

Nio 5.8MP Gray

5.8MP high-bright display



User Guide

MDNG-6221 (option SNEF)

MDNG-6221 (option SPEF)

MDNG-6221 (option NC EM)

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Table of contents

1	Welcome!	5
1.1	What's in the box	6
1.2	At a glance	6
2	Installation	9
2.1	Display controller installation	10
2.2	Display position adjustment	10
2.3	Cable connections	11
2.4	MXRT driver and Intuitive Workflow Tools installation	13
2.5	QAWeb registration	13
2.6	VESA-mount installation	14
3	Daily operation	17
3.1	Recommendations for daily operation	18
3.2	Key indicator lights	18
3.3	Standby switching	19
3.4	OSD menu access	19
3.5	OSD menu navigation	19
3.6	I-Luminate	20
3.7	Viewing mode	20
4	Advanced operation	23
4.1	OSD menu language	24
4.2	OSD menu automatic close function	24
4.3	Power LED	24
4.4	Key indicator lights	25
4.5	Power lock function	25
4.6	DPMS mode	25
4.7	Hibernate	26
4.8	Dry mode	26
4.9	Quick Dry mode	27
4.10	Luminance target	27
4.11	Viewing modes	27
4.12	Display functions	28
4.13	Color presets	28
4.14	Ambient Light Compensation (ALC)	29

4.15	Reading rooms	29
4.16	Embedded QA	30
4.16.1	About Embedded QA	30
4.16.2	DICOM status report	30
4.16.3	DICOM compliance check	31
4.16.4	DICOM calibration	31
4.16.5	Reset DICOM calibration	31
4.16.6	DICOM error threshold	31
4.17	Display orientation	32
4.18	Image scaling	32
4.19	Image source selection	32
4.20	Grayscale conversion modes	34
4.21	EDID format	34
4.22	EDID timings	34
4.23	Display info	35
4.24	Display status	35
5	Cleaning the display	37
5.1	Cleaning instructions	38
6	Important information	39
6.1	Safety information	40
6.2	Cybersecurity	41
6.3	Environmental information	43
6.4	Regulatory compliance information	45
6.5	EMC notice	47
6.6	Explanation of symbols	49
6.7	Legal disclaimer	53
6.8	Technical specifications	54

Welcome!

1

1.1 What's in the box

Overview

- MDNG-6221 display
- User guide
- System sheet
- Documentation disc
- DisplayPort cable
- Mains cable(s)
- External power supply
- USB cable

If you ordered a Barco display controller, it's also in the box together with its accessories. A dedicated user guide is available on the documentation disc.



Keep your original packaging. It is designed for this display and is the ideal protection during transport and storage.



If your product arrived with shipping damage or missing parts, please refer to the instructions in our knowledge base article '3727' at www.barco.com/support/knowledge-base/3727 for further assistance.

1.2 At a glance

Front

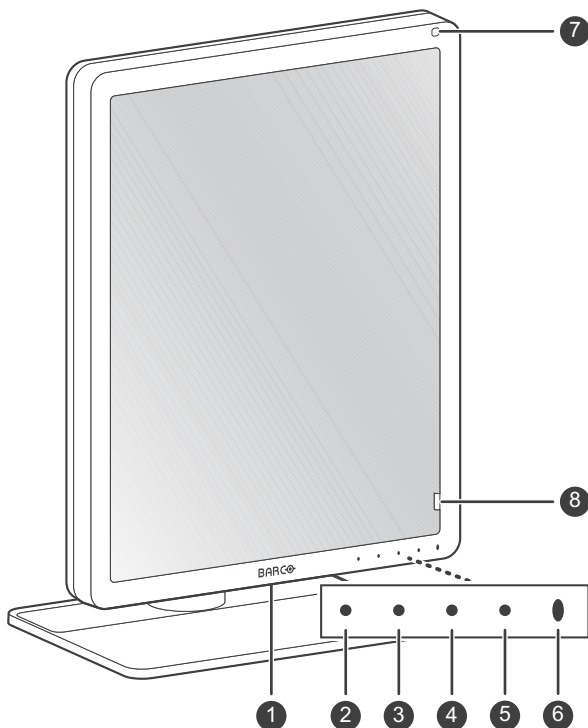


Image 1-1

1. USB-A 2.0 downstream connector
2. Left / I-Luminate key
3. Right key
4. Menu key
5. Standby key

6. Power status LED

- Off: Display not powered, or display operational but power LED function disabled in OSD (see [“Power LED”, page 24](#))
- Steady white: Display operational
- Slow blinking amber: Display in suspend mode (requires DPMS mode to be enabled in the OSD menu, see [“DPMS mode”, page 25](#))
- Fast blinking amber: Display in standby mode (requires DPMS mode to be enabled in the OSD menu, see [“DPMS mode”, page 25](#))
- Steady amber: Display switched off via the standby key, or display in hibernate mode (requires DPMS mode and Hibernate to be enabled in the OSD menu, see [“DPMS mode”, page 25](#) and [“Hibernate”, page 26](#))

