (exception: The first column on the left of the panel remains black). Test of columns or line driver

Service level 2	Function	Adjustment / setting range	Description
	Reset to factory defaults	Execute	All parameters are reset The following are deleted: • User settings • Custom settings The following are reset: • Backlight • Sharpness • User color location • Signal adjustment • Black level settings • RGB relation • DPMS settings • Language • OSD setting • Gamma curve • Standard group • Info window settings • Serial interface settings • H-Scaler clip
	Reboot	Execute	The processor is reset The power supply unit is not switched off. The monitor restarts.

Service level 2	Function	Adjustment / setting range	Description
Others 	Info	Enabled Disabled <i>Default: Disabled</i>	To display an info window The info window is displayed on the bottom right of the screen if the source changes. It provides more detailed information about the set timing.
	Serial interface	Enabled Disabled <i>Default: Enabled</i>	The serial interface can be activated or deactivated. If the serial interface is deactivated ("Off"), it is possible to suppress e.g. the downloading of firmware.
	Serial bus	Enable Disabled <i>Default: deactivate</i>	To configure a network of several monitors This function is used to interconnect several monitors so that they can all be calibrated using a single computer (connected to the first monitor). Note: See Serial interface [► 23]
	Bus address	Slider from 0 ... 10 <i>Default: 1</i>	Definition of bus address for monitor
	H-Scaler clip	Slider from 0 ... 100	Enables the adjustment of the aspect ratio The picture can be expanded or compressed in horizontal direction.
	Motion image improvement	Active Inactive <i>Default:</i> <i>Interlaced signals: Active</i> <i>Progressive signals: Inactive</i>	Activation of motion image improvement - Undesirable comb effects can be reduced in the case of interlaced signals with PAL and NTSC resolutions connected to the "VGA" and "DVI Analog" signal inputs. - Undesirable staircase signals can be reduced in the case of non-interlaced signals (progressive) of up to 60 Hz connected to the "VGA" and "DVI Analog" signal inputs. Note: See Motion image improvement [► 61]

Service level 2	Function	Adjustment / setting range	Description
Force Mode 	Blind mode	Execute	Force Mode is a tool for setting unknown timing that is not displayed via Exact Modes that have already been stored. Suitable for direct entry of Force Mode data that have already been determined. Note: See Monitor adjustment - Force Mode [► 51]
	Live mode	Execute	Force Mode is a tool for setting unknown timing that is not displayed via Exact Modes that have already been stored. Suitable for step-by-step setting of an unknown timing or for fine adjustment of a timing whose data have been entered using "Blind mode". Note: See Monitor adjustment - Force Mode [► 51]
	Help	Execute	Short description of the Force Mode functions
Temperature 	Temperature limit	25 °C - 90 °C Default: 60 °C	Temperature beginning at which the monitor is dimmed
	Shutdown temperature	25 °C - 90 °C Default: 70 °C	Temperature beginning at which the monitor is switched off
	Operation time above 160 cd	Information	Operating hours meter

Service level 2	Function	Adjustment / setting range	Description
Special functions for VGA and BNC signals 	PLL phase gain adjustment	Activated / deactivated <i>Default: Deactivated</i>	Note: Menu item "PLL phase gain" is displayed when "PLL phase gain adjustment" is activated. The value for the PLL phase gain is set through the XICOR AD converter. Note: If "PLL phase gain adjustment" is changed from activated to deactivated, menu item "PLL phase gain" is hidden and the phase gain is set to the default value. 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. Setting the best PLL phase gain The best PLL phase gain can be obtained with the "Check-11" pixel on / pixel off image from the Quantum Data 802R video test generator.

Service level 2	Function	Adjustment / setting range	Description
	PLL frequency gain adjustment	Activated / deactivated <i>Default: Deactivated</i>	Note: Menu item "PLL frequency gain" is displayed when "PLL frequency gain adjustment" is activated. The value for the PLL frequency gain is set through the XICOR AD converter. Note: If "PLL frequency gain adjustment" is changed from activated to deactivated, menu item "PLL frequency gain" is hidden and the phase frequency is set to the default value. 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. Setting the best PLL frequency gain The best PLL frequency gain can be obtained with the "Check-11" pixel on / pixel off image from the Quantum Data 802R video test generator.

Service level 2	Function	Adjustment / setting range	Description
	Clamp width adjustment	Activated / deactivated <i>Default: Deactivated</i>	Note: Menu item "Clamp width" is displayed when "Clamp width adjustment" is activated. The value for the clamp width is set through the XICOR AD converter. Note: If "clamp width adjustment" is changed from activated to deactivated, menu item "Clamp width" is hidden and the clamp width is set to the default value. Clamp width The clamp width establishes the 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 width is set too high a black border appears because the back porch was left and the clamping is reaching the active video signal.

6.7 Lock/unlock OSD menu

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

Lock

You can lock the OSD when it is inactive.

To lock, enter the following key combination without interruption:

- Press key "4" and then key "2" three times.

The OSD menu is locked.

Unlock

- Press key "4" once and then key "2" three times (if the OSD is not active).

The OSD menu is unlocked.

Delivery state

The OSD is unlocked.

6.8 System settings

Note

Optimum picture quality

To achieve optimum picture quality, the monitor must be operated with a graphics resolution of 1280 x 1024 pixels. The corresponding setting for the graphics card must be made in the operating system.
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6.8.1 Avoiding image sticking

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

The following measures can reduce or prevent image sticking:

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

Note

Energy saving (Power Management)

The monitor supports various energy saving settings, called Power Management (PM). When PM is active, the monitor backlight switches off automatically for example, if the monitor is without a video signal for an extended period.

Also observe the operating system manufacturer's instructions regarding power management settings.

6.8.2 Setting the image geometry

The monitor automatically recognizes the standard used, and has preprogrammed set-up values for each standard. However, depending on the graphics card used, it may still be necessary to align and size the picture for the selected standard.

6.8.3 Setting the brightness and contrast

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

Note

Brightness and contrast can only be set accurately using a photometer.

Note

Fine adjustment for analog or digital inputs

- Fine adjustment for analog inputs should only be carried out via the two analog ports (15-pin Sub-D and DVI-I).
- The digital input (DVI-D) does not require a fine adjustment since the signal display is always optimum. With a fine adjustment, it is possible that gray scales are not displayed.

Procedure

- Use the SMPTE test pattern.
- Adjust the brightness so that image sections with 5 % and 0 % gray value still visibly contrast.
- Adjust the contrast so that image sections with 95 % and 100 % gray value still visibly contrast. To adapt the luminosity to the ambient lighting, adjust the backlight brightness. Please note that the factory-set brightness is then no longer maintained.

6.8.4 Monitor adjustment – video source/graphics card

As with all monitors, the LCD monitor also has certain limits, e.g. maximum resolution and refresh rate.

- The graphics card must be set when using the monitor such that these limits are maintained.

Note
Fine adjustment for analog or digital inputs
• Fine adjustment for analog inputs should only be carried out via the two analog ports (15-pin Sub-D and DVI-I). • The digital input (DVI-D) does not require a fine adjustment since the signal display is always optimum. With a fine adjustment, it is possible that gray scales are not displayed.

RGB sources (via 15-pin Sub-D or DVI-I connector) supply analog signals that are basically intended for conventional CRT monitors and that are processed directly by them.

In contrast, the analog signals must be converted into digital signals for the LCD monitor by 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.

A manual fine adjustment is therefore necessary during which the monitor (or, more precisely, the video digitizer) is matched to the respective video source.

