Instruction for Use

SCD 19102
SMD 19102

19" Color and Grayscale Monitor

Important

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

EIZO®

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.

Proper use of EIZO products

Note the following:

⚠ WARNING

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

Trademarks

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

Disclaimer of liability

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

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Table of contents

1 Introduction

1.1 Contents of this document

This document explains the functionality and the approved application of the:

- SCD 19102 19" color monitor
- SMD 19102 19" gray scale monitor

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.

The monitors are available in color and gray scale variants:

- Color monitor
  - SCD 19102 C, version without protective front pane, without multifunctional stand
  - SCD 19102 CP, version with protective front pane, IPx2 at front
  - SCD 19102 D, version without protective front pane, with multifunctional stand
- Gray scale monitor
  - SMD 19102 C, version without protective front pane, without multifunctional stand
  - SMD 19102 CP, version with protective front pane, IPx2 at front
  - SMD 19102 D, version without protective front pane, with multifunctional stand

Note
These instructions are available on the supplied CD-ROM and on the website www.eizo.com.

2 Safety instructions

Ensure that all necessary steps are taken to avoid injuries or incorrect diagnoses.

No zero error rate

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

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

User

In the following, health personnel such as radiologists or MTAs are referred to as the "user".

Service/service personnel

The terms "service" or "service personnel" denote specially trained and authorized personnel, e.g. hospital technicians, medical device manufacturers.

2.1 General safety instructions

Correct and safe operation of the 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 commonly used.

For safety reasons, the following precautions must be observed:

⚠ **DANGER**

Please observe all warning information present on the monitor and in the instruction manual.

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 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 or signal output unit
- Use of a safety isolating transformer
- Use of the additional protective conductor terminal

Installing the monitor: The monitor's suspension arm must have its own protective conductor.. This protective conductor, together with the protective conductor of the monitor, ensures that the housing leakage current always remains less than 500 µA, even in the event of a first fault event.

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 line power, components in the device are subject to high voltages. Touching the components may be fatal.

No contact between device and patients

The device is not suitable for direct contact with patients. 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 monitor and in the instruction manual.

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 penetrating into the device may result in an electric shock or failure of the device.

⚠ **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.

IMPORTANT:

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 installed stand, as well as the mounting surface, must be suitable for the weight of the device.
- For install 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 monitor in the vicinity of sources of heat, e.g. radiators, heating appliances or other devices which 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 acclimation 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.

IMPORTANT:

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 particularly to protect the monitor LCD module 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 Instruction Manual.
- Monitor: The screen is extremely sensitive to mechanical damage. Absolutely avoid scratches, shocks, etc.

What to do if the monitor is faulty

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

- Damage to the plug or power cable.
- Following the entry of liquid into the device.
- If the device has been exposed to moisture.
- If the device does not function or if a fault cannot be corrected using the instruction manual.
- If the device has been dropped and/or the housing damaged.
- If the device smells of burning or produces peculiar noises.

Be aware of 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

Touching the screen can result in brief image distortions due to mechanical pressure or electrostatic discharge.

2.2 Product-specific safety instructions

⚠ CAUTION

If the SCD / SMD 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 / SMD 19102 C and SCD / SMD 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.

See also

Installing the monitor [▸ 16]

Installing the base and cable (SCD 19102) [▸ 22]

3 Description

3.1 Scope of delivery

Note
Keep the packaging material for subsequent transport of the device.

All SCD / SMD 19102 monitors are delivered with the following components:

- CD with instruction manual
- European power cable
- US power cable
- Chinese power cable
- DVI-D video cable

3.2 Application

The 19" color and gray scale monitors have been specially designed for medical diagnostics according to the safety standard IEC 601. The monitors also comply with safety standards UL 2601 and EN 60601-1.

3.3 Performance features

SCD 19102 19" color monitor and SMD 19102 19" gray scale monitor have the following features, which permit a wide area 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 meets 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 gray scale contrast across a very wide viewing angle (in-plane switching (IPS) technology). The optimum screen resolution is 1280 x 1024 pixels. Video signals with other resolutions, as are common in medical technology, are 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)

SCD 19102

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

SMD 19102

- The monitor is connected to the computer system using either the 15-pin Sub-D input socket, the BNC sockets or the DVI input socket (digital only).

If necessary, the monitor display is adapted using an OSD menu.

Video inputs

The SCD 19102 and SMD 19102 monitors have 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 and SMD 19102 monitors can be adapted to special timing settings.

Protective glass

The SCD 19102 CP and SMD 19102 CP have anti-glare protective glass 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 pane 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 keypad 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. EIZO GmbH will not be held liable if changes are made to the device.

4.1 Installation site

Provide adequate ventilation

Ventilation slots are located on the rear of the housing.

The distance at the rear must be at least 10 cm from a wall or 15 cm from other devices.

Unimpeded access to the power switch

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.

Observe the permissible ambient temperature range

The device must operate within the permissible ambient temperature range.

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

The SCD 19102 CP and SMD 19102 CP monitors have 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 [▸ 70].

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.

Change of environment

If the device is brought into a warm environment from a cold one, condensation may form in the device. The device should not be switched on until all the condensed water has evaporated, including that inside the device. This may take several hours, depending on the conditions.

4.2 Installing the monitor

Ceiling suspension

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

Comply with the following during installation (100 mm hole spacing according to VESA standard):

Information on the fastening screws	
Number	4
Thread	M4
Strength	8.8
Insertion depth	7 mm minimum / 9 mm maximum
Torque	Max. 3 Nm

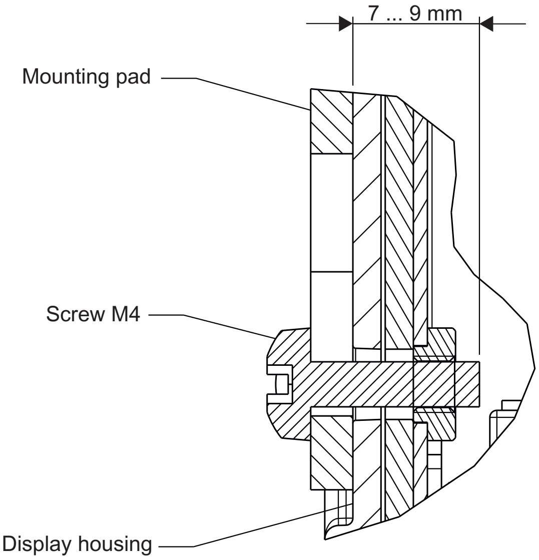


Fig. 1: Insertion depth of mounting screws

See also

Product-specific safety instructions [▸ 12]

Installation site [▸ 15]

Installing the base and cable (SCD 19102) [▸ 22]

5 Connecting

5.1 General connection information

⚠ **CAUTION**

All information and warnings related to this product must be observed to ensure danger-free operation.

⚠ **CAUTION**

Changes to device

Device settings may only be adjusted by trained service personnel; otherwise, the warranty is void.

Do not make any changes to the device without prior approval from the manufacturer.

The monitor is designed for individual connection to a graphics card with a power supply of 110 or 240 V (TN-S system with PE conductor).

⚠ **CAUTION**

Observe shielding measures

Please observe all local EMC guidelines pertaining to shielding. If these requirements are not met, interference signals could penetrate the monitor.

To guarantee perfect image reproduction, the following instructions should be observed:

Only shielded cables are permitted for all signal connections.

Screw tight or lock all plug-in connections.

Signal and power cables must not be routed through the same duct.

The monitor must not share a power supply with motors or valves (interference peaks!).

NOTICE

Disconnecting from line power

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

See also

Electromagnetic compatibility [▸ 78]

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.

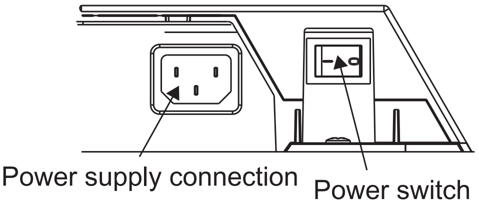


Fig. 2: Rear view of SCD / SMD 19102

5.3 Overview of signals and connections

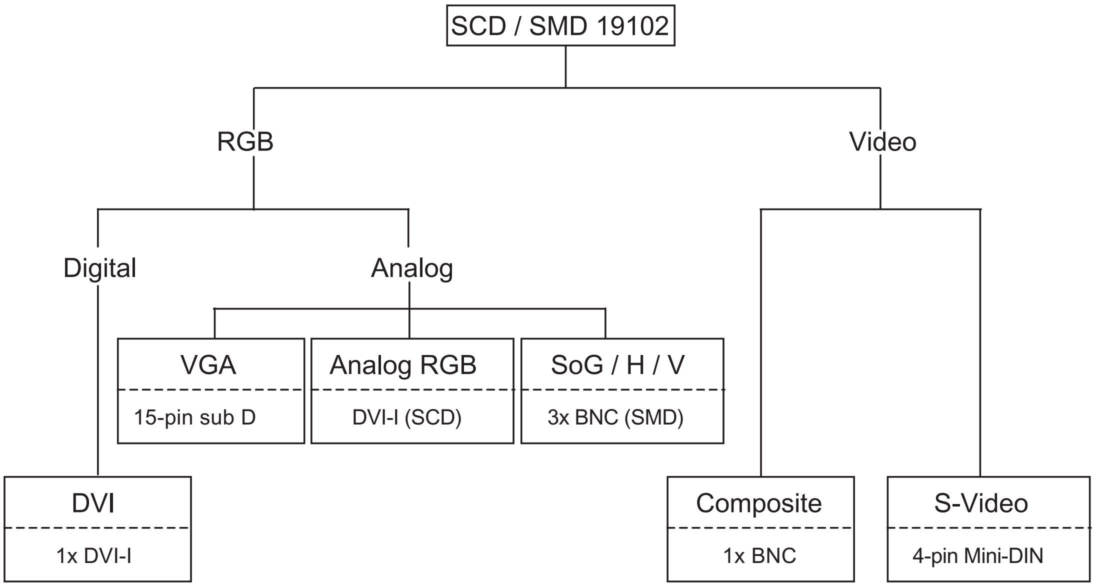


Fig. 3: Overview of signals and connections

5.4 Connection panel

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

SCD 19102

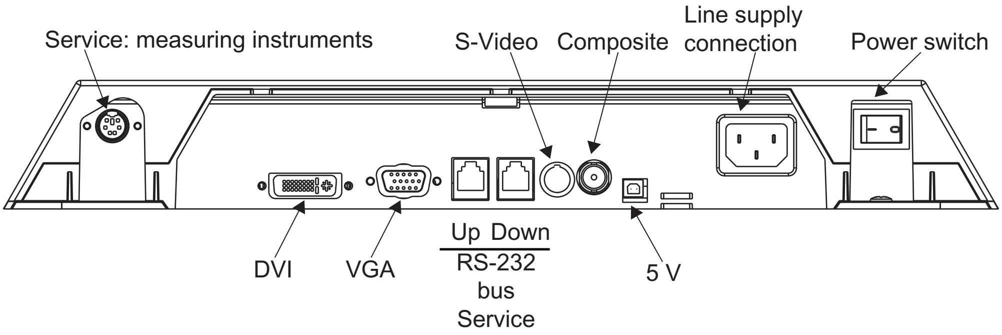


Fig. 4: Connection panel of the SCD 19102 color monitor

SMD 19102

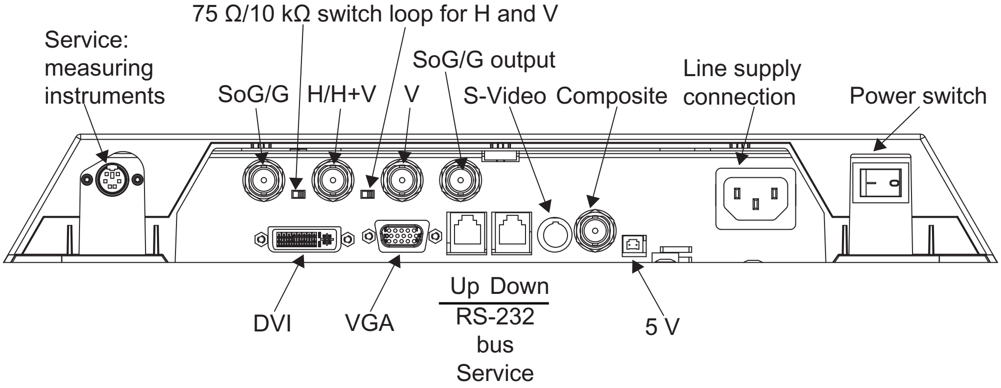


Fig. 5: Connection panel of the SMD 19102 gray scale monitor

See also

Connecting the signal cable [▸ 20]

Connecting the power cable [▸ 21]

Serial interface [▸ 25]

5.5 Connecting the signal cable

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.