7. Ambient light sensor (option SPEF only)

8. I-Guard Front sensor

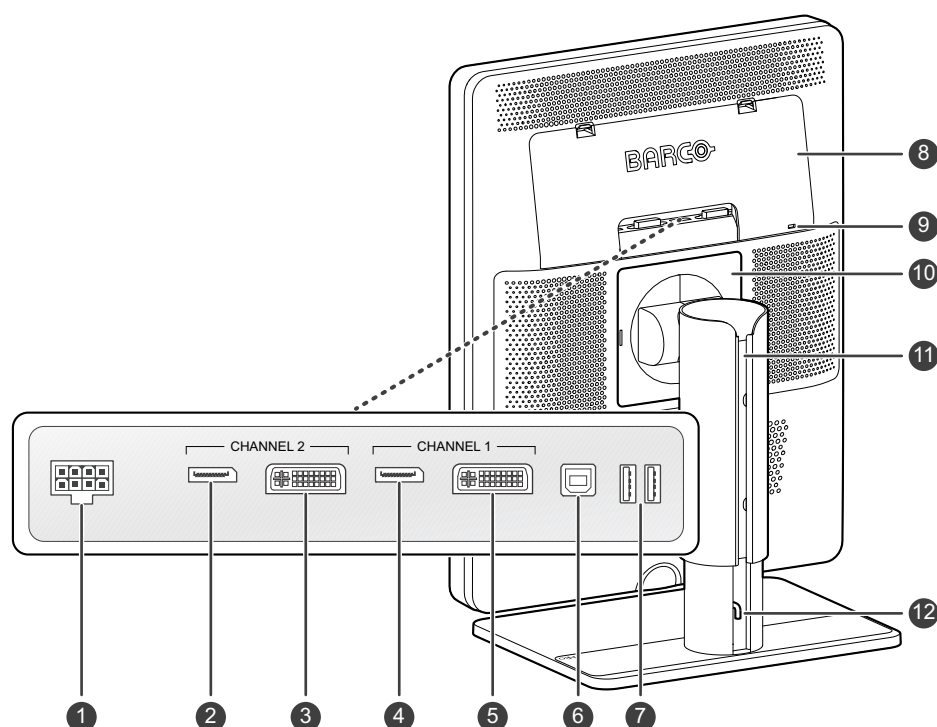
Back

Image 1–2

1. +24 VDC power input
2. Channel 2 DisplayPort video input
3. Channel 2 DVI video input
4. Channel 1 DisplayPort video input
5. Channel 1 DVI video input
6. USB-B 2.0 upstream connector¹
7. USB-A 2.0 downstream connectors (2x)
8. Connector compartment cover
9. Kensington security lock
10. VESA mount cover plate
11. Cable duct
12. Foot lock clip

1. Always connect the display(s) to a USB 3.0 hub, or if unavailable, to a USB 2.0 hub but then no more than two displays can be connected to the same hub.



Welcome!

Installation

2

2.1 Display controller installation

About

Before you install your display and connect it with the workstation, make sure to have a suitable² display controller installed in the workstation.



The Nio 5.8MP Gray display operates at its full specifications when driven by a Barco **MXRT display controller** and **MXRT driver** (which also includes the Barco **Intuitive Workflow Tools**). If you ordered a MXRT display controller, it is included in the box of your display.

For more information and installation instructions, please check the Barco “Display Controller and Intuitive Workflow Tools” user guide at www.barco.com/support.

2.2 Display position adjustment

To adjust the display position

1. Pull out the red foot lock clip from the hole at the back of the foot.

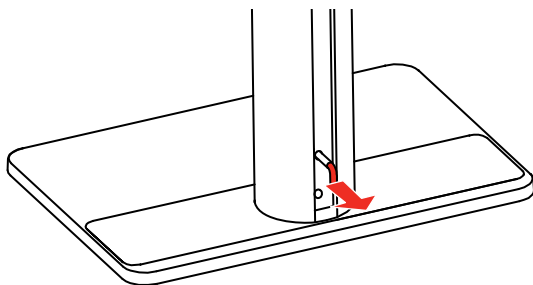


Image 2-1

2. You can now safely tilt, swivel, pivot, raise and lower the display as desired.

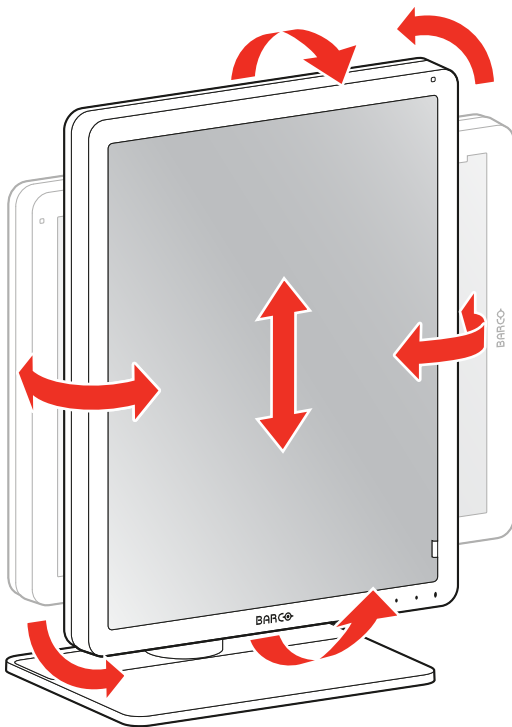


Image 2-2

2. For a list of compatible display controllers, please refer to the compatibility matrix available at www.barco.com/mybarco/mysupport/healthcare/compatibility-matrices



WARNING: The display must be in its highest position before it can be properly pivoted.



Store the foot lock clip in the storage hole in case the display needs to be transported later.

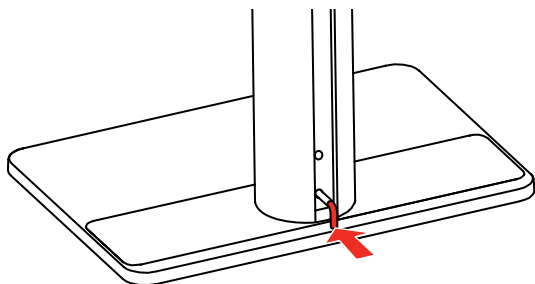


Image 2-3



If, after installing the display of the system, you change the panel orientation while an image is on the screen, the result depends on the graphic board and the resolution of the image. In some cases the image will be rotated automatically, in other cases it will not be rotated (e.g., when pixels would be lost after rotation). If necessary, change the image resolution in the display control panel and restart the system after changing the orientation.

2.3 Cable connections

To connect the cables

1. Open the connector compartment. Do this by gently pushing the two lips on top of the cover, after which it can be removed from the display.