The fine adjustment includes, for example, setting the horizontal/vertical picture position and the picture sharpness. This can be done via the OSD menu.

In order to optimize the monitor settings for the installed graphics card and guarantee that all gray scales can be distinguished, we recommend that brightness and contrast are adjusted only for the analog inputs.

Please note that these settings have no impact on the calibration in the look up table:

- To reduce the brightness using the OSD operator controls, use a picture with 0% gray scale (black) and a suitable measuring instrument. Wait until the measuring instrument shows constant values. Then increase the brightness slightly until the monitor display is just above the lowest black level (one step is generally sufficient).
- The white value can be set in the same way. Again, use a test pattern with 100% gray value (white). Only the contrast should be adjusted, to ensure that the black value remains unchanged.
- Increase the contrast until you no longer register an increase in light density on the measuring instrument. Then reduce the contrast to slightly below the maximum value (one or two steps are usually sufficient).
- Make sure once again that the black value has not changed. If it should have changed, repeat the two steps described above until the value no longer changes (cause: black value reduction).

The monitor is now configured for optimum performance with the installed graphics card. If you are still not satisfied with the luminance, you can increase the black and white values further by adjusting the backlight in the OSD menu.

NOTICE

Permanently higher setting for backlight

Please note that a permanently higher setting for the backlight results in a more rapid reduction in the brightness performance toward the end of service life.

6.8.5 Monitor adjustment – LUT

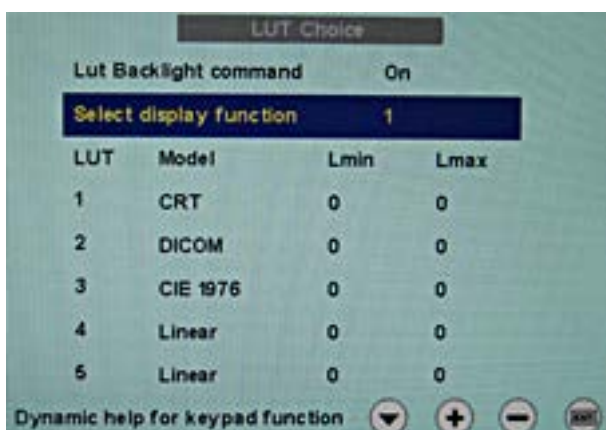


Fig.: LUT

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

You can select between five different LUT values in this menu. The values saved in the monitor are shown in a table in the OSD window.

Note

Additional information is available in the QA software instruction manual.

6.8.6 Monitor adjustment - Force Mode

Introduction

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 ranges. Such signals frequently occur with older medical equipment. A timing of this sort can be set using the Force Mode functions.

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

Force Mode timings can be saved in the custom settings. Thus, up to five additional Force Mode timings are available.

Only one timing can be saved in Force Mose itself.



Fig.: Force Mode

NOTICE

Force Mode is an engineering tool

Force Mode is only used to determine exotic and unknown timings.

An unknown timing can be used in the monitor with these data.

Basic information on timing

Scanning in the 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 are normally set to the interlaced procedure; computer signals and monitors compatible with them are normally set to 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.

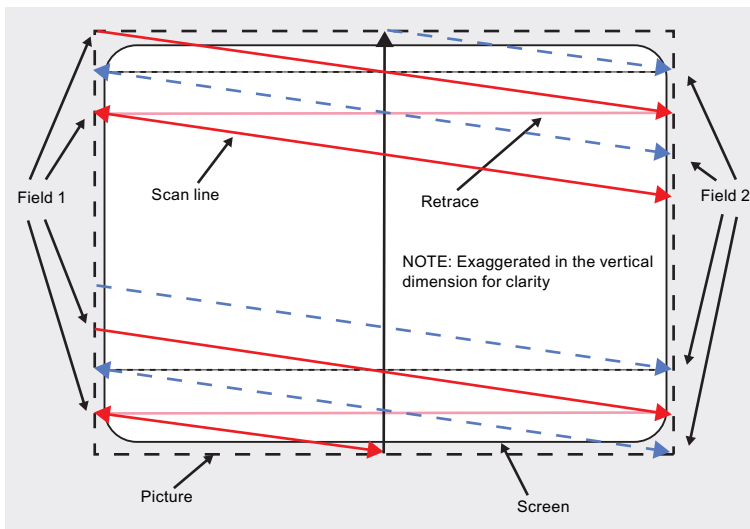


Fig.: Interlaced scanning system

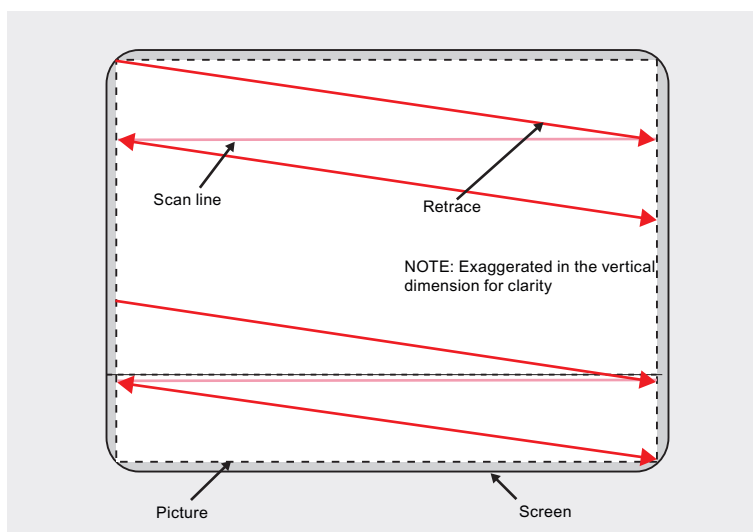


Fig.: Non-interlaced scanning system

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

Horizontal timing diagram (the vertical timing diagram is identical)

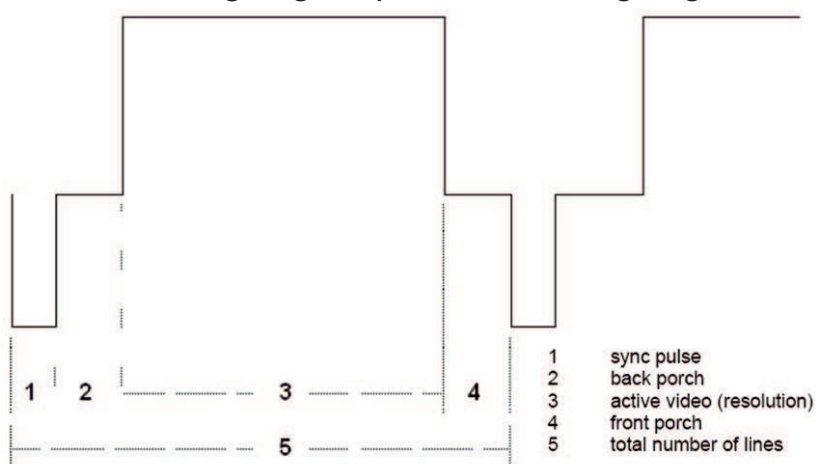


Fig.: Timing diagram

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)

Blind mode

"Blind mode" is used to enter known or already determined timings. The values to be set have to be known.

[Live mode](#) ► 55] should be used to set unknown timing data step-by-step.