⚠ **CAUTION**

- When connecting to the BNC sockets, the three cables for the R, G and B signals must be of equal length. Otherwise, color fringing, which appears similar to convergence faults, will occur due to unequal propagation times.
- The levels of the incoming analog RGB signals must be equal.
- If the same RGB signal is connected to several monitors via the BNC sockets using T-connectors, the R, G, B, and H DIP switches on the monitors must be set to 10 kΩ. These DIP switches must be set to 75 Ω on the last monitor in the chain.

The signal cable connections are located on the back of the monitor.

15-pin Sub-D socket

- Connect VGA cable with the 15-pin Sub-D connector (male) for the analog input to the 15-pin Sub-D connector (female).

DVI socket

The DVI cable can be connected in two ways:

- With DVI digital signal or
- With DVI analog signal (SCD 19102 only)

BNC sockets (SoG / H / V)

- With a wire (R or **G** or B, with composite synchronization):
  - Connecting wire for BNC connection "G".
- With three wires (R or **G** or B, with separate synchronization):
  - Connecting wire for BNC connections "G", "H/H+V" and "V".

4-pin mini-DIN socket (video input)

- Connect video cable for the sync video input (Y/C signal) to the 4-pin mini-DIN socket.

BNC socket (video input)

- Connect video cable for the composite input to the BNC socket.

See also

Connection panel [▸ 19]

5.6 DIP switches (for SMD 19102 only)

The SMD 19102 has two DIP switches between the three BNC sockets.

These switches are used for changeover between high impedance (10 kΩ) and low impedance (75 Ω) for the H and V synchronization inputs.

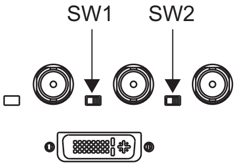


Fig. 6: Position of the DIP switches

Delivery state

Switch	Function	Delivery state
SW1	Input resistance for H/H+V signal	75 Ω
SW2	Input resistance for V signal	75 Ω

5.7 Connecting the power cable

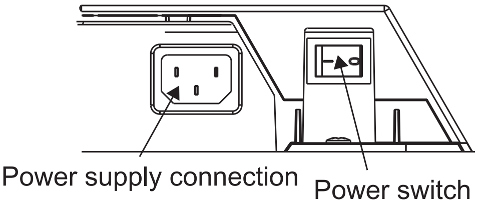
⚠ **CAUTION**

Only connect the device to line power with a protective conductor

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

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 supplied power cable into the line power socket.
- The power cable can be secured using a cable grip.



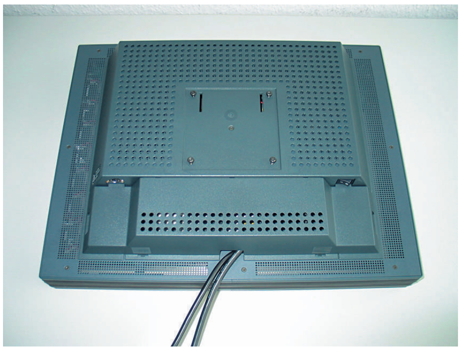
⚠ **CAUTION**
• Only use the power cable in the scope of delivery, or a cable with protective conductor and appliance plug to DIN 49 547, IEC 320 (max. length 3 m). Furthermore, the cable must adhere to all local safety regulations applicable to the specific country in which the monitor is used. • Device fuses must only be replaced by the repair centers or servicing department. • **Note for North America:** Molded power supply plugs must comply with the requirements for hospitals with respect to CSA Std. C22.2 No. 21 and UL 498.

See also

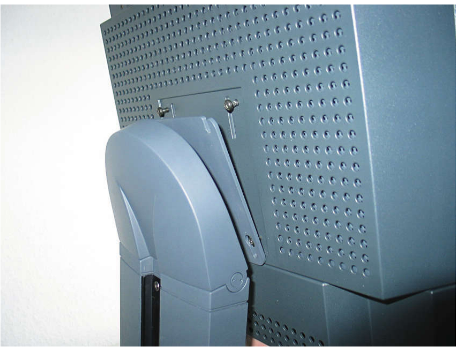
Connection panel [▸ 19]

5.8 Installing the base and cable (SCD 19102)

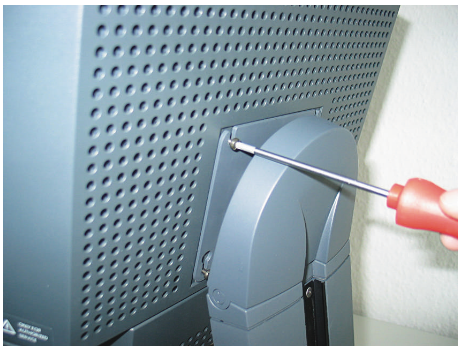
⚠ **CAUTION**
Do not use screws of excessive length Screws which are too long can damage mechanical and electronic components of the device.



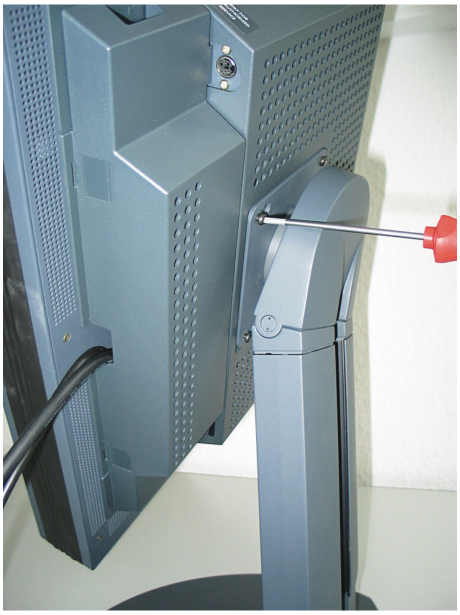
1. Attach the connecting cable before installing the stand on the monitor.
2. Slightly tighten the screws on the mounting plate.



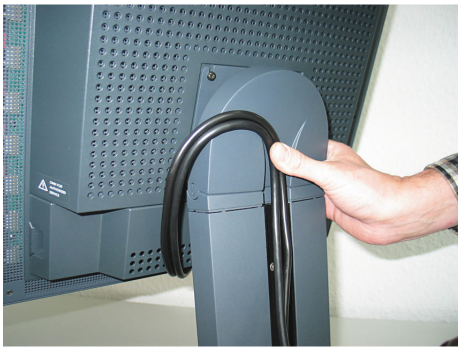
3. First insert two screws into the bottom two drilled holes of the stand.
4. Then insert the remaining screws into the top two drilled holes.
5. Slowly lower the monitor.



6. First tighten the top two screws.

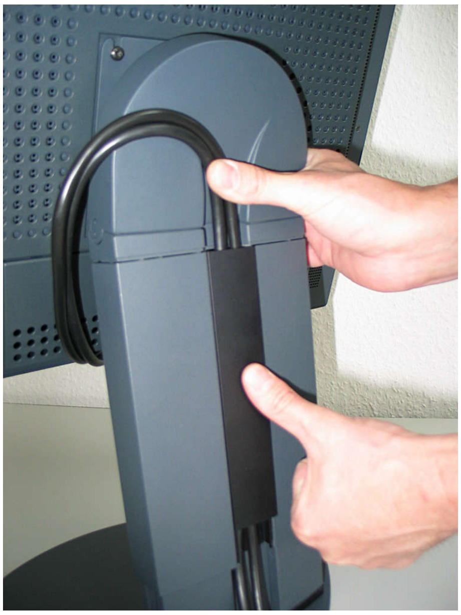


7. Then carefully turn the monitor 90° clockwise and tighten the lower screws.



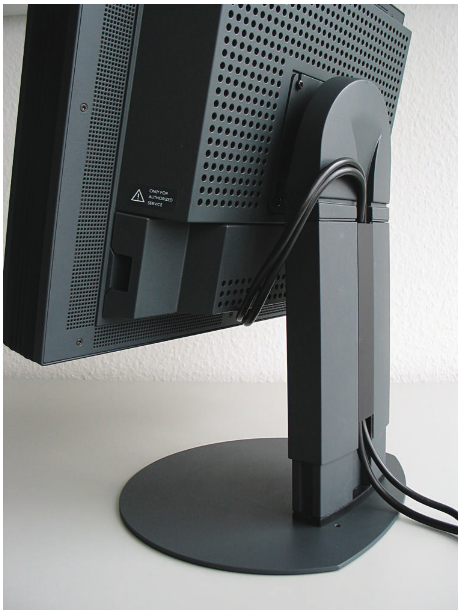
8. Route the connecting cable in the cable duct.

   WARNING: Do not route the connecting table 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



See also

Installing the monitor [▷ 16]

Product-specific safety instructions [▷ 12]

5.9 Serial interface

⚠ **WARNING**

Devices on service sockets

- Apart from the Serial Spot Meter and Universal Serial Luminance Meters, no other devices 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.
- Serial Spot Meters or Universal Serial Luminance Meters must not be connected in the presence of patients.

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 the connection of a Universal Serial Luminance Meter or a Serial Spot Meter.

Please note the "6-pin mini-DIN socket" figure: It shows the lower left corner of the underside of the monitor (viewed from the back).

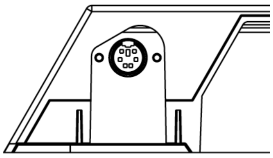


Fig. 7: Service socket for measuring instruments

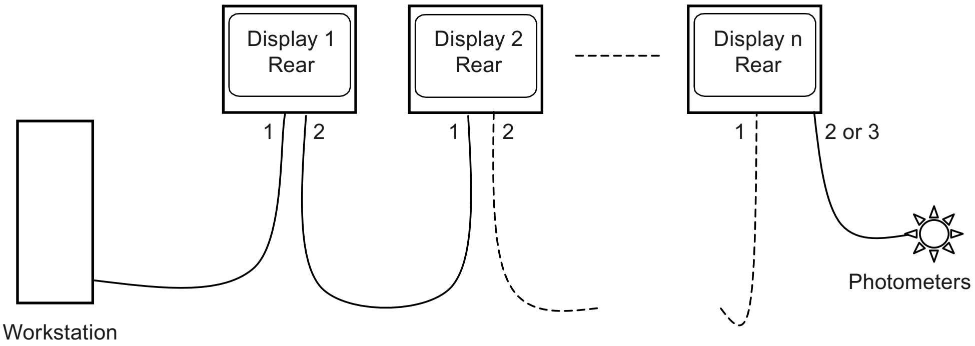


Fig. 8: Possible configuration – serial bus mode

* Photometer is a generic term for the measuring instrument suggested by EIZO GmbH Display Technologies:

- Advanced Serial Luminance Meter with adapter from 9-pin Sub-D to 6-pin mini-DIN socket **.

** Service mode! Not permitted in the patient environment.

If the monitor connection is made via the serial bus (see Fig. "Possible configuration – serial bus mode"), the setting "Serial bus" must first have been activated using "On Screen Display → Servicelevel 2 → Others". In this case (also under "On Screen Display → Servicelevel 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.

See also

Connection panel [▸ 19]

Menu functions [▸ 30]

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.