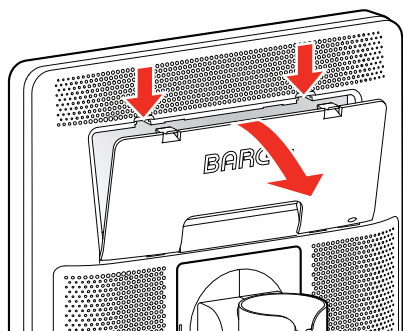


Image 2-4

2. Connect one or more video sources from your workstation(s) to the corresponding video inputs on the display.

Note: The MDNG-6221 can have multiple video inputs connected at once, and switching between these inputs can be easily done in the OSD menu. See [“Image source selection”](#), page 32 for more info on how to configure the different video inputs on your display.

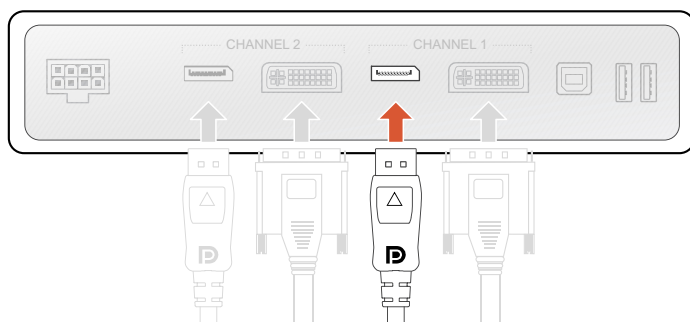


Image 2-5

3. Connect the workstation's USB host to the USB upstream connector on the display if you want to make use of QAWeb or any of the display USB downstream connectors (e.g. to connect a keyboard, mouse, touch pad or other peripheral).



Image 2-6

4. Connect the supplied external DC power supply to the power input on the display.

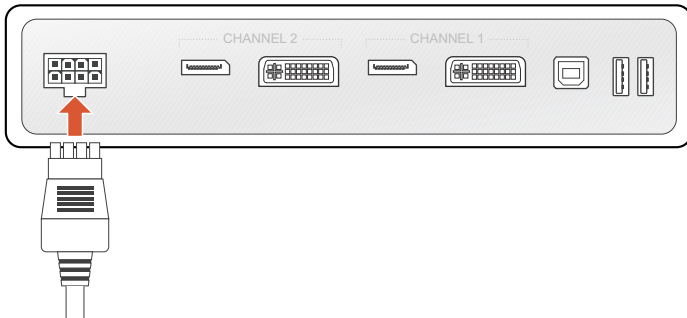


Image 2-7

5. Route all cables through the cable duct in the stand of your display. For better strain-relief and shielding of the cables, fix the cables with the cable straps at the inside of the connector compartment.

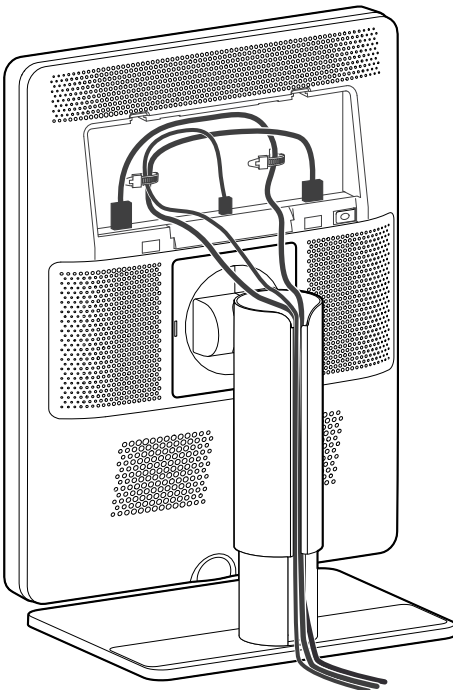


Image 2-8

6. Close the connector compartment cover. You will hear a “click” sound when the cover is in position.

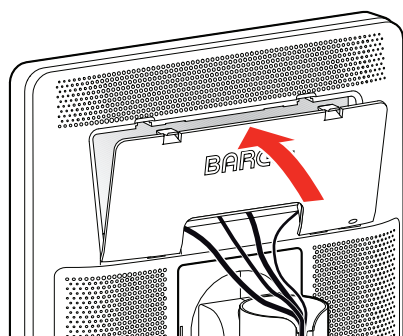


Image 2-9

7. Connect the external DC power supply to a **grounded** power outlet by using one of the power cables included with the display.

2.4 MXRT driver and Intuitive Workflow Tools installation

About

When you are using a Barco MXRT display controller, you can start up your Nio 5.8MP Gray display system and install the **MXRT driver** and **Intuitive Workflow Tools**. Barco's Intuitive Workflow Tools are designed to increase visibility of subtle details, improve focus during reading sessions, and accelerate workflow.

To install the MXRT driver and Intuitive Workflow Tools

1. Switch on your Nio 5.8MP Gray as described in "Standby switching", page 19.
2. Turn on the workstation connected to your display.
Your display will be running in a basic video mode at a default refresh rate when first time starting up.
3. Download the latest MXRT driver and Intuitive Workflow Tools from www.barco.com/mxrt.
4. Install the **MXRT driver** and Barco's **Intuitive Workflow Tools** as described in the Barco "Display Controller and Intuitive Workflow Tools" user guide at www.barco.com/support.
5. When the drivers are completely installed, your display will automatically detect the connected video input signal(s) and apply the correct video mode and refresh rate.

2.5 QAWeb registration

About

QAWeb Enterprise helps you manage quality and assure compliance of your expanding healthcare enterprise with less effort, lower cost, and complete confidence. This fully automated and secure system supports a consistent image quality and uptime for all registered imaging display systems within your facility and across your enterprise. Learn more at www.barco.com/qaweb.

To register your display system to your QAWeb Enterprise organization, the QAWeb Enterprise Agent must be installed and running on your workstation and it must be able to communicate with the QAWeb Enterprise cloud service.

For more information and instructions, check the QAWeb Enterprise user guide on www.barco.com/support/qaweb-enterprise.



When still using the older MediCal QAWeb, visit www.barco.com/support/medical-qaweb to obtain the installation package and user documentation.