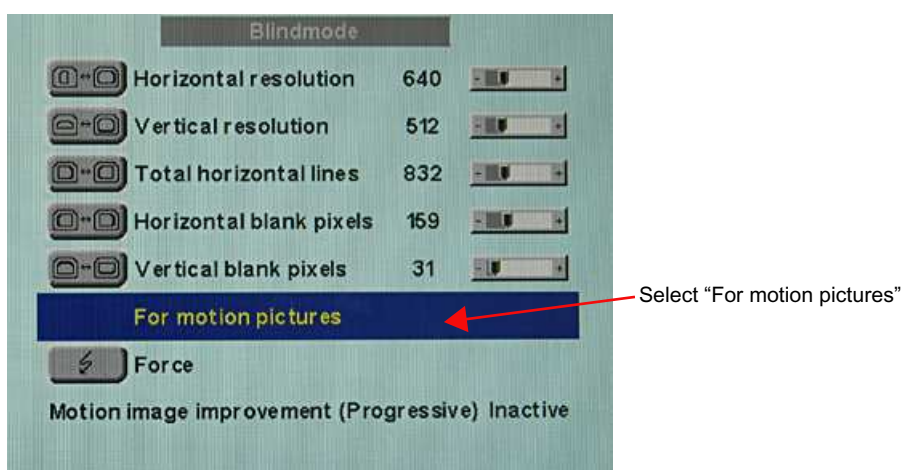
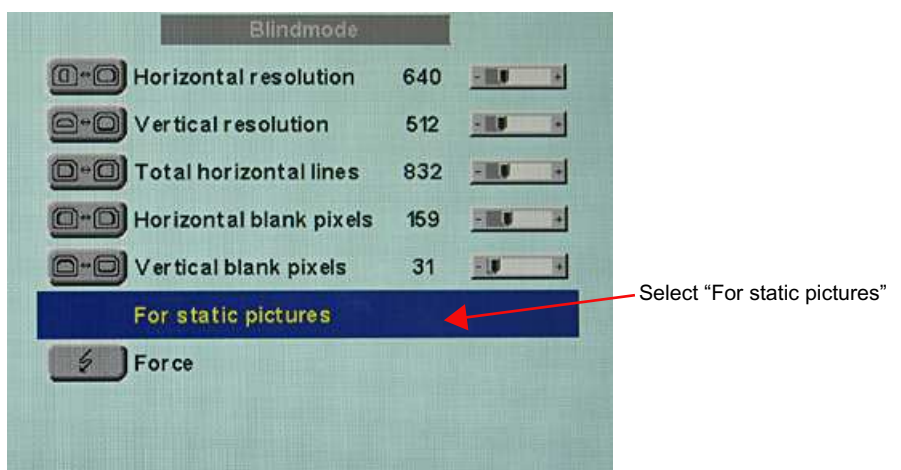
Note

Always save data with "Force"

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

Entering known timing data and fine adjustment

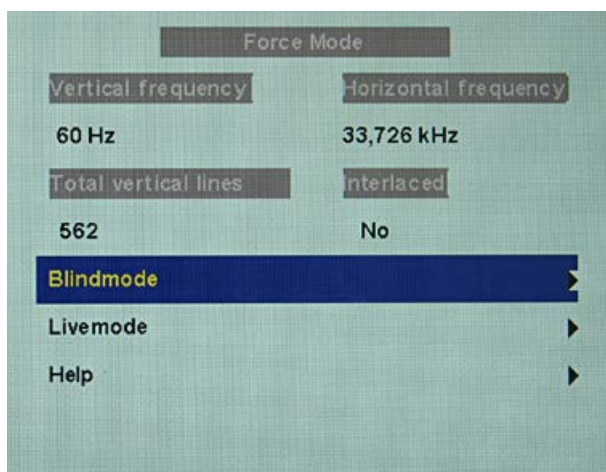
1. Open a test pattern with a clearly defined border (e.g. SMPTE image).
2. Open the "Blind mode" menu: Main menu → Servicelevel 2 → Force Mode → Blind mode.
3. Enter the timing data into the individual input fields using the Menu, Up and Down keys.
4. Select either "For static pictures" or "For motion pictures" in line 6 in the "Blind mode" menu and confirm using key 2.



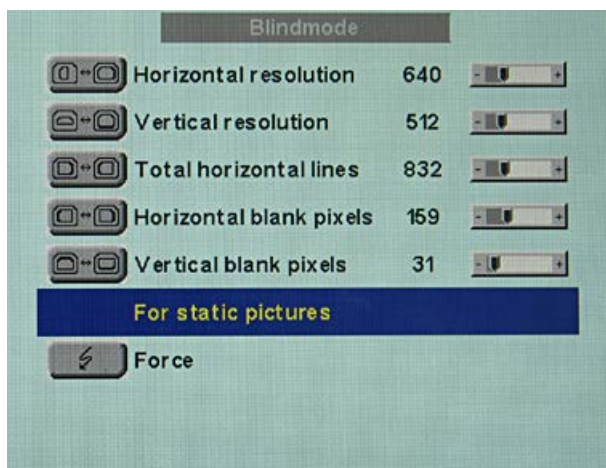
5. Execute the "Force"  Force command using key 2.

Note: For progressive timings with an image refresh rate greater than 60 Hz, only the

items "For static pictures" or "Reset" can be selected in line 6 in the "Blind mode" menu.



Note: If the "Reset" setting is selected, all learned values are deactivated in the current Force Mode window.



Live mode

If a timing is not detected by the monitor or if the image is not satisfactory, a fine adjustment can be performed using "Live mode" or "Position/Zoom" and "Frequency/Phase".

"Live mode" is used for step-by-step approximation of an unknown timing. The changes in the test pattern are output live on the monitor.

Note

All settings in "Live mode" must be carried out with the zoom factor "1 to 1" ("Position/Zoom" menu).

Note

Always save data with "Force"

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

Known data

If some of the timing data are already known, for example the resolution, they should first be entered in "[Blind mode ▶ 54](#)" in order to simplify the next steps.

If the resolution is known, it can be used for the approximation of "Horizontal lines (total)". The following applies: "Horizontal lines (total)" > "Horizontal resolution". If, when setting "Horizontal lines (total)", the "Horizontal resolution" is larger, the latter must be reduced. A larger "Horizontal resolution" can result in the image being split vertically.

Sequence for setting a timing

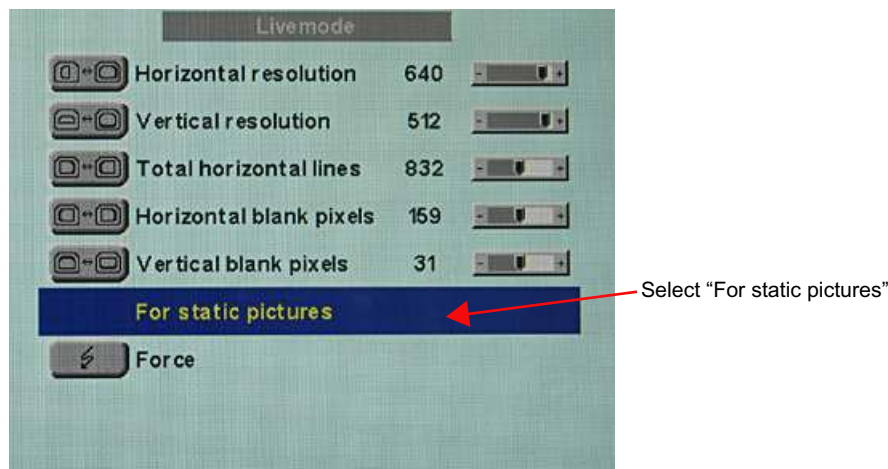
1. Determine start values using auto function
2. Optimize scanning frequency
3. Optimize geometry and resolution