See also

Troubleshooting [▸ 72]

6.2 Operator controls

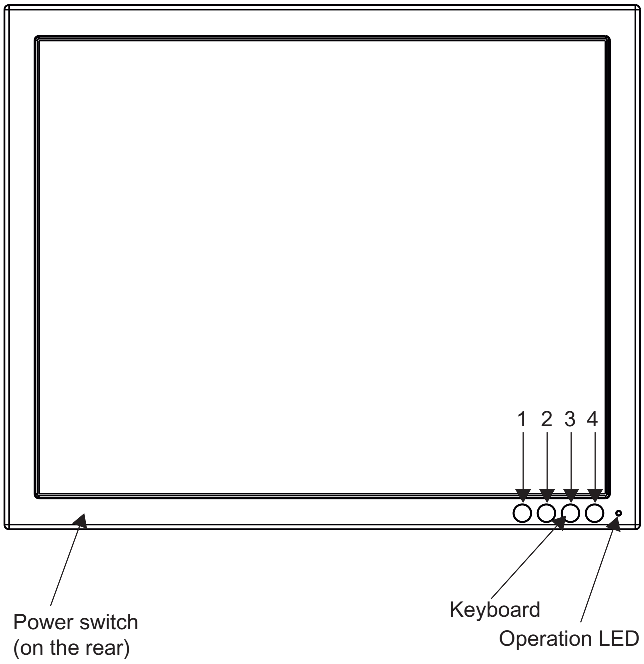


Fig. 9: Front view: Keypad and status LED

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

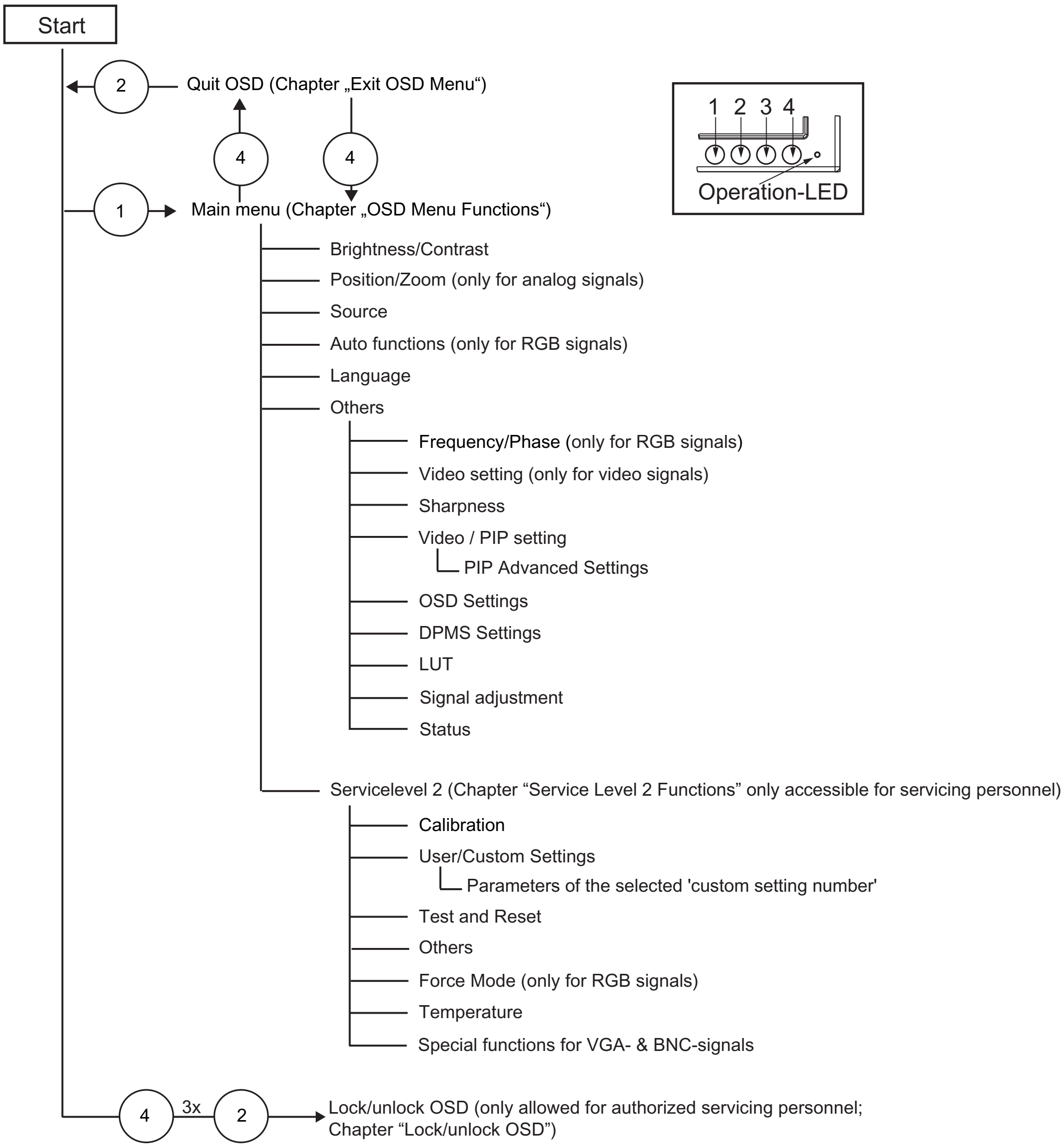
Key	Situation	Action
3	Function is selected	Decrease/change value
4	All menus except the "Exit OSD" menu	Return to previous menu level (settings are retained)
	"Exit OSD" menu	Return to main menu (settings are retained)

6.3 Description of OSD menu

6.3.1 OSD overview

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

Parts of the OSD menu can also be used without an input signal.


Start
2
Quit OSD (Chapter „Exit OSD Menu“)
4
4
1
Main menu (Chapter „OSD Menu Functions“)
1 2 3 4
Operation-LED
Brightness/Contrast
Position/Zoom (only for analog signals)
Source
Auto functions (only for RGB signals)
Language
Others
Frequency/Phase (only for RGB signals)
Video setting (only for video signals)
Sharpness
Video / PIP setting
PIP Advanced Settings
OSD Settings
DPMS Settings
LUT
Signal adjustment
Status
Servicelevel 2 (Chapter “Service Level 2 Functions” only accessible for servicing personnel)
Calibration
User/Custom Settings
Parameters of the selected 'custom setting number'
Test and Reset
Others
Force Mode (only for RGB signals)
Temperature
Special functions for VGA- & BNC-signals
4
3x
2
Lock/unlock OSD (only allowed for authorized servicing personnel; Chapter “Lock/unlock OSD”)

See also

Exit OSD [▸ 43]

Menu functions [▸ 30]

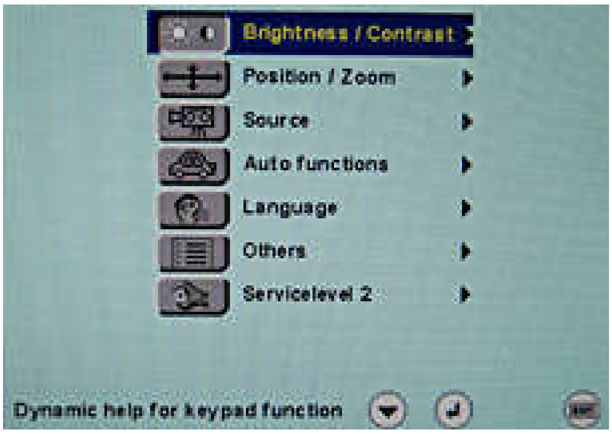
Service level 2 functions [▸ 44]

6.3.2 Menu functions

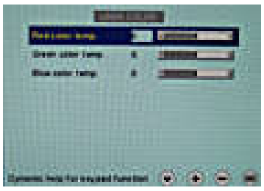
Program levels

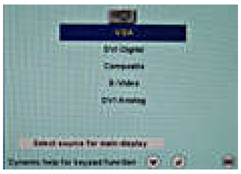
Printed/identified in bold type	Menu title (main menu or first sub-menu level

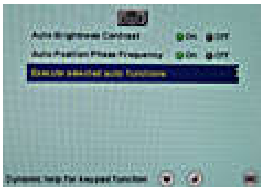
Main menu

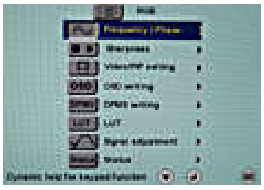


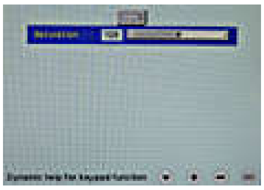
Main menu	Function	Adjustment / setting range	Description
Brightness/Contrast	**Brightness**	0 … 100 %	**Set brightness** Adapting the representation of darker picture areas. **Note**: The brightness settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, 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 (SCD 19102 only)	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) *Default: 1 (6500°K)*	**Set the desired color temperature or hue** Three fixed color temperatures and one adjustable color temperature 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** (SCD 19102 only)	**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
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.

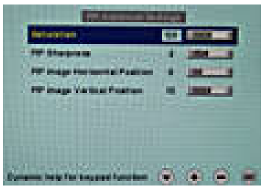
Main menu	Function	Adjustment / setting range	Description
	V position	0 … 100 %	**Shift picture in vertical direction** With identical monitor and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
	Zoom	1 to 1 Fill all Fill ratio Fill to square *Default: Fill all*	**Selection between different picture size settings:** • *1 to 1*: The picture is displayed on screen with its original resolution. • *Fill all*: 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. • *Square*: The picture is zoomed to square format.
Picture source  VGA DVI Digital Composite S-Video DVI Analog Select source for main display	**Select source for main display** Selection of picture source for full format image. If you call this OSD menu, the current source is displayed.		

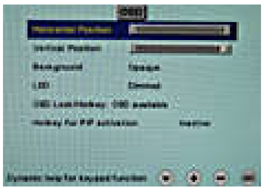
Main menu	Function	Adjustment / setting range	Description
		SCD 19102: VGA DVI Digital Composite S-Video DVI Analog *SMD 19102* VGA DVI Digital Composite S-Video SoG / H / V	After switching the monitor off and on again, the image sources are queried in sequence. **Note:** Alternatively, the source can be selected through a hot key function (see the OSD menu → Others → OSD setting).
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 *Default: On*	**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".

Main menu	Function	Adjustment / setting range	Description
	Auto position/phase/ frequency	On / Off *Default: On*	**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 *Default: English*	**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 			
	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.

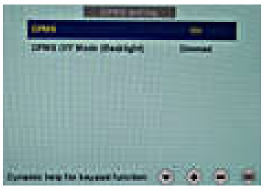
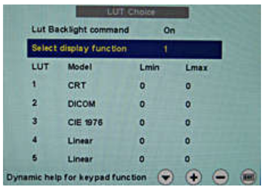
Main menu	Function	Adjustment / setting range	Description
	Phase (only for RGB signals)	0 … 255	
	**Video setting (only for video signals)**		
	Saturation (only SCD 19102 for video signals)	1 … 255 *Default: 128*	Adjusting the saturation for video signals
	Sharpness		
	Interpolation filters	1 ... 5	**One 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	Off 1 2 3 *Default: Off*	Activating and deactivating the PIP window and setting the PIP window size
	PIP source	Auto VGA DVI Digital Composite S-Video DVI Analog (for SCD19102) SoG / H / V (for SMD19102) *Default: Auto*	**The source is selected that is to be shown in the PIP window.** "VGA" and "DVI" or "SoG / H / V" (SMD 19102) 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: • Reduce the resolution of the signal or • Change the window size under "PIP size"
	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

Main menu	Function	Adjustment / setting range	Description
	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).
	**PIP advanced settings**		
	Saturation (only SCD 19102 for video signals)	1 … 255 *Default: 128*	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

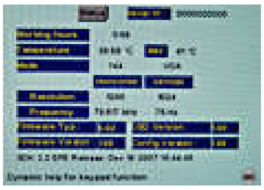
Main menu	Function	Adjustment / setting range	Description
	PIP image vertical position (only for analog signal)	Slider control	Shift the image in the vertical direction in the PIP window
	**OSD settings**		
	Horizontal position	Slider control *Default: Right*	Setting the horizontal position of the OSD menu
	Vertical position	Slider control *Default: Down*	Setting of vertical position of OSD menu
	Background	Opaque Transparent *Default: Opaque*	Selection of OSD background (Opaque or Transparent).
	LED	Dimmed Lit *Default: Dimmed*	Adjust the brightness of the status LED.