2.6 VESA-mount installation



CAUTION: Use suitable mounting apparatus to avoid risk of injury.



WARNING: Never move a display attached to an arm by pulling or pushing the display itself. Instead, make sure that the arm is equipped with a VESA compliant handle and use this to move the display. Please refer to the instruction manual of the arm for more information and instructions.



WARNING: Use a mount that is compliant with the VESA 100 mm standard. Use a mount that can support the weight of the display. Refer to the technical specifications of this display for the applicable weight.

Overview

The panel, standard attached to the tilt & swivel foot, is compatible with the VESA 100 mm standard. So it can be used with an arm stand according to the VESA 100 mm standard.

Therefore, the tilt & swivel foot must be removed from the panel.

1. Put the display in the lowest position and lock the height mechanism.

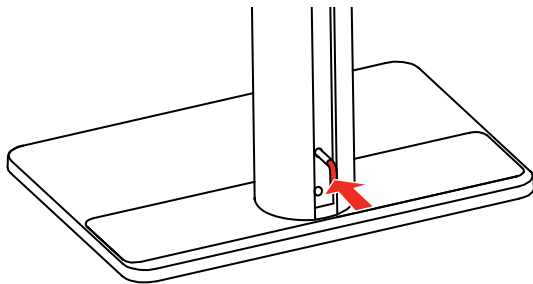


Image 2-10

2. Put the display face down on a clean and soft surface. Be careful not to damage the panel screen.
3. Remove the plastic cover with a flathead screw driver.

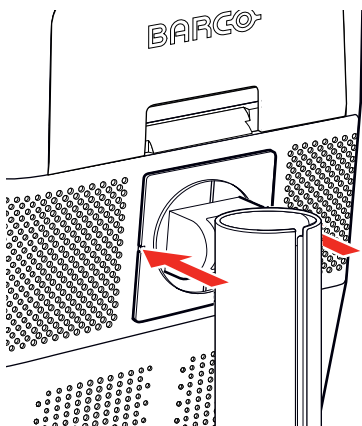


Image 2-11

4. Slide the plastic cover over the neck of the foot.

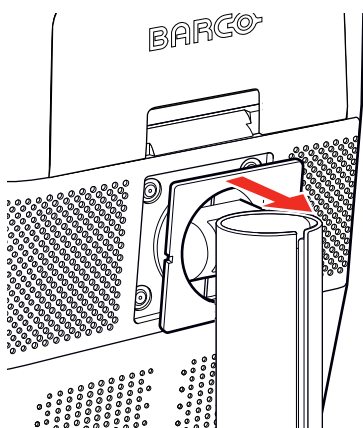


Image 2-12

5. Remove the four screws fixing the foot while supporting the foot.

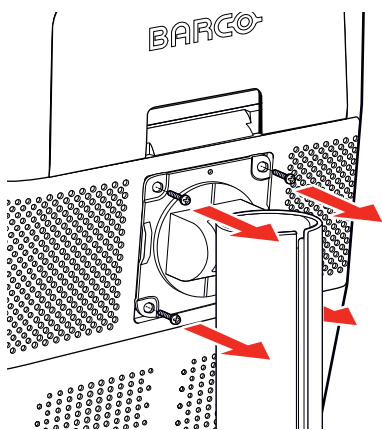


Image 2-13

6. Attach the arm stand **firmly** to the panel using 4 screws M4 x 8 mm.

Daily operation

3

3.1 Recommendations for daily operation

Optimize the lifetime of your display

Enabling the Display Power Management System (DPMS) of your display will optimize its diagnostic lifetime by automatically switching off the backlight when the display is not used for a specified period of time. By default, DPMS is enabled on your display, but it also needs to be activated on your workstation. To do this, go to the “Power Options” of your workstation.



Barco recommends setting DPMS activation after 20 minutes of non-usage.

Use a screen saver to avoid image retention

Prolonged operation of an LCD with the same content on the same screen area may result in a form of image retention.

You can avoid or significantly reduce the occurrence of this phenomenon by using a screen saver. You can activate a screen saver in the “Display properties” window of your workstation.



Barco recommends setting screen saver activation after 5 minutes of non-usage. A good screen saver displays moving content.

In case you are working with the same image or an application with static image elements for several hours continuously (so that the screen saver is not activated), change the image content regularly to avoid image retention of the static elements.

Understand pixel technology

LCD displays use technology based on pixels. As a normal tolerance in the manufacturing of the LCD, a limited number of these pixels may remain either dark or permanently lit, without affecting the diagnostic performance of the product. To ensure optimal product quality, Barco applies strict selection criteria for its LCD panels.

Enhance user comfort

Every Barco multi-head display system is color matched to the tightest specifications in the market.



Barco recommends keeping color-matched displays together. Furthermore, it is important to use all displays of a multi-head configuration at the same rate to preserve color matching throughout the economic lifetime of the system.

Maximize quality assurance

QAWeb Enterprise helps you manage quality and assure compliance of your expanding healthcare enterprise with less effort, lower cost, and complete confidence. This fully automated and secure system supports a consistent image quality and uptime for all registered PACS display systems within your facility and across your enterprise.



Barco highly recommends to use QAWeb Enterprise. Learn more at www.barco.com/qaweb.

3.2 Key indicator lights

About the key indicator lights

By default, the indicator lights of the keys will be off which makes the keys unavailable at that moment. To make the keys illuminate and available for further actions touch one of the keys. As a result, all keys will be illuminated and are now available for further actions. However, if no further actions are taken within the following 5 seconds, the keys will dim again.



The Left / I-Luminate key is always lit and available for activation of the I-Luminate feature. Please refer to “I-Luminate”, page 20 for more information.



The key auto-dim function can be disabled in the OSD menus. Please refer to “Key indicator lights”, page 25 for detailed instructions on how to do this.

3.3 Standby switching

About standby switching



The connected power supply also provides a switch that can be used to turn the power completely off. To use the display, please make sure to switch on this power supply. This can be done by pushing the on/off switch on the power supply into the “|” position.