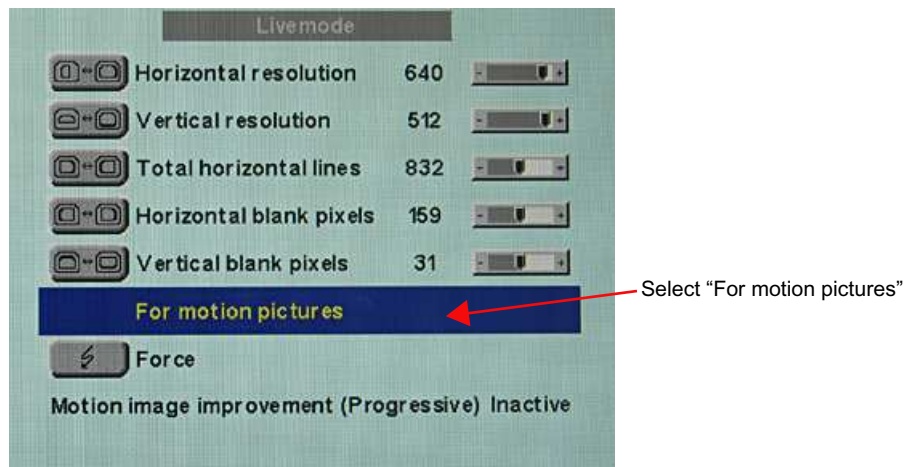
Step-by-step instructions for setting a timing can be found in the next three sections.

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.

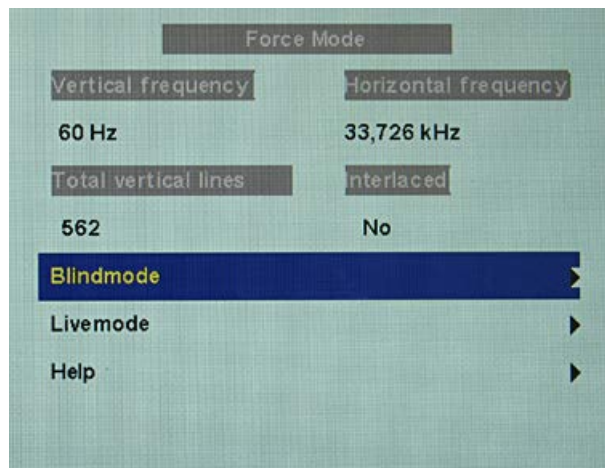
1. Open a test pattern with a clearly defined border (e.g. SMPTE image).
2. Open the "Live mode" menu: Main menu → Servicelevel 2 → Force Mode → Live mode.
3. Select either "For static pictures" or "For motion pictures" in the "Live mode" menu and confirm using key 2.



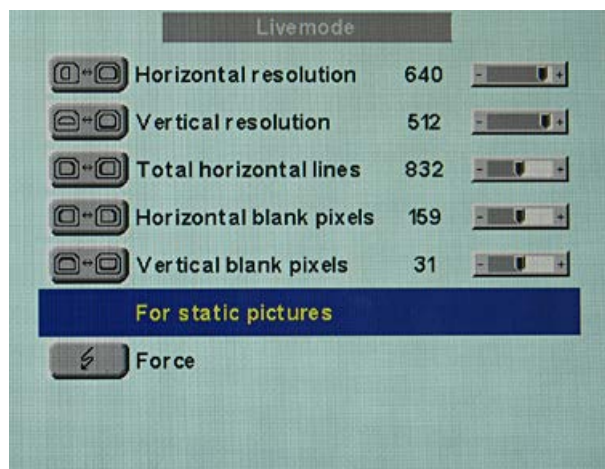


Note: For progressive timings with an image refresh rate greater than 60 Hz, only the items "For static pictures" or "Reset" can be selected in the "Live mode" menu.

4. Execute the "Force"  command using key 2.



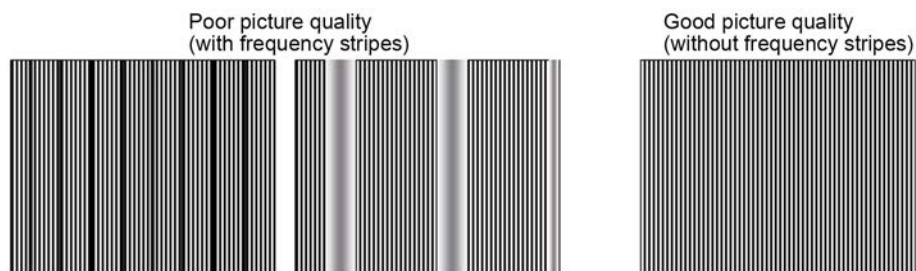
Note: If the "Reset" setting is selected, all learned values are deactivated in the current Force Mode window.



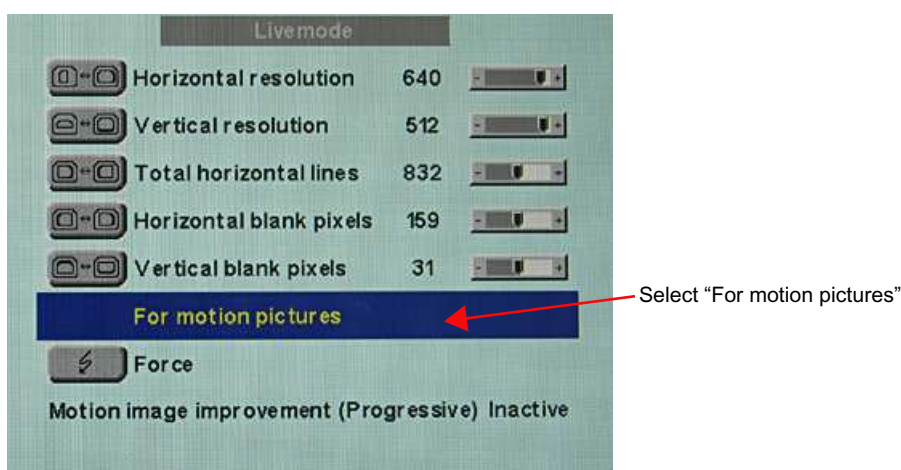
Optimize scanning frequency

The correct signal frequency must now be set ("Horizontal lines. (total)").

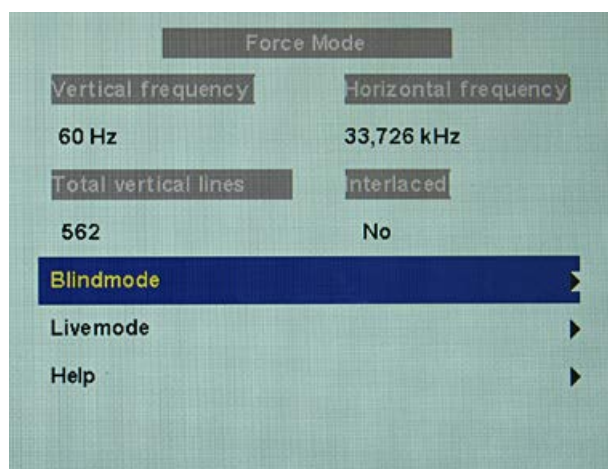
1. In order to set "Horizontal lines (total)" correctly, it is best to use an SMPTE and a pixel on/pixel off test pattern. If the test patterns are not available, you can use an image with clearly defined border and a line written "IIIIII" for the setting. Optimize the signal frequency such that no interferences are present in the picture. If the interval between the interferences becomes larger, and these therefore also become fewer, you are moving the slider in the correct direction.