Main menu	**Function**	**Adjustment / setting range**	**Description**
	OSD lock/hotkey	Hotkey brightness / contrast Hotkey backlight Hotkey select source *Default: OSD available*	**Selection of different OSD lock/hotkey settings:** • *Brightness / contrast hotkey:* The OSD menu is locked and can only be unlocked using a specific key combination. Only the brightness and contrast can be changed by any user with the OSD keys without the need for a key combination. • Backlight hotkey: The OSD menu is locked and can only be unlocked using a specific key combination. Only the backlight can be changed by any user with the OSD keys without the need for a key combination. • *Select source hotkey:* The OSD menu is locked and can only be unlocked using a specific key combination. Only the source can be changed by any user with the OSD keys without the need for a key combination. **Note:** See Lock/unlock OSD menu [▷ 53]

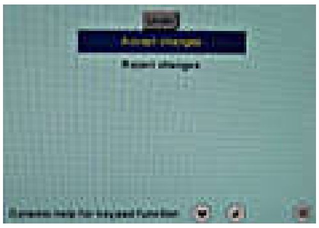
Main menu	Function	Adjustment / setting range	Description
	Hotkey for PIP activation	Active Inactive *Default: Inactive*	**Activating and deactivating the PIP window with key 4 on the front** If "Active" is selected, the PIP window can be opened or closed with the saved settings using key 4 on the front without opening the OSD menu.
	**DPMS setting**		
	DPMS	On Off *Default: On*	**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 dimmed (depending on the parameter for the "DPMS Off Mode": see below). This saves energy and increases the lifespan of the backlight.
	DPMS Off mode (backlight)	Dimmed Off *Default: Dimmed*	"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 Backlight command On Select display function 1 LUT Model Lmin Lmax 1 CRT 0 0 2 DICOM 0 0 3 CIE 1976 0 0 4 Linear 0 0 5 Linear 0 0 	**LUT choice**		
	LUT backlight command	On / Off *Default: On*	**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.

Main menu	Function	Adjustment / setting range	Description
	Select gamma curve	1 ... 5 *Default:* *SCD 19102: LUT 1*	**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 [▸ 56]
	Signal setting		
	Switch loop	1 … 20 *Default: 1*	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).

Main menu	Function	Adjustment / setting range	Description
	Tolerance factor	1 … 20 *Default: 1*	**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 *Default:* • *RGB* (for SCD19102) • *Monochrome* (for SMD19102*)*	**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".
	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 this value). **Note:** A specific test pattern and timing are prerequisites. The A/D converters have already been factory-set and need not be readjusted.

Main menu	**Function**	**Adjustment / setting range**	**Description**
	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)
Servicelevel 2	Settings in this menu may only be carried out by service personnel. See Service level 2 functions [▸ 44]		

6.3.3 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.

6.3.4 Service level 2 functions

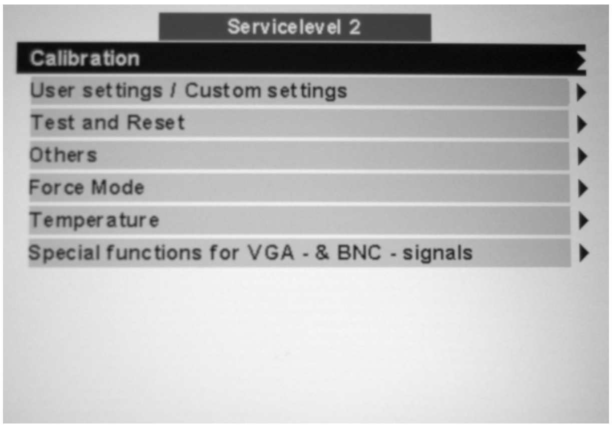
NOTICE
"Servicelevel 2" is restricted to service personnel trained by EIZO GmbH Display Technologies.

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

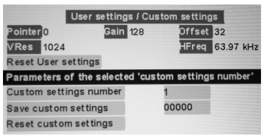
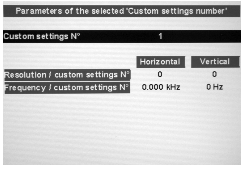
Key combination for opening "Servicelevel 2"

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

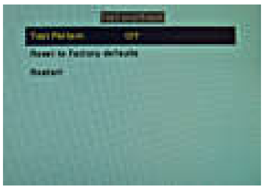
Menu structure

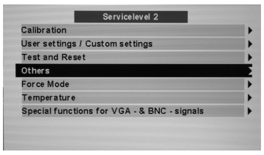

Servicelevel 2
Calibration
User settings / Custom settings
Test and Reset
Others
Force Mode
Temperature
Special functions for VGA - & BNC - signals

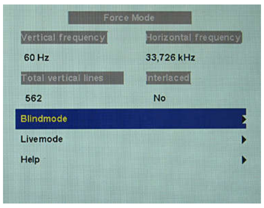
Servicelevel 2	**Function**	**Adjustment / setting range**	**Description**
Calibration 	**Temperature**	Information	Specified as info in °C
	Backlight command	Information	Facility for reading out the current tab value of the backlight
	Backlight sensor info	Information	• Backlight sensor regulation • Minimum and maximum regulation
	When backlight regulation is set to "On": **Backlight (regulated)**	0 … 100 %	**Set brightness of monitor backlight** Adjustment of overall brightness to ambient lighting.
	When backlight regulation is set to "**Off**": **Backlight (controlled)**	0 … 3360	Backlight inverter value
	Backlight regulation	On Off *Default: On*	The backlight regulation (backlight sensor) is switched on or off

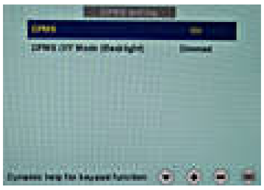
Servicelevel 2	Function	Adjustment / setting range	Description
	ADC calibration	Execute	**Automatically calibrate A/D converter for the applied video level** The video level range of the system is checked, and the monitor set accordingly. This results in optimum adjustment of the individual RGB A/D converters 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 this value). **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.
User / custom settings  User settings / Custom settings Pointer 0 Gain 128 Offset 32 VRes 1024 HFreq 63.97 kHz Reset User settings Parameters of the selected 'custom settings number' Custom settings number 1 Save custom settings 00000 Reset custom settings	**Reset User settings**	Execute	All automatically stored timing data are deleted
	Parameter of set "Custom settings number"  Parameters of the selected 'Custom settings number' Custom settings N° 1 Horizontal Vertical Resolution / custom settings N° 0 0 Frequency / custom settings N° 0.000 kHz 0 Hz	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.

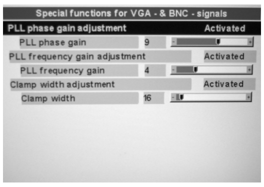
Servicelevel 2	Function	Adjustment / setting range	Description
	Save custom settings		**Press the "Up" key to save the current picture settings and timing data to the memory addresses specified via the "Custom settings number".** The 5-digit combination indicates which individual memory addresses have been allocated. *Example:* 10010 ⇒ Addresses 1 and 4 have been allocated.
	Reset custom settings	Execute	Clears the content of the five memory locations

Servicelevel 2	**Function**	**Adjustment / setting range**	**Description**
Test and Reset 	**Test pattern**	Off Color bars Gray bars Calibration picture *Default: Off*	**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

Servicelevel 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.
Others  Servicelevel 2 Calibration User settings / Custom settings Test and Reset Others Force Mode Temperature Special functions for VGA - & BNC - signals	**Info**	On Off *Default: Off*	**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	On Off *Default: On*	**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.

Servicelevel 2	Function	Adjustment / setting range	Description
	Serial bus	Enable Disabled *Default: deactivate*	**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 [▷ 25]
	Bus address	Slider from 0 ... 10 *Default: 1*	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 *Default:* *Interlaced signals: Active* *Progressive signals: Inactive*	**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 [▷ 67]
Force Mode  Vertical frequency: 60 Hz Horizontal frequency: 33,726 kHz Total vertical lines: 562 Interlaced: No	**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 [▷ 57]

Servicelevel 2	Function	Adjustment / setting range	Description
	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 [▸ 57]
	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
	For SCD 19102: **Operation time above 160 cd** For SMD 19102: **Operation time above 400 cd**	Information	Operating hours meter
	For SCD 19102: **Operation time below 160 cd** For SMD 19102: **Operation time below 400 cd**	Information	Operating hours meter

Servicelevel 2	Function	Adjustment / setting range	Description
Special functions for VGA and BNC signals  Special functions for VGA - & BNC - signals PLL phase gain adjustment Activated PLL phase gain 9 PLL frequency gain adjustment Activated PLL frequency gain 4 Clamp width adjustment Activated Clamp width 16	**PLL phase gain adjustment**	Activated / deactivated *Default: Deactivated*	**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.

Servicelevel 2	Function	Adjustment / setting range	Description
	PLL frequency gain adjustment	Activated / deactivated *Default: Deactivated*	**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.

Servicelevel 2	Function	Adjustment / setting range	Description
	Clamp width adjustment	Activated / deactivated *Default: Deactivated*	**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.

6.3.5 Lock/unlock OSD menu

⚠CAUTION

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.

6.4 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.

6.4.1 Avoiding image sticking

Image sticking may occur with TFT monitors. It is an effect where 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.

6.4.2 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.

6.4.3 Setting brightness and contrast

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

⚠ **CAUTION**

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

⚠CAUTION

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.

Notes on adjustment

- 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 luminance. However, the factory setting for brightness is no longer maintained.

6.4.4 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.

⚠CAUTION

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).

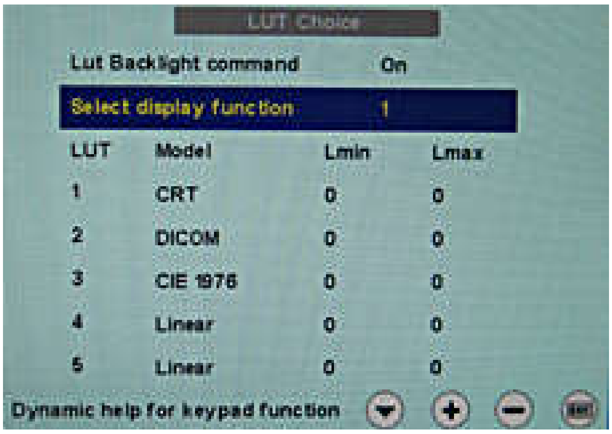
The monitor is now configured for optimum performance with the installed graphics card. If you are still not satisfied with the luminance, you can increase the black and white values further by adjusting the backlight in the OSD menu.

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.

6.4.5 Monitor adjustment – LUT



Lut Backlight command On

Select display function 1

LUT	Model	Lmin	Lmax
1	CRT	0	0
2	DICOM	0	0
3	CIE 1976	0	0
4	Linear	0	0
5	Linear	0	0

Fig. 10: 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.

6.4.6 Monitor adjustment - Force Mode

6.4.6.1 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. See Service level 2 functions [▸ 44].

Only one timing can be saved in Force Mose itself.

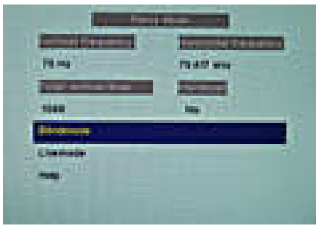


Fig. 11: Force Mode

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.

6.4.6.2 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.