Switching on the display while it is in standby mode or vice versa can be done by:

1. Illuminate the keys as previously described.
2. While the keys are illuminated, touch the standby key for approximately 2 seconds.

As a result, the display will switch on or will switch to standby mode.




In case of a power outage recovery, your display will always start-up in the power mode it was in before the power interruption (i.e. standby or on). This protects your display against inadvertent image retention problems.

3.4 OSD menu access

About the OSD menu

The OSD menu allows you to configure different settings to make your Nio 5.8MP Gray fit your needs within your working environment. Also, you can retrieve general information about your display and its current configuration settings through the OSD menu.

To access the OSD menu

1. Press any of the front keys to illuminate and activate them.
2. While the keys are illuminated, press the Menu key (). The OSD main menu comes up.
3. If the *OSD menu locked* message appears, wait for the message to disappear, then press the following key sequence: Menu – Left – Right – Left – Menu. After this, the OSD main menu comes up.







3.5 OSD menu navigation

To navigate through the OSD menus

Navigating through the OSD menus can be done by:

- Use the left/right keys to move through the (sub)menus, change values or make selections.
- To go into a submenu or confirm adjustments and selections, use the menu key.
- Use the standby key to cancel adjustments or exit a (sub)menu.
- Exit all OSD menus at once by touching the standby key for approximately 2 seconds.

The key icons are displayed above the keys and are adapted to the function that it is used for (menu dependent):

		Left, Right
		Menu
		Enter
		Cancel
		Standby (IEC 60417–5009)

3.6 I-Luminate

About I-Luminate

I-Luminate is a patented³ technology that increases image brightness. When I-Luminate mode is turned on, the LED backlight of the display is smoothly boosted to the maximum value, creating the highest possible luminance while adjusting the DICOM GSDG curve accordingly.

To switch I-Luminate on/off

- Press the Left / I-Luminate key during normal operation (while the OSD menu is not active) to switch on I-Luminate mode.
- Press the Left / I-Luminate key again to switch off I-Luminate mode and return to normal mode.



I-Luminate mode will automatically switch off after 1 minute.



I-Luminate is only applicable for the SNEF and SPEF versions.

3.7 Viewing mode

About viewing modes

The Nio 5.8MP Gray can be used in two viewing modes:

- **Diagnostic:** This mode provides the full calibrated luminance and is intended for using the display for diagnostic purposes.
- **Text:** In this mode, the luminance is reduced to approximately half of the luminance. This is intended for using the display with office applications such as word processing.
Please note that text mode is not persistent. Once powered off, the display will restart in diagnostic mode.



The diagnostic mode should always be selected when the Nio 5.8MP Gray is intended to be used for screening and diagnosis.

3. I-Luminate is covered by patents EP 2580748B1, US9082334B2 and US9685109B2

To quickly change the viewing mode

Press the Left / I-Luminate and Right key simultaneously during normal operation (while the OSD menu is not active) to change the viewing mode.

Advanced operation

4

About

This section describes all settings available in the OSD menu and how to change and configure them.



Certain OSD menu settings affecting calibration can be managed by QAWeb. Manually changing these settings in the OSD menu is still possible but the changes will be overwritten at each sync with QAWeb. The OSD menu can also be locked/unlocked by QAWeb.

4.1 OSD menu language

About the OSD menu language

By default, the OSD menu comes up in English. However, there's a wide range of other languages available for the OSD menu of your Nio 5.8MP Gray.

To change the language of the OSD menu:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > User Interface > Menu* menu.
3. Enter the *Language* submenu.
4. Select one of the available languages and confirm.

4.2 OSD menu automatic close function

About the OSD menu automatic close function

By default, the OSD menu will disappear automatically after approximately 90 seconds of inactivity. However, this function can be disabled so that the OSD menu remains on the screen until manually closed.

To enable/disable the OSD menu automatic close function:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > User Interface > Menu* menu.
3. Enter the *Automatic Close* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.3 Power LED

About the power LED

To prevent distractions, the power LED is off by default when the display is switched on and used in normal operation. This behavior can be changed so that the power LED will light up during normal operation. Below is an overview of the different power LED states, in ascending order of power consumption:

- Off: Display not powered, or display operational but power LED function disabled in OSD (see [“Power LED”, page 24](#))
- Steady white: Display operational
- Slow blinking amber: Display in suspend mode (requires DPMS mode to be enabled in the OSD menu, see [“DPMS mode”, page 25](#))
- Fast blinking amber: Display in standby mode (requires DPMS mode to be enabled in the OSD menu, see [“DPMS mode”, page 25](#))
- Steady amber: Display switched off via the standby key, or display in hibernate mode (requires DPMS mode and Hibernate to be enabled in the OSD menu, see [“DPMS mode”, page 25](#) and [“Hibernate”, page 26](#))

To enable/disable the power LED

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > User Interface > Indicator Lights* menu.
3. Enter the *Power Status* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.4 Key indicator lights

About the key indicator lights

By default, after lighting up, the key indicator lights will dim again if no further actions are taken within the following 5 seconds. However, this behavior can be changed so that the key indicator lights are always on or always off.

To configure the key indicator lights

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > User Interface > Indicator Lights* menu.
3. Enter the *Keys* submenu.
4. Select *Automatic/Always On/Always Off* as desired and confirm.

4.5 Power lock function

About the power lock function

By enabling the power lock function, the Nio 5.8MP Gray is forced to remain switched on. This means that it can't be switched to stand-by mode manually until the power lock function is disabled again.

To enable/disable the power lock function:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > User Interface > Controls* menu.
3. Enter the *Power Lock* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.6 DPMS mode

About DPMS mode

Enabling the Display Power Management System (DPMS) mode on your display will optimize its diagnostic lifetime by automatically switching off the backlight when the display is not used for a specified period of time. By default, DPMS mode is enabled on your display, but it also needs to be activated on your workstation. To do this, go to the "Power options" of your workstation.



Barco recommends setting DPMS activation after 20 minutes of non-usage.



When DPMS mode is enabled, an additional power saving function becomes available: hibernate. See "[Hibernate](#)", [page 26](#) for more information.