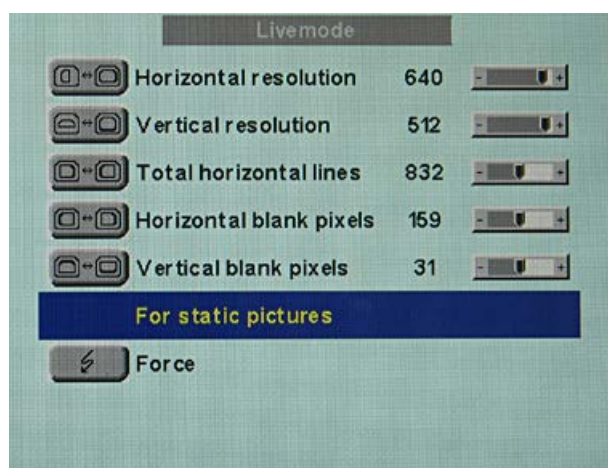
2. If you reach the limit of the control range when setting, you must perform the "Force" command with the selection "For static pictures" or "For motion pictures". The current setting is then saved, and the slider set to the center of the control range. Once you have set the signal frequency optimally, you can continue with the adjustment.



Note: For progressive timings with an image refresh rate greater than 60 Hz, only the items "For static pictures" or "Reset" can be selected in line 6 in the "Live mode" menu.



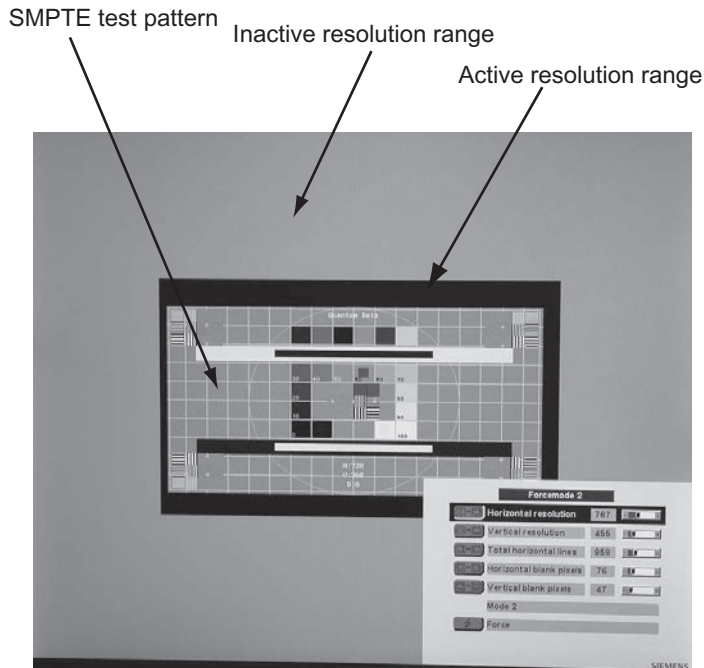
Note: If the "Reset" setting is selected, all learned values are deactivated in the current Force Mode window.



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, namely, 1280 x 1024. 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. Open the "Live mode" menu: Main menu → Servicelevel 2 → Force Mode → Live mode.
3. Select either "For static pictures" or "For motion pictures" in line 6 in the "Live mode" menu and confirm using key 2.
4. Use the "Horizontal blank pixels" input field to shift the left edge of the SMPTE image pixel-exact to the left internal border of the gray/blue area.
5. 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.
6. Use the "Vertical blank pixels" input field to shift the top edge of the SMPTE image pixel-exact to the top internal border of the gray/blue area.
7. 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.
8. Execute the "Force"  Force command with key 2.

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 unknown timing has been successfully set, you can now exit the OSD menu. The monitor will recognize the newly set timing and set it as saved whenever connected.

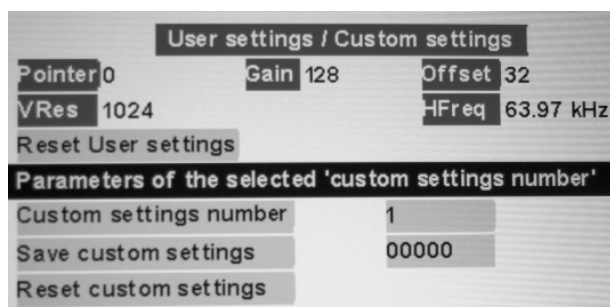
Note

Once all settings in Force Mode have been performed, the zoom factor can be set in the "Position / Zoom" menu.

Saving of several timings

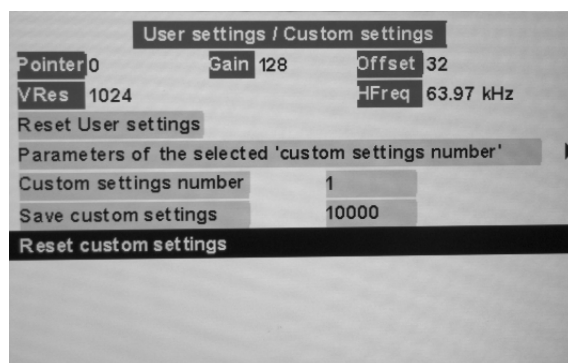
Save the timings in the OSD menu "Servicelevel 2 → User / Custom settings".

Up to five timings can be saved.



1. Select the storage number via "Custom settings number".
2. Save the timing by selecting "Save custom settings" and execute with key 2.
3. The saved timing is now identified by a "1" in "Save custom settings".

The location in the "Save custom settings" number where the 1 is set depends on the selected "Custom settings number". For example, if you have selected "1" as the "Custom settings number", the 1st position of "Save custom settings" is set to "1".

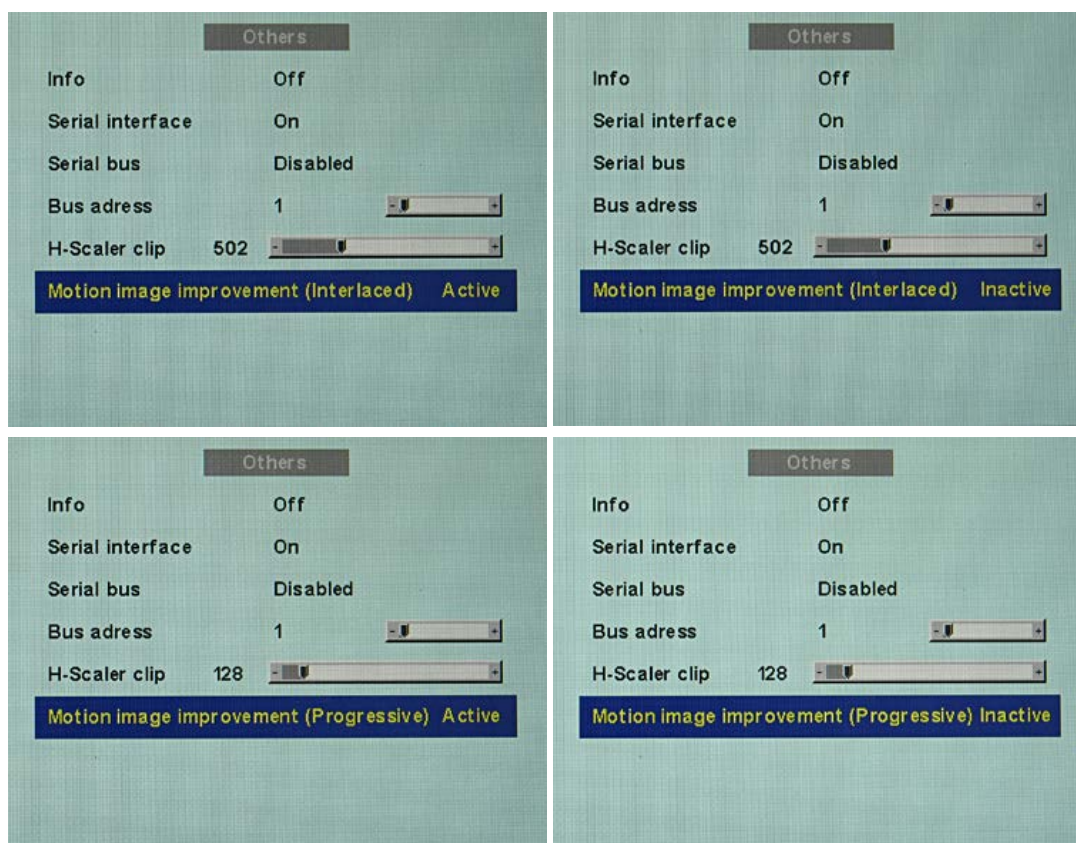


Saved timings can be overwritten at any time.