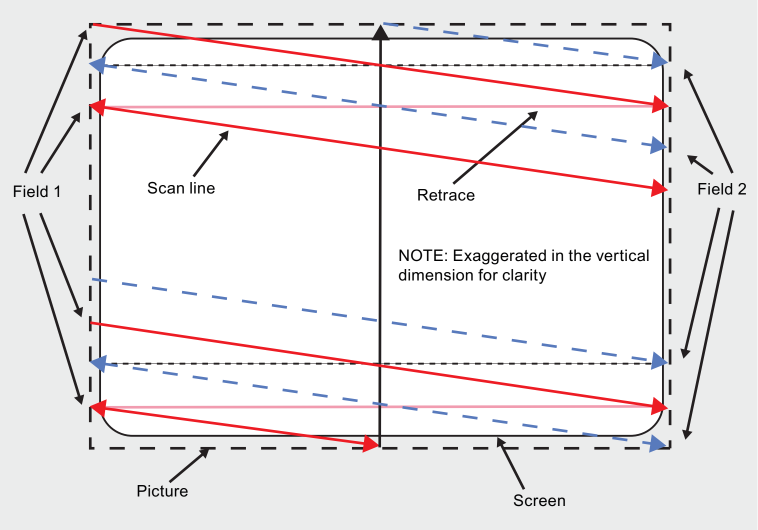


Fig. 12: Interlaced scanning system

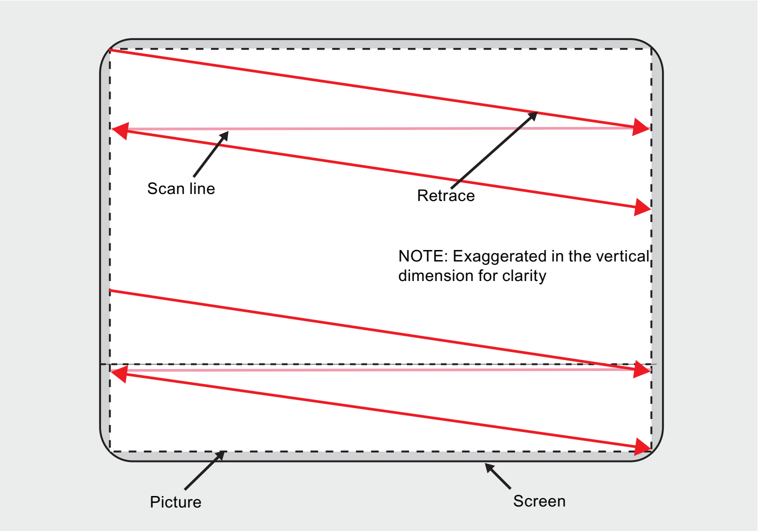


Fig. 13: Non-interlaced scanning system

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)

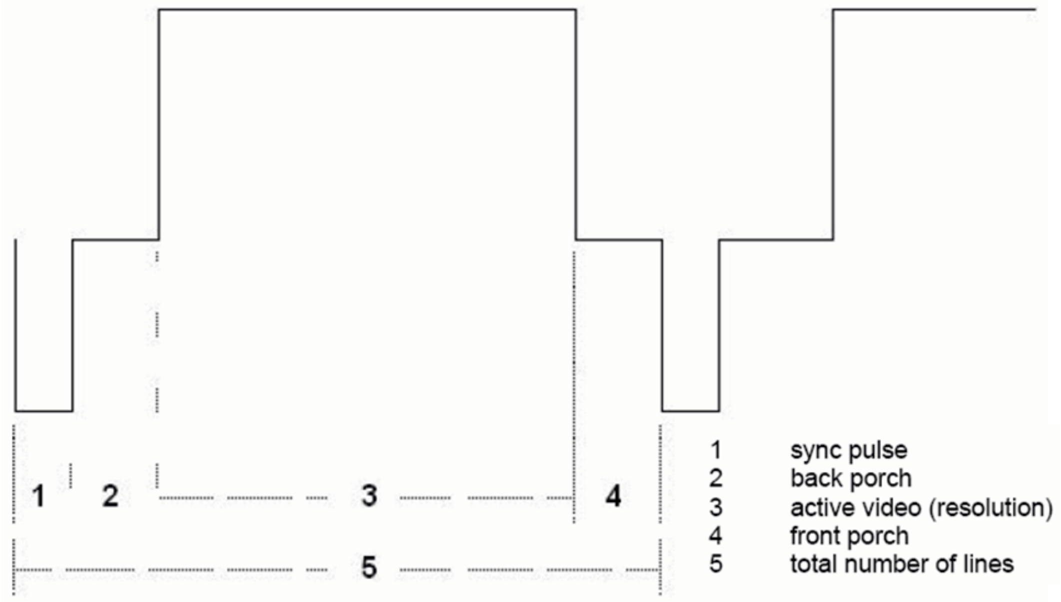


Fig. 14: Timing diagram

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

6.4.6.3 Blind mode

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

Live mode [▸ 61] should be used to set unknown timing data step-by-step.

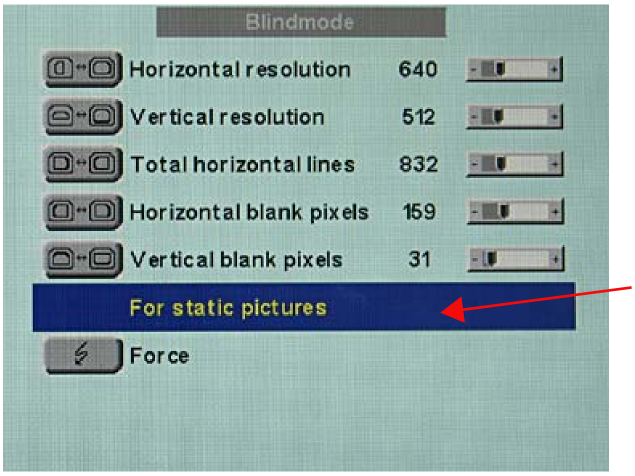
Note

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.

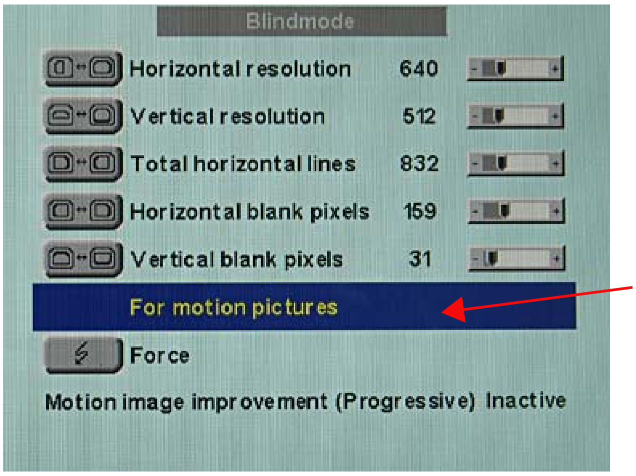
Entering known timing data and fine adjustment

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.



Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For static pictures
Force

Select “For static pictures”

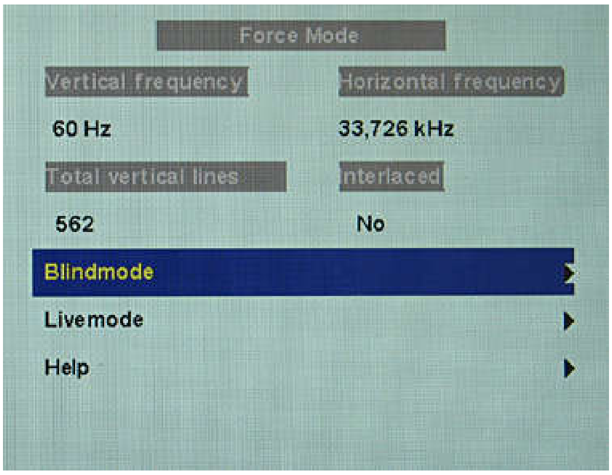


Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For motion pictures
Force
Motion image improvement (Progressive) Inactive

Select “For motion pictures”

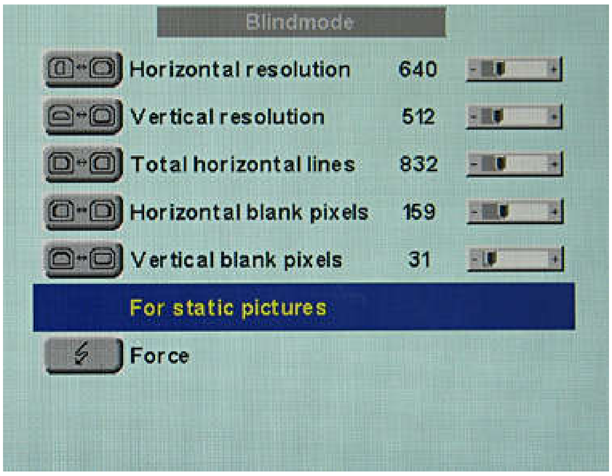
5. Execute the "Force" Force command using key 2.

   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.



Vertical frequency: 60 Hz
Horizontal frequency: 33,726 kHz
Total vertical lines: 562
Interlaced: No

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



Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31

6.4.6.4 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 [▸ 59]" 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

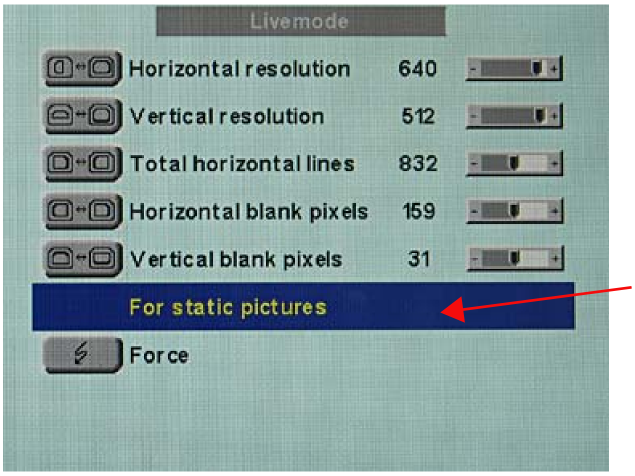
1. Determine start values using auto function
2. Optimize scanning frequency
3. Optimize geometry and resolution

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.

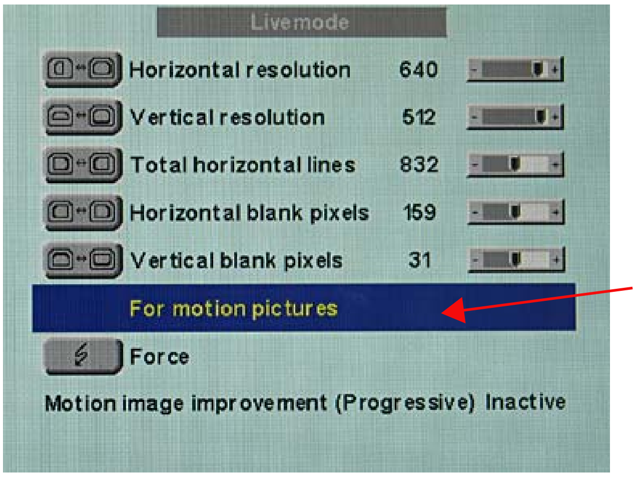
1. Open a test pattern with a clearly defined border (e.g. SMPTE image).
2. Open the "Live mode" menu: Main menu → Servicelevel 2 → Force Mode → Live mode.
3. Select either "For static pictures" or "For motion pictures" in the "Live mode" menu and confirm using key 2.



Livemode

Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For static pictures
Force

Select “For static pictures”



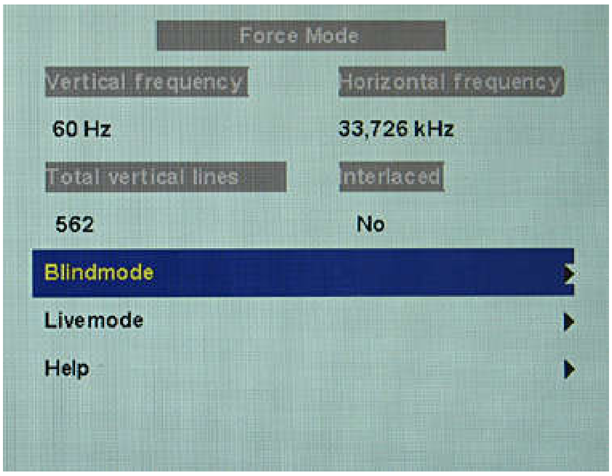
Livemode

Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For motion pictures
Force
Motion image improvement (Progressive) Inactive

Select “For motion pictures”

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" Force command using key 2.