To enable/disable DPMS mode on your display:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Power Management* menu.
3. Enter the *DPMS Mode* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.7 Hibernate

About hibernate

When hibernate is enabled, not only the backlight, but also other functions will be disabled to reduce power consumption to a minimum. This happens after an adjustable period of time.



DPMS mode must be enabled before hibernate can be enabled. See [“DPMS mode”, page 25](#).



Connect your keyboard, mouse, touchpad, etc. directly with your workstation (and not with the display) to be able to awake your workstation and display from hibernate.

To enable/disable hibernate

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Power Management* menu.
3. Enter the *Hibernate* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

To adjust the hibernate time-out

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Power Management* menu.
3. Enter the *Hibernate Timeout* submenu.
4. Set the time-out value as desired and confirm.

4.8 Dry mode

About Dry mode

Dry mode prevents condensation from forming in the display.

- In DPMS mode, the backlight remains powered at a minimum level to maintain some heat in the panel.
- When returning from DPMS mode, standby mode or off state, the display fans spin fast for 1 hour to increase airflow in and around the display. After 1 hour, the fan speed returns to normal regime.



Dry mode remains enabled until manually disabled.

To enable/disable Dry mode on your display:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Power Management* menu.
3. Enter the *Dry Mode* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.9 Quick Dry mode

About Quick Dry mode

Quick Dry mode prevents condensation from forming in the display. Immediately after Quick Dry mode is enabled, the display fans spin fast for 1 hour to increase airflow in and around the display. After 1 hour, the fan speed returns to normal regime and Quick Dry mode is disabled again.



Quick Dry mode is always automatically disabled after it has run 1 time.

To enable/disable Quick Dry mode on your display

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Power Management* menu.
3. Enter the *Quick Dry Mode* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.10 Luminance target

About the luminance target

The luminance target of your Nio 5.8MP Gray is adjustable over a predefined range. When you change the luminance target, the display will adjust its backlight to reach the target.

To set the luminance target:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration* menu.
3. Enter the *Luminance Target* submenu.
4. Set a luminance target value as desired and confirm.



The default, factory calibrated luminance value is available in the technical specifications table. The guaranteed backlight lifetime is valid for this setting.

4.11 Viewing modes

About viewing modes

The Nio 5.8MP Gray can be used in two viewing modes:

- **Diagnostic:** This mode provides the full calibrated luminance and is intended for using the display for diagnostic purposes.
 - **Text:** In this mode, the luminance is reduced to approximately half of the luminance. This is intended for using the display with office applications such as word processing.
- Please note that text mode is not persistent. Once powered off, the display will restart in diagnostic mode.



The diagnostic mode should always be selected when the Nio 5.8MP Gray is intended to be used for screening and diagnosis.

To select a viewing mode

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration* menu.

3. Enter the *Viewing Mode* submenu.
4. Select *Diagnostic/Text* as desired and confirm.



To quickly switch the viewing mode without having to enter the OSD menu, touch the left and right key at the same time during normal operation.

4.12 Display functions

About display functions

Native, uncorrected panels will display all grayscale/color levels with luminance increments that are not optimal for crucial diagnostic information. Studies have shown however, that in medical images certain grayscale/color parts contain more diagnostic information than others. To respond to these conclusions, display functions have been defined. These functions emphasize on these parts containing crucial diagnostic information by correcting the native panel behavior.

The available display functions for your Nio 5.8MP Gray are:

- **Native:** If you select Native, the native panel behavior will not be corrected.
- **Dynamic Gamma 1.8 or 2.2:** These are gamma functions that are shifted to take into account the non-zero luminance of an LCD panel when driven with a “black” signal. They are especially useful in CT applications to improve the perception of low Hounsfield values.
- **DICOM:** DICOM (Digital Imaging and Communications in Medicine) is an international standard that was developed to improve the quality and communication of digital images in radiology. In short, the DICOM display function results in more visible grayscales in the images. Barco recommends selecting the DICOM display function for most medical viewing applications.
- **User:** This display function will be automatically selected when display functions are defined by QAWeb.
- **Gamma 1.8 or 2.2:** Select one of these display functions in case the display is to replace a CRT display with a gamma of 1.8 or 2.2 respectively.



The settings of the display must be adapted to suit the requirements of the visualization software. In case of doubt, please contact the vendor of the visualization software.

To select a display function:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration* menu.
3. Enter the *Display Function* submenu.
4. Select one of the available display functions and confirm.

4.13 Color presets

About color presets

The available color preset settings for your display are:

- **Clearbase:** Simulation of the clearbase film color temperature.
- **Bluebase:** Simulation of the bluebase film color temperature.
- **User:** When selecting the User color temperature setting, you will be able to manually define the X and Y coordinates or the display color temperature in separate submenus.
- **Native White:** The native, unmodified color temperature of the LCD panel.

To select a color preset:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Color Settings* menu.

3. Enter the *Color Presets* submenu.
4. Select one of the available Color Presets and confirm.

4.14 Ambient Light Compensation (ALC)

About ALC



Ambient Light Compensation (ALC) can only be enabled on your display when the display function is set to DICOM. Please refer to [“Display functions”, page 28](#).

When ALC is enabled, the DICOM display function will be recalculated taking a preset ambient light correction value into account. This value is determined by the selected reading room. Therefore, it is also important to select a realistic reading room when enabling ALC. This can be done by following the instructions in [“Reading rooms”, page 29](#).

To enable/disable ALC:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Ambient Light* menu.
3. Enter the *Ambient Light Compensation* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.15 Reading rooms

About reading rooms



Reading rooms can only be selected on your display when the display function is set to DICOM. Please refer to [“Display functions”, page 28](#)

The American Association of Physicists in Medicine (AAPM) composed a list of pre-defined reading rooms. Each of these reading rooms are defined by following parameters:

- the maximum light allowed in this type of room
- the preset ambient light correction value for this reading room

These parameters are stored in your display and determine the preset ambient light correction value to take into account to recalculate the DICOM display function when Ambient Light Compensation (ALC) is enabled. Please refer to [“Ambient Light Compensation \(ALC\)”, page 29](#) to enable ALC.