Motion image improvement

If the setting "For motion pictures" is selected and "Force" is carried out in the menu "Blind mode" or "Live mode", the menu line "Motion image improvement" is displayed with the setting "Inactive".

If the motion image improvement is to be activated, the setting for this must be changed from "Inactive" to "Active" either in the "Servicelevel 2" → "Others" menu or in the "Blind mode" or "Live mode" of the Force Mode menu.



Motion image improvement with interlaced signals

Note

With the setting "Motion image improvement" for interlaced signals, the sharpness settings cannot be changed in the "Others" menu.

Using the motion image improvement, it is possible to reduce undesirable comb effects in the case of motion images of interlaced signals with PAL and NTSC resolutions connected to the "VGA" and "DVI Analog" signal inputs.

Motion image improvement with non-interlaced (progressive) signals

Using motion image improvement, it is possible to reduce undesirable staircase signals in the case of all non-interlaced signals of up to 60 Hz connected to the "VGA" and "DVI Analog" signal inputs.

Note

Despite motion image improvement, staircase signals can occur with PIP images of the signal sources "S-Video" and "Composite Video". The staircase signals can occur if a signal source with motion image improvement is active in the main picture.

7 Operation

Once installed, operating the monitor consists mainly 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.

7.1 Note for users

CAUTION
--

Settings must not be changed by users
--

None of the settings may be changed on site by the user. This also applies to settings made using the monitor keys. These are therefore locked for certain applications. Contact Service if settings have to be changed.
--

CAUTION
--

If keys are locked contact service

If the keys are locked, contact the service department to unlock them. Unlocking them yourself invalidates the warranty

8 Cleaning

8.1 Cleaning

NOTICE

Device maintenance, cleaning and disinfecting

- The front panel is extremely sensitive to mechanical damage. Avoid all scratches, knocks etc.
The SCD 19102 CP version with protective glass are much less sensitive in this regard.
- SCD 19102 version, without protective glass: Remove water drops immediately; extended contact with water discolors the surface.
- Clean the front panel when dirty using a microfiber cloth and, if necessary, a cleaning agent. Only clean housing parts using the recommended cleaning agents.
- The entire monitor may only be disinfected using the tested disinfecting agents.

NOTICE

Remove all residual cleaning agents immediately

- Some cleaning agents leave residue (streaks) on the surface that can easily be removed by wiping with a damp cloth.
- Remove residues of alcohol, "Cidex", "Taski DS 5001" and "Surfanios Fraicheur Citron" from the surface immediately. Residue of these cleaning agents on the surface often causes permanent streaks.

Recommended cleaning agents and disinfectants

Agent class	Tested cleaning agents and disinfectants	Further examples
Alcohol	• Ethyl alcohol (96%) • Isopropyl alcohol (70%) • 0.5% chlorhexidine in isopropyl alcohol (70%)	• Hospiset cloth • Mikrozyd liquid
Aldehyde	• Melsitt • Cidex • Cidex (2.4% glutaraldehyde solution)	• Aldasan 2000 • Kohsolin • Gigasept FF
Chlorine derivatives	• Terralin • Sodium hypochlorite (10%)	Quartamon Med

Agent class	Tested cleaning agents and disinfectants	Further examples
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 labs) - Virex II 256 - Precise Hospital Foam Cleaner Disinfectant "Green Soap" USP - Ovation - Formula 409 - Fantastik - WexCide	
Guanidine derivatives	Lysoformin	
Quaternary compounds	Incidur spray, undiluted	
Standard household washing-up liquid	Tempo	Fairy Ultra, Pril, Palmolive
Pyridine derivatives	Activ spray, undiluted	
Water	- Tap water - Distilled water 1.6 % water-based ammonia solution	

Prohibited cleaning agents and disinfectants

Agent class	Tested cleaning agents and disinfectants
Peroxide compounds	Perform Dismozon pur

These cleaning agents and disinfectants can bleach the paint after a longer period of application.

9 Troubleshooting

9.1 Troubleshooting

Fault	Cause	Remedy
Operation LED dark	Blown fuse	Inform service department
No picture appears on the monitor	Power cable is not connected or incorrectly connected.	Check power cable Power switch set to "On" position?
Operation LED flashes green	No video signal	Check video cable
No picture appears on the monitor	Video source does not send a video signal	Check video source
Operation LED flashes green Fuzzy picture, interference in vertical lines	Scanning frequency or phase incorrectly set.	Adjust frequency and phase.
DPMS ON mode: LED flashes green, then orange	Loose connections	Plug in cables properly and secure them
DPMS OFF mode: LED flashes green	Faulty cable	Replace cable
Operation LED flashes orange, temperature warning appears on the screen	Overtemperature threshold: The temperature limit has been exceeded	Check the following: - The temperature limit is not set correctly: - Check the setting in the OSD menu (Service level 2). - Room temperature is too high - The cooling fins on the housing are covered. - Non-compliance with the spacing requirements on installing the monitor. - The monitor is close to a heat source.
Operation LED flashes red, no image appears on the monitor	Overtemperature threshold: Temperature for automatic shut-down has been reached. - The monitor will shut down automatically after 30 minutes. - The monitor will switch on again as soon as the temperature falls sufficiently.	
Image has no contrast	The video source is only transmitting a green signal	In the OSD menu, switch over from "RGB" to "MONO"
The image cannot be shifted horizontally with reference to the panel	Synchronization not OK	Set maximum window size and perform "Auto adjust"

Other information output via two-color LEDs

LED	Monitor status
LED orange	No fault; "Power down" was switched on and activated.
LED green	Video signal recognized, no fault

10 Technical specifications

Note

Applicability of technical specifications

All technical specifications are valid after a warming-up period of 30 minutes.