Force Mode

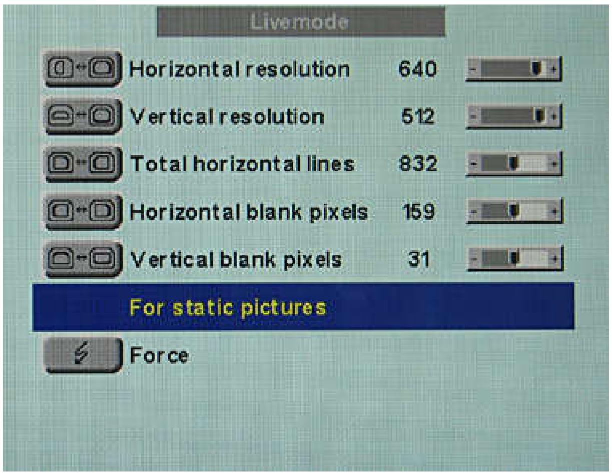
Vertical frequency: 60 Hz

Horizontal frequency: 33,726 kHz

Total vertical lines: 562

Interlaced: No

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



Livemode

Horizontal resolution 640

Vertical resolution 512

Total horizontal lines 832

Horizontal blank pixels 159

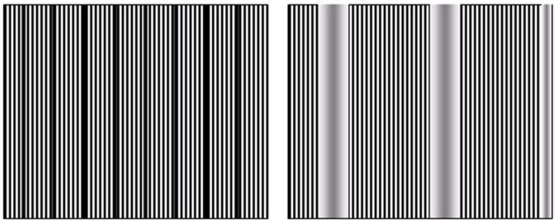
Vertical blank pixels 31

Optimize scanning frequency

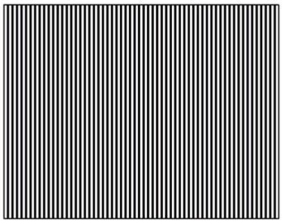
The correct signal frequency must now be set ("Horizontal lines. (total)").

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 "IIIIIII" 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.

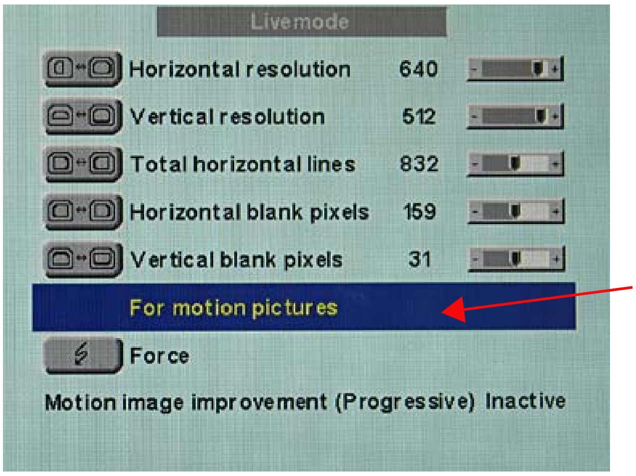
Poor picture quality
(with frequency stripes)



Good picture quality
(without frequency stripes)

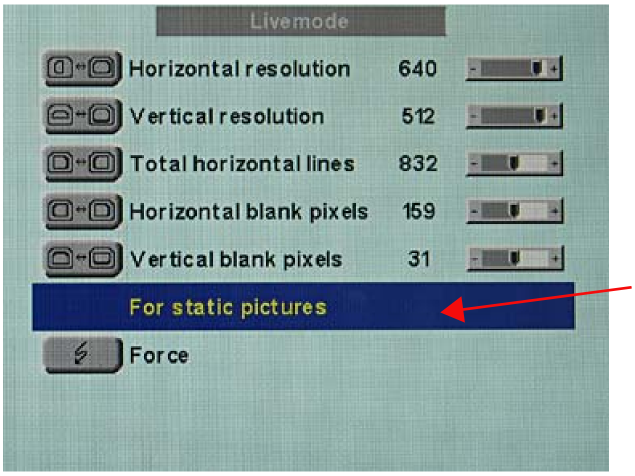


2. If you reach the limit of the control range when setting, you must perform the "Force" command with the selection "For static pictures" or "For motion pictures". The current setting is then saved, and the slider set to the center of the control range. Once you have set the signal frequency optimally,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



Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For motion pictures
Force
Motion image improvement (Progressive) Inactive

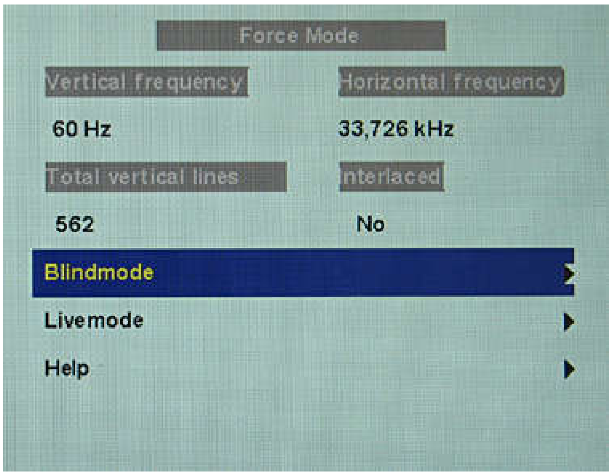
Select “For motion pictures”



Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For static pictures
Force

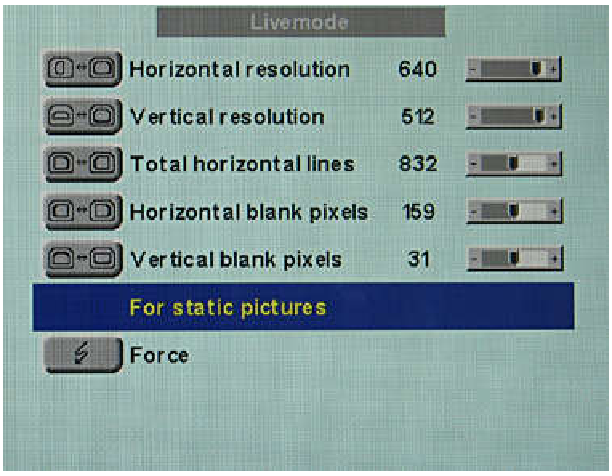
Select “For static pictures”

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.



Vertical frequency 60 Hz
Horizontal frequency 33,726 kHz
Total vertical lines 562
Interlaced No

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

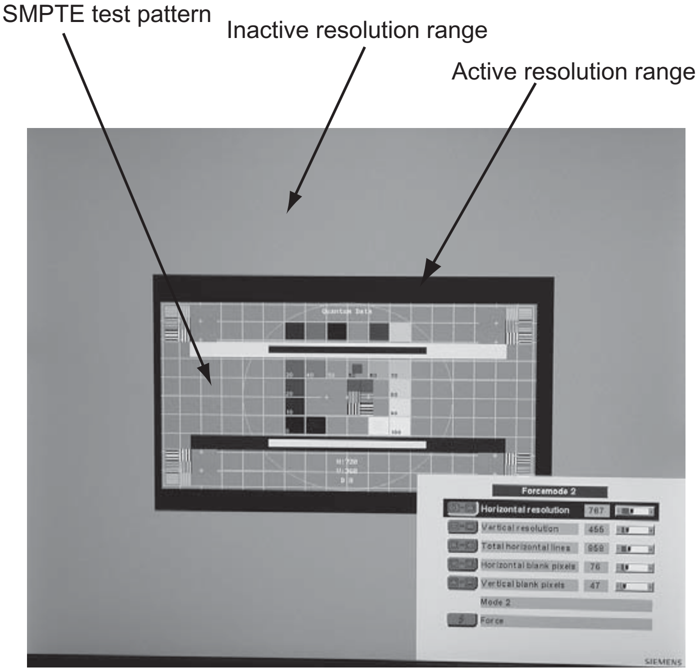


Horizontal resolution 640
Vertical resolution 512
Total horizontal lines 832
Horizontal blank pixels 159
Vertical blank pixels 31
For static pictures
Force

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).



Horizontal resolution 767
Vertical resolution 456
Total horizontal lines 858
Horizontal blank pixels 76
Vertical blank pixels 47
Mode 2
Force

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

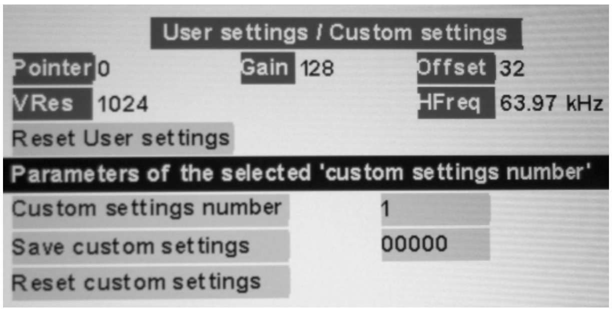
The unknown timing has been successfully set, you can now exit the OSD menu. The monitor will recognize the newly set timing and set it as saved whenever connected.

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".

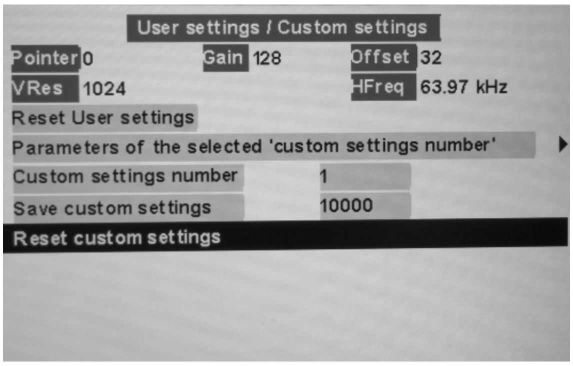
Up to five timings can be saved.



User settings / Custom settings
Pointer 0
Gain 128
Offset 32
VRes 1024
HFreq 63.97 kHz
Reset User settings
Parameters of the selected 'custom settings number'
Custom settings number 1
Save custom settings 00000
Reset custom settings

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" us set to "1".



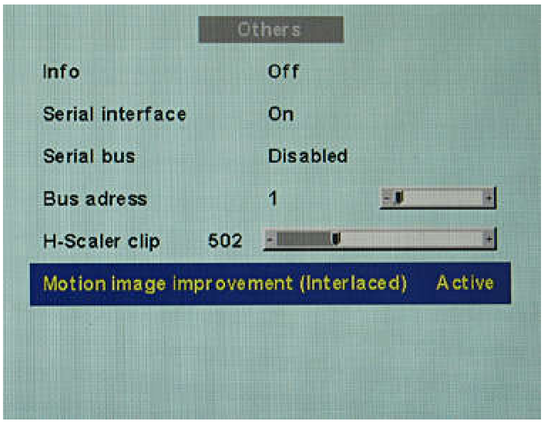
User settings / Custom settings
Pointer 0 Gain 128 Offset 32
VRes 1024 HFreq 63.97 kHz
Reset User settings
Parameters of the selected 'custom settings number'
Custom settings number 1
Save custom settings 10000
Reset custom settings

Saved timings can be overwritten at any time.

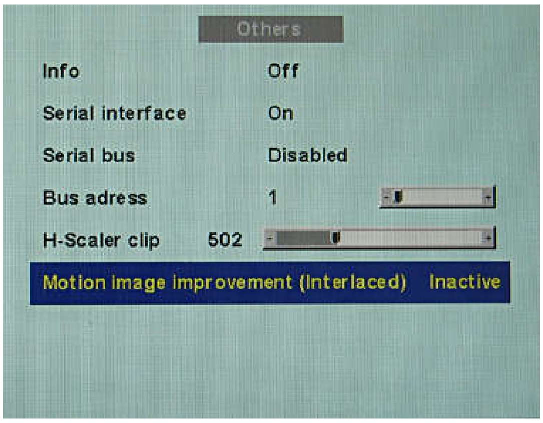
6.4.6.5 Motion image improvement

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".

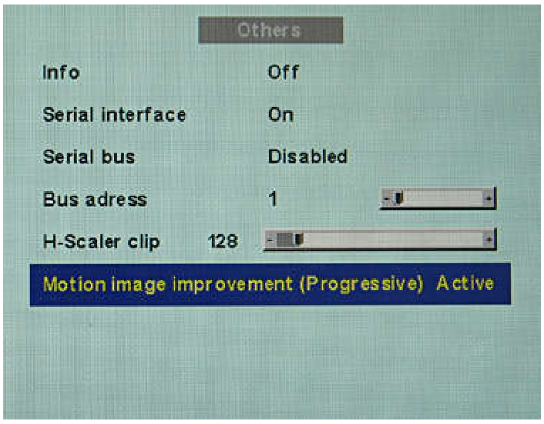
If the motion image improvement is to be activated, the setting for this must be changed from "Inactive" to "Active" either in the "Servicelevel 2" → "Others" menu or in the "Blind mode" or "Live mode" of the Force Mode menu.