The available reading rooms for your Nio 5.8MP Gray are:

- **CR/DR/ MAMMO:** Corresponds to light conditions in diagnostic reading rooms for computed radiology, digital radiology or mammography. This setting has the lowest maximum ambient light.
- **CT/MR/NM:** Corresponds to light conditions in diagnostic reading rooms for computed tomography, magnetic resonance or nuclear medicine scans.
- **Staff Office:** Corresponds to light conditions in office rooms.
- **Clinical Viewing Room:** Corresponds to light conditions in diagnostic reading rooms for clinical viewing.
- **Emergency Room:** Corresponds to light conditions in emergency rooms.
- **Operating Room:** Corresponds to light conditions in operating rooms. This setting has the highest maximum ambient light.

To select a reading room:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Ambient Light* menu.
3. Enter the *Reading Room* submenu.

4. Select one of the available reading rooms and confirm.

4.16 Embedded QA

4.16.1 About Embedded QA

About

Embedded QA allows you to run a display calibration or compliance test directly from the display using the OSD menus described in the next sections. Embedded QA will use the front sensor / I-Guard to measure the necessary luminance levels for either a calibration or compliance test. Various settings for both actions can be selected from the display's OSD menu. The last results of both actions can be consulted from the OSD.

Embedded QA or QAWeb?

Embedded QA is not a replacement for the Barco QAWeb solution.

Although Embedded QA is a reliable option to perform a simple calibration or compliance test, Barco still highly recommends QAWeb as the solution of choice for calibration and QA. QAWeb brings many benefits such as centralized asset management, the ability to schedule tasks, remote management, automated reporting, alerting and specific support of regional QA standards such as DIN 6868-57, JESRA and AAPM TG18. That's why QAWeb Agent acts as the master for all supported displays from the moment it is installed and running. QAWeb Agent will take over from Embedded QA and overwrite any settings which were applied by Embedded QA.

4.16.2 DICOM status report

About DICOM status report

Following information is available:

DICOM Compliance Status (status since last compliance check)

- **Compliance status:** Shows if the current DICOM curve is compliant or not.
- **Maximum error:** Shows the maximum error of the current DICOM curve. This is the deviation compared to a perfect DICOM.
- **Error threshold:** Shows the error threshold. This is the maximum error allowed before a DICOM calibration is required.
- **Time elapsed since latest compliance check:** Shows the backlight runtime since last compliance check.
- **Display Function:** Shows the current display function.
- **Ambient light compensation:** Shows the ambient light compensation status.
- **Reading Room:** Shows the selected reading room.
- **Luminance:** Shows the measured luminance.
- **Black luminance:** Shows the measured black luminance.

DICOM Calibration Status

- **No calibration executed yet:** No other information is visible
- **Calibration executed:** When the calibration is executed, the following extra information is shown: Time elapsed since latest calibration, Display Function, Ambient Light Compensation and Reading Room.

Current DICOM Settings

- **Display Function:** Shows the current display function.
- **Ambient Light Compensation:** Shows the ambient light compensation status.
- **Reading room:** Shows the selected reading room.

To retrieve the DICOM status report:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Embedded QA* menu.
3. Select *DICOM Status Report* to make the information visible on the screen.

4.16.3 DICOM compliance check

About DICOM compliance check

The DICOM compliance check will measure the DICOM curve of your display in different steps. After measurement, the DICOM status report is shown.

To start DICOM compliance check:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Embedded QA* menu.
3. Select *DICOM Compliance Check* to start the compliance check.



Warning: Pressing a key during the compliance check will abort the check.

4.16.4 DICOM calibration

About DICOM calibration

The DICOM calibration will add a correction to the current DICOM curve to approach the perfect DICOM curve as well as possible.

To start DICOM calibration:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Embedded QA* menu.
3. Select *DICOM calibration* to start the calibration.



Warning: Pressing a key during calibration will abort the calibration, previous values will be restored.



Note: After calibration, the compliance check will start automatically.

4.16.5 Reset DICOM calibration

About reset DICOM calibration

It is possible to restore the original (factory default) DICOM curve.

To reset the DICOM calibration:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Embedded QA* menu.
3. Enter the *DICOM Preferences* submenu.
4. Select *Reset DICOM Calibration* to restore the original (not corrected) DICOM curve.

4.16.6 DICOM error threshold

About DICOM error threshold

The threshold to define the DICOM compliance can be modified in steps of 5% starting from 5 to 30%. When the maximum deviation is not bigger than the selected threshold, the compliance check will be OK.

To set the DICOM error threshold:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Calibration > Embedded QA* menu.
3. Enter the *DICOM Preferences* submenu.

4. Set *Error Threshold* as desired and confirm.

4.17 Display orientation

About Display orientation

Your display automatically detects its physical orientation (portrait or landscape) and, by default, automatically adjusts the image orientation to this. This means that when your display is physically rotated, the image will rotate along.

The OSD menu however, allows to overrule this behavior and force the image orientation to portrait or landscape regardless of the physical orientation of the display. This may be especially useful when operating your display with the screen facing upwards.

To set the Display orientation

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Display Orientation* submenu.
4. Select *Landscape/Portrait/Automatic* as desired and confirm.

4.18 Image scaling

About image scaling

Enabling image scaling will copy each individual pixel to one or more adjacent pixels so that the size of the displayed image will be a multiple of the original image source video input signal.



Image scaling is only possible when the resolution of your display's video input signal is less than or equal to half the maximum resolution of the display.

To enable/disable image scaling:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Source* menu.
3. Enter the *Scaling* submenu.
4. Select *Enabled/Disabled* as desired and confirm.