10.1 Graphic display

Type	Color, IPS, TFT panel
Screen size	376 mm x 301 mm
Screen diagonal	19" (48 cm)
Native resolution	1280 x 1024 (full-screen format)
Pixel arrangement	3 subpixels
Pixel distance	0.294 mm x 0.294 mm
Contrast ratio	- Typically 900:1 - At least 600:1
Brightness	- Typically 330 cd/m² - Min. 260 cd/m²
Horizontal viewing angle	At least $\pm 85^\circ$
Vertical viewing angle	At least $\pm 85^\circ$
Protective screen	SCD 19102 CP only: Optically non-reflective protective glass on both sides
Backlight	White LEDs
Lifetime of backlight	Typically 45,000 hours (applies to an ambient temperature for the backlight of 25 °C)

10.2 Voltage supply

Mains connection	Non-heating appliance socket
Line voltage	100 V AC ... 240 V
Miniature fuse	2 x 3.5 A, quick-blow
Line frequency	50 ... 60 Hz ($\pm 5\%$)
Power consumption	< 58 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 (like multi-sync CRTs) Likewise, resolutions above 1280 x 1024 can be reduced and then displayed. Interpolation artifacts must be expected when displaying images with a resolution other than 1280 x 1024. (Caution: If the timing is frame-buffered or frame-synchronized, the picture information may be lost; the gray scales - the color hues for color images - are also reduced and may be visible).
Timing recognition	H frequency, V frequency, interlaced, number of horizontal lines

10.4 Inputs/Outputs

Analog signal input

RGB input, H/C-Sync input and V-Sync input	15-pin sub-D socket (female), any polarity
DVI input	DVI-I socket (analog pins are allocated)
RGB signal	- Video level: 0.5 ... 1.0 V_{pp} - Sync level: TTL compatible
SoG signal	- Video level: 0.5 ... 1.0 V_{pp} - Sync level: 0.2 ... 0.3 V_{pp}

Digital signal input

DVI input	Over DVI-I socket, single link
DDC	via DVI

Video input

S-Video	Via 4-pin mini-DIN socket
Composite	Over 1x BNC socket
Composite & S-Video	- Video level: 0.5 ... 1.4 V_{pp} - Sync level: 0.2 ... 0.3 V_{pp}
Standards	PAL (625 Z / 50 Hz) NTSC (525 Z / 60 Hz)

Analog signal output

SoG signal	- Video level: 0.5 ... 1.0 V_{pp} - Sync level: 0.2 ... 0.3 V_{pp}
------------	---

Serial interface

RS 232	via RJ 11 socket (female) or 6-pin mini-DIN socket
--------	--

10.5 Controls and connectors

Front	- Four keys for OSD menu - Operation LED
Back	1x power connection socket 1x DVI socket 1x 15-pin 3-row Sub-D socket 1x BNC socket 1x 4-pin mini-DIN socket 2x RS 232 sockets (RJ11) - Voltage source for connection of external devices (5 V/1 A) 2x 75 Ω/10 kΩ switch loop for H and V
Rear panel (accessible without detaching connection panel cover)	1x power switch 1x RS 232 socket (6-pin mini-DIN socket)

10.6 Mechanical design

Housing components	ABS
Protective screen	SCD 19102 CP only: Optically non-reflective protective glass on both sides
Visible screen area	Approx. 376 x 301 mm
Ventilation openings	In rear panel
Degree of protection	- IP20 in accordance with DIN 40050 - IP22 at front (SCD 19102 CP only)
Connection panel	On rear panel, under cover
Weight in kg	
• SCD 19102 C (without base)	6.4 kg (± 0.5 kg)
• SCD 19102 CP (without base, with front pane)	7.0 kg (± 0.5 kg)
• SCD 19102 D (with base)	9.9 kg (± 0.5 kg)

Dimensions (W x H x D) in mm	
• SCD 19102 C (without base)	423 x 349 x 95
• SCD 19102 CP (without base, with front pane)	423 x 349 x 95
• SCD 19102 D (with base)	423 x 449 ... 547 x 279

10.7 Climatic conditions

Operation

Temperature range	5 °C ... 40 °C ambient temperature
Temperature gradient	Max. 5 °C/h, without condensation
Air pressure	1053 ... 540 hPa

Transport and storage (packed)

Temperature range	-20 °C ... +60 °C ambient temperature
Temperature gradient	Max. 5 °C/h, without condensation
Air pressure	1053 ... 540 hPa

10.8 Safety specifications

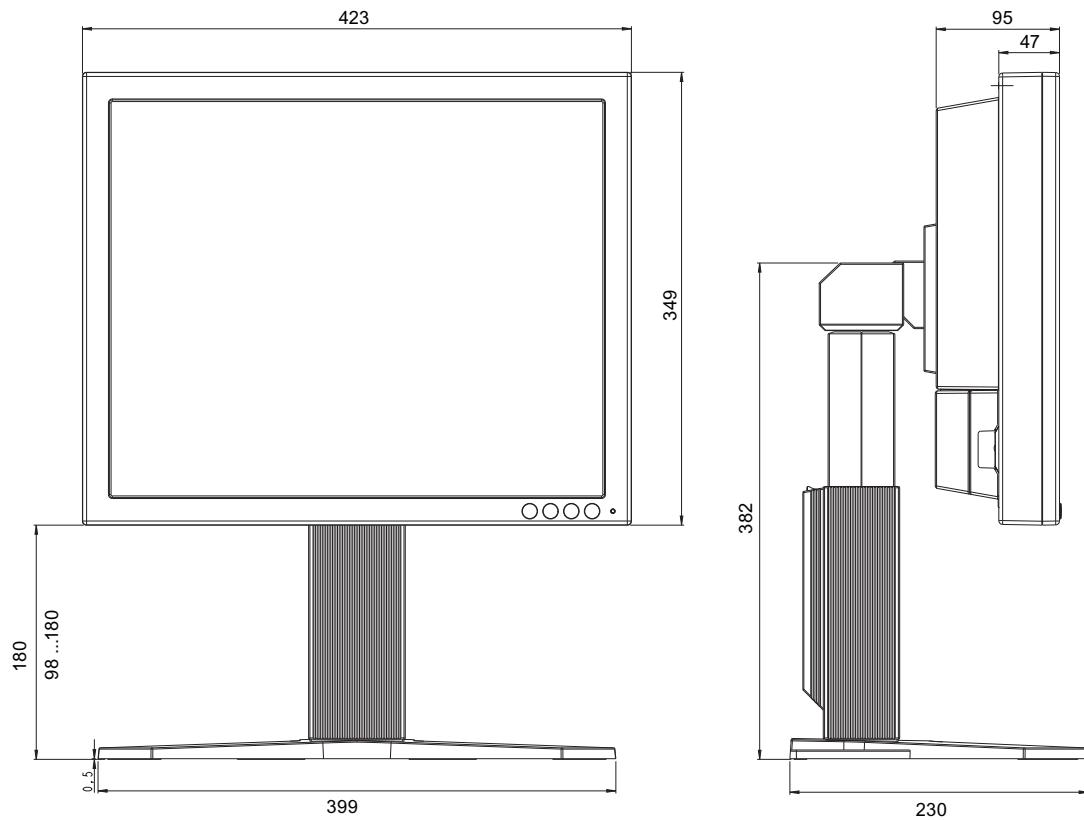
Safety standards	• IEC 60601-1 • CAN/CSA C22.2 No. 60601-1 • UL60601-1 • GB 4943.1 (non-tropical, altitude < 2000 m)
Protection class	Protection class I
Degree of protection according to DIN 40050	IP20
Medical device classification (EU)	Class I