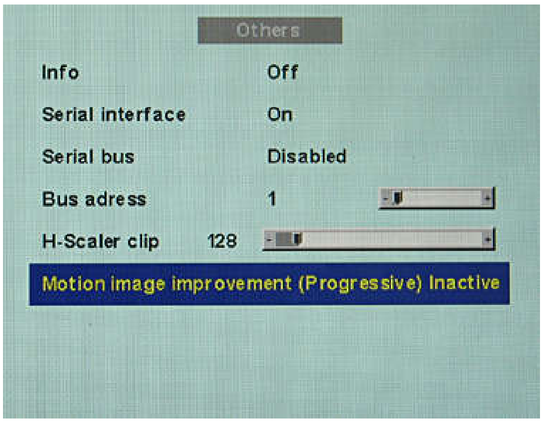
Others
Info Off
Serial interface On
Serial bus Disabled
Bus adress 1
H-Scaler clip 502
Motion image improvement (Interlaced) Active



Others
Info Off
Serial interface On
Serial bus Disabled
Bus adress 1
H-Scaler clip 502
Motion image improvement (Interlaced) Inactive



Others
Info Off
Serial interface On
Serial bus Disabled
Bus adress 1
H-Scaler clip 128
Motion image improvement (Progressive) Active



Others
Info Off
Serial interface On
Serial bus Disabled
Bus adress 1
H-Scaler clip 128
Motion image improvement (Progressive) Inactive

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.

See also

Service level 2 functions [▸ 44]

Live mode [▸ 61]

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 and maintenance

8.1 Cleaning

NOTICE

Device maintenance, cleaning and disinfecting

- The front panel is extremely sensitive to mechanical damage. Avoid scratches, collisions, etc..
  SCD / SMD 19102 CP versions with protective glass are much less sensitive in this regard.
- SCD / SMD 19102 versions, 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 • Mikrozid 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	

Forbidden 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
No picture appears on the monitor, operation LED off	Fuse is defective	Inform service personnel
	Power cable is not inserted or incorrectly inserted.	Connect power cable
No picture appears on the monitor, Operation LED flashes green	No video signal	Check video cable
	Video source is not outputting a video signal	Check video source
Blurred image, 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 (Servicelevel 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 shutdown 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 & monochrome, 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 spacing	0.294 mm x 0.294 mm
Contrast ratio	
• SCD series	• Typically 600:1 • At least 400:1
• SMD series	• Typically 900:1 • At least 600:1
Brightness	
• SCD series	• Typically 280 cd/m² • Min. 230 cd/m²
• SMD series	• Typically 1000 cd/m² • Min. 800 cd/m²
Horizontal viewing angle	At least ± 85°
Vertical viewing angle	At least ± 85°
Protective glass	**For SCD / SMD 19102 CP only:** Optically non-reflective protective glass on both sides
Backlight	6 CCFT (cold cathode fluorescent tubes)
Lifetime of backlight	Typically 45,000 hours for CCFT (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 (± 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	via 15-pin Sub-D connector (female), any polarity **SMD series only:** via 3 BNC sockets (green, horizontal sync, vertical sync)
DVI input	**SCD series only:** via DVI-I socket, (analog pins are used)
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 page	• 1x power connection socket • 1x DVI socket • 1x 15-pin 3-row Sub-D socket • 3x BNC sockets (SMD series only) • 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 glass	**For SCD / SMD 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 only for SCD / SMD 19102 CP
Connection panel	On rear panel, under cover
Weight in kg	
• SCD / SMD 19102 C (without stand)	6.4 kg (± 0.3 kg)
• SCD / SMD 19102 CP (without stand, with front pane)	7.0 kg (± 0.3 kg)
• SCD / SMD 19102 D (without stand)	11.4 kg (± 0.3 kg)
Dimensions (W x H x D) in mm	
• SCD / SMD 19102 C (without stand)	422.5 x 348.5 x 95
• SCD / SMD 19102 CP (without stand, with front pane)	422.5 x 348.5 x 95
• SCD / SMD 19102 D (without stand)	314 x 348.4 ... 546.5 x 279 *

* Corresponds to a possible height adjustment of 100 mm.

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 Mechanical requirements

Operation

Vibrations	According to EN 60068-2-6 10 ... 58 Hz at ± 0.075 mm deflection 58 ... 500 Hz at 10 m/s²

Shock	According to EN 60068-2-27 (single impact) 150 m/s², 6 ms Under operating conditions, the device must not be exposed to continuous or repeated shocks.

Packed unit

Vibrations	According to EN 60068-2-6 5 ... 9 Hz at ± 3.5 mm deflection 9 ... 500 Hz at 10 m/s²
Shock	According to EN 60068-2-27 (single impact) 250 m/s², 6 ms (in storage packaging) to EN 60068-2-29 (continuous shocks)

10.9 Safety specifications

Safety standards	• IEC/EN 60601-1 (Second Edition) • IEC/EN 60601-1 (Third Edition) • CAN/CSA C22.2 No. 601.1-M90 • CAN/C22.2 No. 60601-1-08
Protection class	Protection class I
Degree of protection according to DIN 40050	IP20
Conformity	CE according to MDD 93/42/EEC (Class I)

⚠ **CAUTION**

Subsequent installation of a stand

The SCD / SMD 19102 C and SCD / SMD 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.

10.10 Electromagnetic compatibility

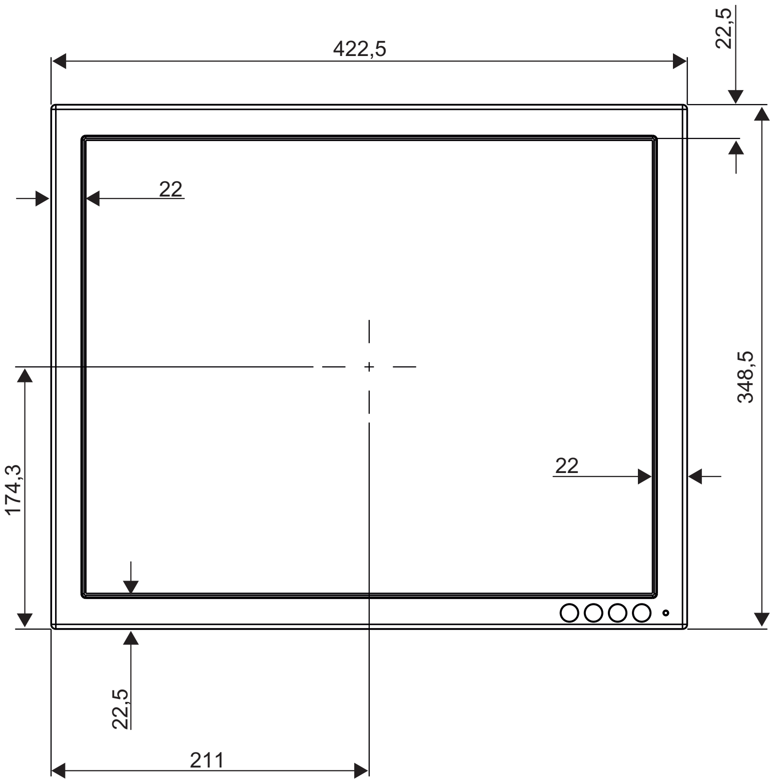
Interference voltage/interference noise	EN 60601-1-2
Voltage fluctuations	EN 610004-11
Burst on power cables	EN 61000-4-4 1 kV
Surge on power cables	EN 61000-4-5 1 kV symmetrical, 2 kV unsymmetrical
Static discharge on casing parts (ESD)	EN 61000-4-2 8 kV air, 4 kV contact
RFI	EN 61000-4-3 80 MHz ... 2.5 GHz 3 V/m 80 % AM 1 kHz
Noise immunity	EN 61000-4-6 150 kHz ... 80 MHz 3 V/m 80 % AM 1 kHz
Magnetic constant fields	EN 61000-4-8 Max. 4000 A/m
Magnetic alternating fields	EN 61000-4-8 Max. 10 A/m