11 Dimensioned drawings

All dimensions in mm

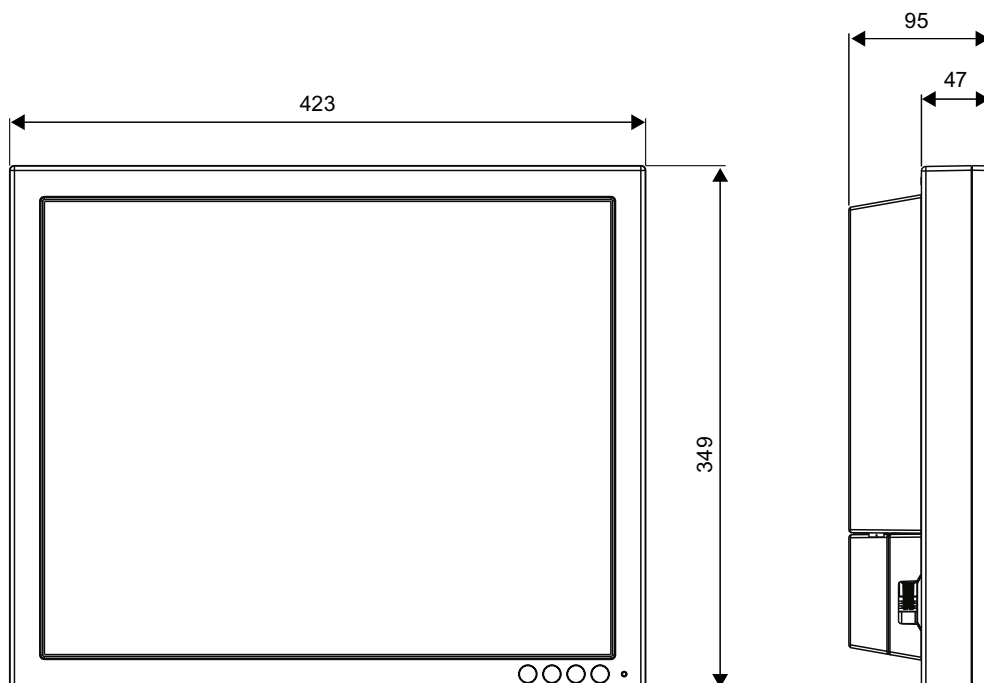
11.1 SCD 19102 D (with stand)

11.1.1 View from front and side

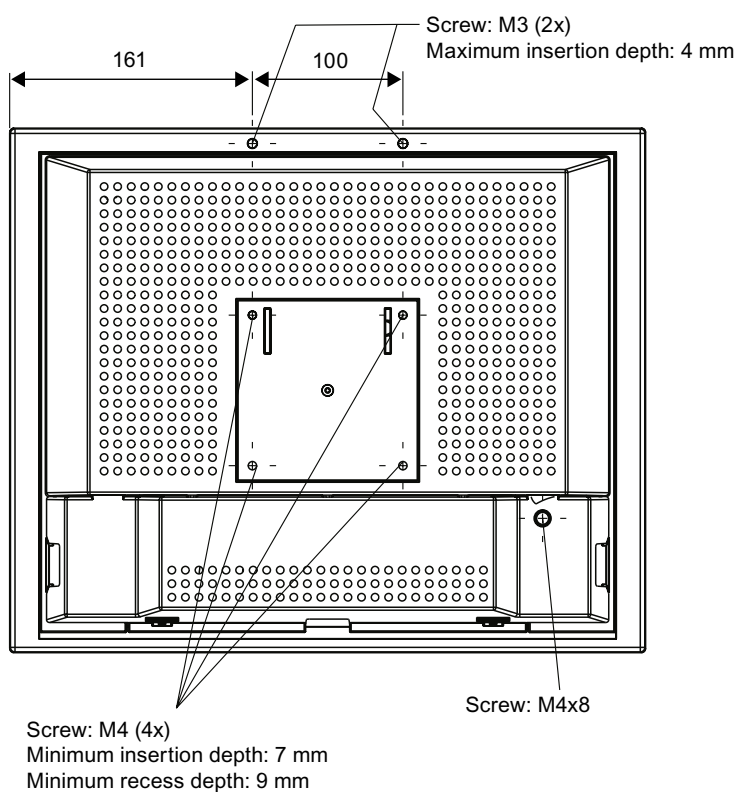


11.2 SCD 19102 C/CP (without stand)

11.2.1 View from front and side



11.2.2 Rear view



12 Spare parts / accessories

12.1 Multifunctional base

Complete with all possible settings

- Height, tilt, and rotation setting
- Rotation to portrait / landscape format

Product	Order number	Description
Multifunctional base	6GF69888AA03	Suitable for monitor SCD 19102

12.2 DVI transmission path and cable

DVI transmission path TDL 3600

NOTICE

If the monitor is not designed for a 5 V/1 A power supply, a power supply unit is required for the DVI transmission path.

Digital graphics connection supports the transmission of high-quality video data. Using the DVI cable set from EIZO, this data can be transmitted over a distance of up to 36 m without any reduction in quality.

The transmission set comprises a receiver and a transmitter that are connected over the CAT cable. This medium is widely implemented, rugged in use and the cables are easy to connect. The plugs at each end are small enough to pass through narrow pipes

Product	Order No.
DVI transmission path TDL 3600-SL • 36 m without power supply unit	6GF6010-0DA36
DVI transmission path TDL 3600-SL • 36 m with power supply unit	6GF6010-1DA36
DVI transmission path TDL 2300-SL • 23 m with power supply unit	6GF6010-1DA23

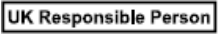
Cables and adapters

Different cables and adapters allow problem-free integration of our monitors, even in extremely complex systems.

Product	Order No.
DVI cable, single link, 3 m	6GF6980-1TA07
BNC to VGA cable	6GF6980-1TB04

13 Appendix

13.1 Markings and symbols

Marking / symbol	Meaning
	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 Chinese national regulations.
	BIS marking, in accordance with Indian national regulations.
	RCM marking for conformity with Australian EMC standards.
	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).
	Input for service calls.
	Symbol for "Comply with the instructions for use".
	Symbol for "Authorized service personnel only".
	Symbol for "Dangerous voltage".
	UK Responsible Person
	Swiss authorised representative (CH-REP)

13.2 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 SCD 19102. 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 SCD 19102 is intended for use in the electromagnetic environments noted below. Customers and users of the SCD 19102 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 SCD 19102 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. The SCD 19102 is approved for use in a number of environments. This includes residential areas and areas connected directly to the public low-voltage grid, such as private homes.
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 SCD 19102 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 SCD 19102 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 SCD 19102 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 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 SCD 19102			
The SCD 19102 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 SCD 19102

The SCD 19102 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.

13.3 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: SCD 19102 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 (enclosed)
Canadian Notice This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de le classe B est conforme à la norme NMB-003 du Canada.

13.4 China RoHS (Restriction of Hazardous Substances)

液晶显示器 LCD Display

型号 Model: 6GF621#-2C\$# (#=0..1 ; \$=A..Z ; #=00..99)

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.

13.5 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

13.6 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.

13.7 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.

13.8 Repairs

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

13.9 Additional devices

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

13.10 Contact

Support during installation and for technical questions

www.eizo-or.com

13.11 Trademarks

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Index

A

Ambient temperature	14, 70
Analog signal input	68
Analog signal output	69

B

Blind mode	54
Brightness	49

C

Ceiling suspension	15
Cleaning agent	64
Cleaning staff	6
Connecting	20
Connection panel	18
Contact	83
Contrast	49

D

Digital signal input	68
Disinfectants	64
Disposal	83

E

Energy saving	48, 49
Environment	14

F

Features	12
Fine adjustment	49, 50

G

General safety instructions	7
Grounding	16

I

Image Sticking	48
----------------	----

L

Live mode	56
-----------	----

M

Motion image improvement	43, 62
--------------------------	--------

O

Order number	12
OSD menu	
Unlock	48

P

Power connector	20
-----------------	----

S

Serial interface	23, 69
Service personnel	6
Shielding measures	16
Signal input	20

T

Technical specifications	67
Timing	
Basic information	52
Blind mode	54
Live mode	56
Saving	61

U

User	6
------	---

V

Ventilation	14
Video input	18, 68

W

Warranty conditions	83
---------------------	----



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Instructions for Use, 06/2022

SCD 19102

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