11 Dimensioned drawings

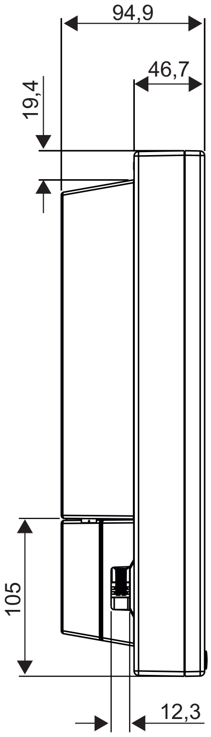
All dimensions in mm

11.1 SCD / SMD 19102 C/CP (without stand)

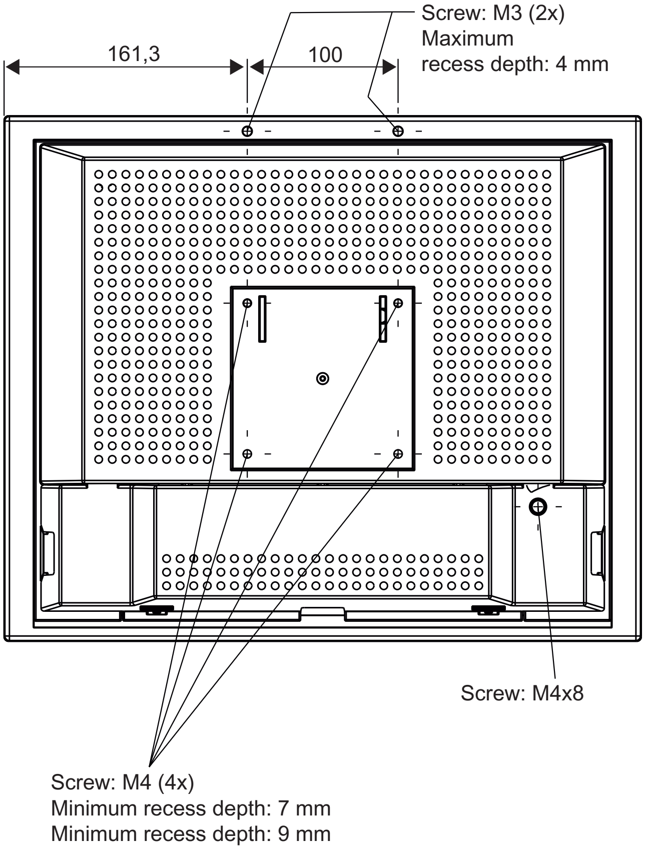
11.1.1 Front view



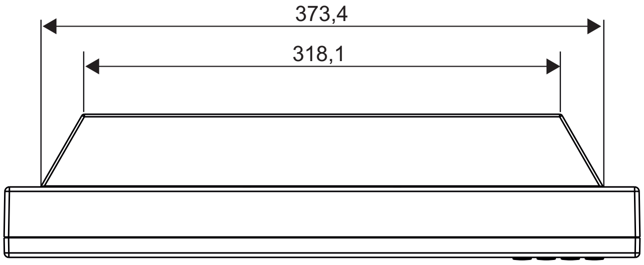
11.1.2 View from left



11.1.3 Rear view

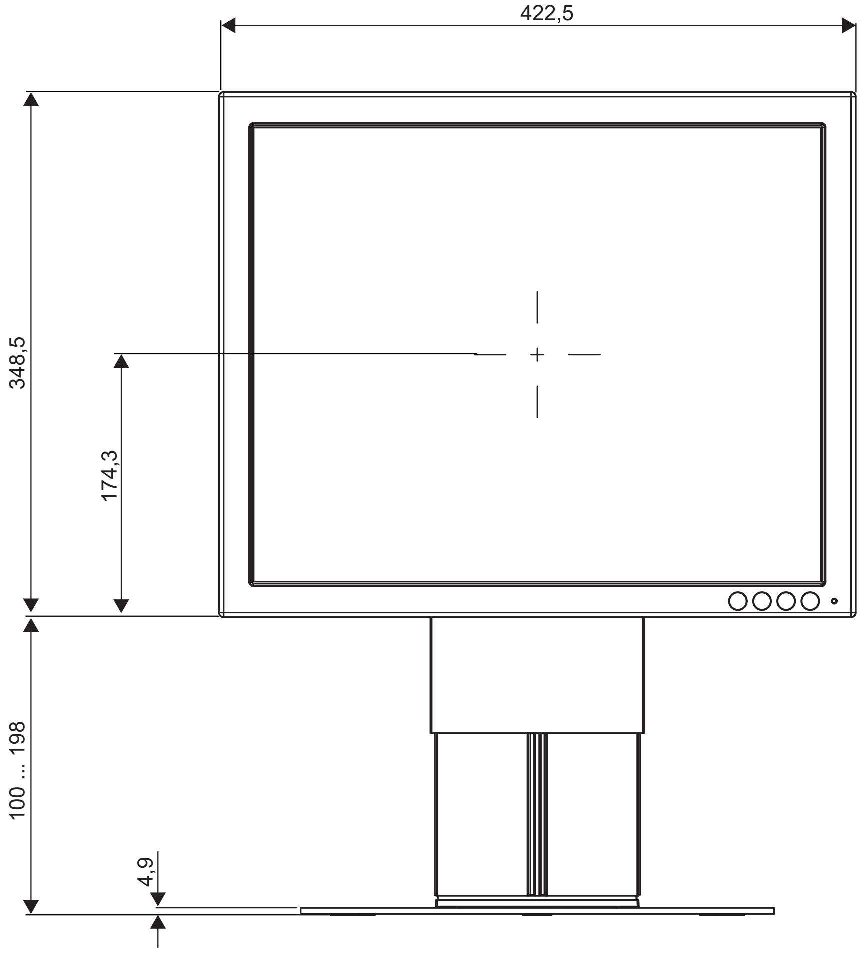


11.1.4 View from above

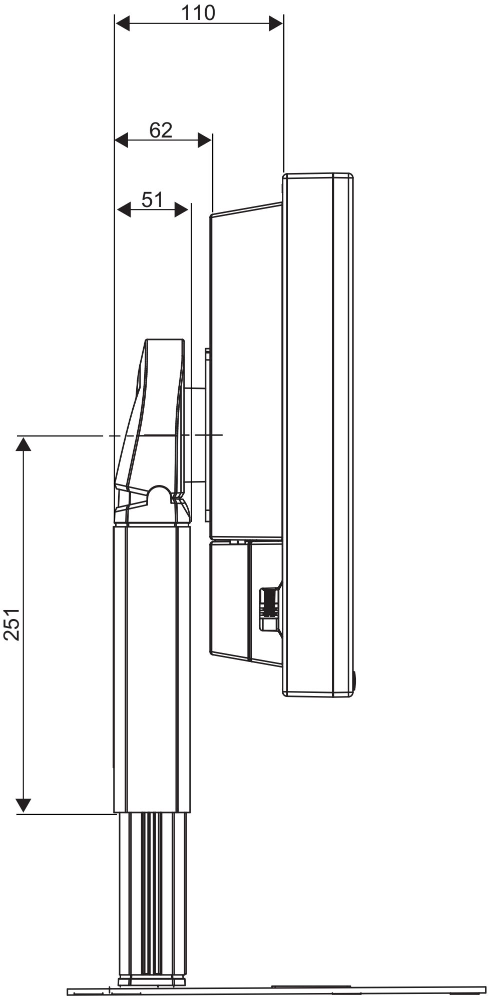


11.2 SCD / SMD 19102 D (with stand)

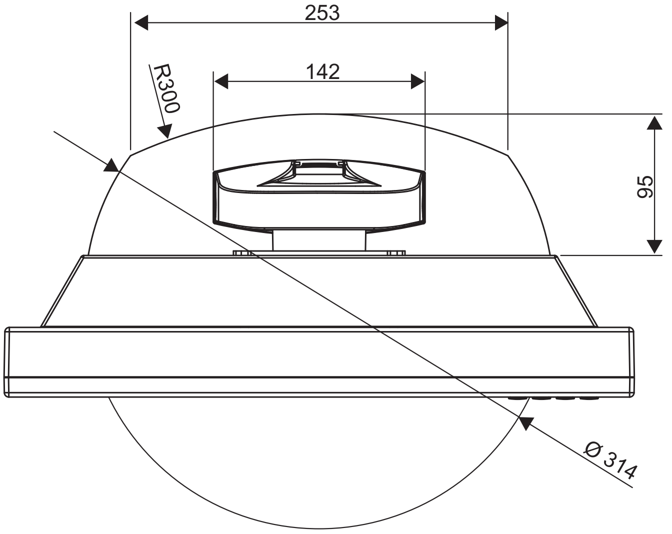
11.2.1 Front view



11.2.2 View from left



11.2.3 View from above



12 Spare parts / accessories

12.1 Monitor stand

Note
Product and accessory updates are available on our home page www.eizo.com

Multifunctional stand

Complete with all possible settings

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

Stand	Compatible monitors	Order No.
Multifunctional stand	SxD 19102 C	6GF6988-8AA03

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

The markings and symbols on the device have the following meanings:

Marking/symbol	**Meaning** **(location on device)**
⚠	Symbol for "Caution, observe accompanying documents". (name plate).
CE	CE marking (EU conformity mark). (name plate).
CCC	CCC marking, in accordance with for Chinese national regulations. (name plate).
SA ® C US 201133	CSA marking, in accordance with U.S. and Canadian national regulations. (name plate).
🏭 11/2011	Symbol for date of production for medical products. (name plate).
🗑	WEEE marking: Product must be disposed of separately; materials may be recycled. (name plate).
10	Marking according to ACPEIP (China-RoHS). (name plate)
|	"On" symbol (voltage) (power switch)
○	"Off" symbol (voltage) (power switch)
🔧	Input for service calls. (PS2 socket)

Marking/symbol	**Meaning** **(location on device)**
	Symbol "Comply with the instruction manual". (device)
	Symbol for "Authorized service personnel only". (device)

13.2 Warranty

Opening 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.

13.3 Repairs

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

13.4 Environmental protection

Please observe all local requirements and laws pertaining to the disposal of devices.

13.5 Accessory devices

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

13.6 Trademarks

EIZO Logo is a registered trademark of EIZO Corporation in Japan and other countries.

EIZO is a registered trademark of EIZO in Japan and other countries.

RadiForce is a registered trademark of RadiForce in Japan and other countries.

RadiCS is a registered trademark of RadiCS in Japan and other countries.

RadiNET is a registered trademark of RadiNET in Japan and other countries.

ScreenManager is a registered trademark of ScreenManager in Japan and other countries.

Windows Windows is a registered trademark of Windows in the United States and other countries.

Apple is a registered trademark of Apple Inc.

Macintosh is a registered trademark of Apple Inc.

Mac is a registered trademark of Apple Inc.

VESA is a registered trademark of VESA in the United States and other countries.

All other trademarks are the properties of their respective owners.

13.7 China RoHS (Restriction of Hazardous Substances)

LCD Display 液晶显示器
型号 Model: 6GF621#-2E$## (#=0..1 ; $=A..Z ; ##=00..99)

根据 SJ/T11364-2006《电子信息产品污染控制标识要求》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/T11364-2006 Marking for Control of Pollution caused by Electronic Information Products.

电子信息产品污染控制标志说明 Explanation of Pollution Control Label

该标志表明本产品含有超过中国标准 SJ/T11363- 2006《电子信息产品中有毒有害物质的限量要求》中限量的有毒有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。

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

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

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".

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

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

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

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

部件名称 Component Name	有毒有害物质或元素 Hazardous substances’ name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
液晶纯平屏幕 LCD Flat Screen	X	X	O	O	O	O
背光逆变器 Backlight Inverter	O	O	O	O	O	O
控制板 Controller Board	O	O	O	O	O	O
电源 Power Supply	O	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） Acessories (signal cable, power line, etc.)	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 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毒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。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.
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 SJ/T11363-2006

- 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.

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

The flat lamps of the LCD Flat screen for medical backlights use a lead-containing solder glas. There is no risk, because the substance is integrated in the glass of the flat lamp.The flat lamps of the LCD Flat screen for medical backlights contain Mercury. The Mercury is inside the CCFL tubes.

13.8 Disposal of materials containing mercury

WARNING

Disposal of product components that contain mercury must be in accordance with the applicable regional or national legislation.

This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. (Within this system, the backlight lamps in the monitor display contain mercury)

Ce produit comporte des composants susceptibles de contenir du mercure devant être recyclé ou éliminé conformément aux lois locales, régionales ou nationales en vigueur. (dans le présent système, les lampes de rétro-éclairage de l'écran contiennent du mercure)

Dieses Produkt enthält quecksilberhaltige Schaltungen, die gemäß den regionalen oder nationalen gesetzlichen Bestimmungen zu recyceln oder zu entsorgen sind. (In diesem System ist Quecksilber in den zur Hinterleuchtung des Displays verwendeten Lampen enthalten)

该产品中涉及使用含汞类设备，这些设备的回收、处理必须符合当地、该国家与地区的法律要求。（该系统中，显示器的背光灯含汞。

Tento výrobek je složen ze zařízení, která mohou obsahovat rtuť, jejíž recyklace nebo likvidace musí proběhnout v souladu s místními a státními zákony. (V tomto systému je rtuť obsažena v zadních lampách kontrolního displeje.)

Dette product består af enheder, der kan indeholde kviksølv, som skal genbruges eller bortskaffes I henhold til locale eller nationale love. (I dette system indeholder bagbelysningslamperne i skærmen kviksølv.)

Dit product bestaat uit apparatuur die kwikzilver kan bevatten dat moet worden gerecycleerd of moet worden verwijderd volgens de plaatselijke of nationale wetten of de wetten van de staat. (Binnen dit systeem, bevatten de lampen voor de achtergrondverlichting in de monitordisplay kwikzilver.)

Ez a termék részét olyan berendezések képezhetik, amelyek higanyt tartalmaznak, ezt újra kell hasznosítani, vagy a helyi vagy országos rendelkezéseknek megfelelően kell likvidálni. (E rendszerben a monitor képernyőjének a hátsó megvilágítását biztosító lámpák tartalmaznak higanyt.)

Questo prodotto consiste di dispositivi che possono contenere mercurio, da riciclare o smaltire in accordo con le leggi locali, regionali o nazionali. (In questo sistema, le lampade di retroilluminazione nel display del monitor contengono mercurio.)

本製品は有害な水銀を含有している可能性がある機器で構成されているため、国内および地域の関連法規に基づいてリサイクルまたは廃棄処分してください。（このシステムでは、モニターディスプレイのバックライトランプに水銀が含まれています。）

Dette produktet består av utstyr som kan inneholde kvikksølv, som må resirkuleres eller deponeres i samsvar med lokale eller nasjonale lover. (Innenfor dette systemet inneholder baklyslampene i monitordisplayet kvikksølv.)

Ten produkt składa się z urządzeń mogących zawierać rtęć, która musi być poddawana recyklingowi lub składowana zgodnie miejscowym lub krajowym prawem. (Lampy podświetlające w wyświetlaczu monitora zawierają rtęć.)

Este produto incorpora dispositivos que poderão conter mercúrio, devendo ser reciclado ou eliminado de acordo com as leis locais, estatais ou nacionais. (Dentro deste sistema, as lãmpadas de fundo no écran do monitor podem conter mercúrio.)

Данное изделие состоит из устройств, которые могу содержать ртуть, требующую соблюдения соответствующих местных и федеральных законов при повторном использовании и утилизации.(В данной системе ртуть содержится в лампах подсветки монитора.)

Este producto consta de elementos que pueden contener mercurio, los cuales deben reciclarse o gestionarse de acuerdo a las Leyes locales, regionales o estatales (dentro de este sistema, la lámparas de retroiluminación del display del monitor contienen mercurio)

Denna produkt består av komponenter som kan innehålla kvicksilver, vilket måste återvinnas eller bortskaffas i enlighet med lokala eller nationella lagar. (I systemet innehåller lamporna för bakgrundsbelysningen i skärmen kvicksilver.)

Το συγκεκριμένο προϊόν περιλαμβάνει συσκευές που ενδέχεται να περιέχουν υδράργυρο, η ανακύκλωση ή απόρριψη του οποίου πρέπει να πραγματοποιείται σύμφωνα με τον τοπική, πολιτειακή ή εθνική νομοθεσία. (Στο συγκεκριμένο σύστημα, οι λυχνίες οπίσθιου φωτισμού στην οθόνη του μόνιτορ περιέχουν υδράργυρο)

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