4.19 Image source selection

About image source selection

The Nio 5.8MP Gray has 4 video inputs: DisplayPort 1, DVI 1, DisplayPort 2 and DVI 2. The input to be displayed is dependent on the selected **image source selection mode**:

- **Automatic** image source selection mode automatically detects the connected video input and shows it on the screen. If more than one video input is connected, the input to be displayed will be determined based on the following priority mechanism:
 1. DisplayPort 1 (highest priority)
 2. DVI 1
 3. DisplayPort 2
 4. DVI 2 (lowest priority)
- **Manual** image source selection mode allows to manually select the input to be displayed.
- **Expert** image source selection mode enables the **dual input channel mechanism**. This will make inputs 1 (DisplayPort 1 together with DVI 1) and inputs 2 (DisplayPort 2 together with DVI 2) to be handled as two

separate channels. Switching between channel 1 and channel 2 can in its turn be done automatically or manually:

- Automatic channel selection will automatically detect the connected video input(s) and show it on the screen. Priority will be given to channel 1 inputs if both channels have video input(s) connected. In this way channel 2 can be seen as a backup channel.
- Manual channel selection allows to manually switch to either channel 1, channel 2 or no channel (causing no input to be displayed).

For each channel, the video input (DisplayPort or DVI) can then also be selected automatically or manually:

- Automatic input selection gives priority to DisplayPort over DVI for each channel.
- Manual input selection allows DisplayPort or DVI to be selected manually per channel.

To automatically detect the image source:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Image Source Selection* submenu and select *Automatic*.

To manually select an image source:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Image Source Selection* submenu and select *One Image Source*.
4. Enter the *Image Source* submenu and select one of the image sources.

To enable expert mode (dual input channel mechanism):

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Image Source Selection* submenu and select *Expert*.

To automatically switch between the input channels:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Image Source Selection* submenu and select *Expert*.
4. Enter the *Automatic Selection of Input* submenu and select *Enabled*.

To manually switch between the input channels:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Image Source Selection* submenu and select *Expert*.
4. Enter the *Automatic Selection of Input* submenu and select *Disabled*.
5. Enter the *Left* submenu and select one of the input channels.

To select the image source on channel 1 and 2:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources* menu.
3. Enter the *Image Source Selection* submenu and select *Expert*.
4. Enter the *Input 1 or Input 2 Image Source* submenu and select one of the image sources.

4.20 Grayscale conversion modes



Your Nio 5.8MP Gray display automatically detects the connected video input signals and applies the correct grayscale conversion settings. Manually selecting a grayscale conversion mode is possible, but then your display's image source selection mode should be set to allow this. Please refer to ["Image source selection"](#), page 32 to do this.

About grayscale conversion modes

Grayscale conversion modes specify how color generated on the display controller is converted to grayscale in your display.

The available grayscale conversion modes are:

- **No conversion**
- **Use red channel:** This mode is intended for grayscale displays where gray is sent over the red channel.
- **Use green channel:** This mode is intended for grayscale displays where gray is sent over the green channel.
- **Use blue channel:** This mode is intended for grayscale displays where gray is sent over the blue channel.

To manually select a grayscale conversion mode:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources > Input Settings > DisplayPort 1/2, DVI 1/2* menu.
3. Enter the *Grayscale Conversion* submenu.
4. Select one of the available color conversion modes and confirm.

4.21 EDID format

About EDID format

The Nio 5.8MP Gray supports two EDID formats: E-EDID V1.4 and DisplayID V1.3

To select the EDID format

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources > Input Settings* menu.
3. Enter the *EDID format* submenu.
4. Select one of the available format and confirm.

4.22 EDID timings

About EDID timings

Following EDID timings are available for your Nio 5.8MP Gray:

- **Resolution:** Allows to manually modify the resolution of the image source video input signal.
- **Refresh rate:** Allows to manually select the refresh rate of the image source video input signal depending on the maximum refresh rate of the display controller connected to your display.
- **Color depth:** Allows to change the color depth to 8 or to 10 bit (only when using DisplayPort input).

To manually set EDID timings:

1. Bring up the OSD main menu.
2. Navigate to the *Configuration > Image Sources > Input Settings > DisplayPort 1/2, DVI 1/2* menu.
3. Enter the *EDID* submenu.

4. Select one of the available settings and confirm.

4.23 Display info

About display info

Your display serial number, native resolution, firmware versions, etc. are available in a dedicated submenu of the OSD menu.

To retrieve info about your display:

1. Bring up the OSD main menu.
2. Navigate to the *About this Display* menu to make the information visible on the screen.

4.24 Display status

About display status

The Status submenu of the OSD menu provides info on the current status of your display (runtimes, temperatures, etc.), the status of the connected image sources (video encoding mode, timings, etc.) and the current calibration status of your display (display function, luminance, ALC, etc.).

To retrieve the status of your display:

1. Bring up the OSD main menu.
2. Navigate to the *Status* menu.
3. Enter the *Display*, *Image Sources* or *Calibration* submenu as desired.

Cleaning the display

5

5.1 Cleaning instructions

To clean the display

Apply a cleaning/disinfecting product to a soft lint-free cloth, such as a microfiber or gauze and rub the display surface thoroughly. In order to be effective, all surfaces must be cleaned for a certain amount of time (ranging from 30 seconds to 2 minutes).

Use a cleaning/disinfecting product that is alcohol-, alkali-, water- or chlorine-based. Common examples are:

- Isopropanol 100%
- Ethanol 70%
- 0.5% Chlorhexidine in 70% ethanol/isopropanol
- Ortho-Phthalaldehyde (OPA) 0.55%
- Haemo-sol, 1% in water
- 250 ppm Chlorine solution
- 1.0% Iodine in 70% ethanol
- 1.6% aqueous ammonia
- "Green soap" (USP)
- 0.5% Chlorhexidine in 70% isopropyl alcohol
- Products similar to optical cleaning liquid
- Bacillol AF
- Flux
- Sodium hypochlorite 10%

When selecting an alternative cleaning/disinfecting product, it is recommended to always identify the active ingredients. In case of doubt about a certain cleaning product, use plain water.

Do not use any of the following products:

- Alcohol in concentrations > 70%
- Strong alkalis lye, strong solvents
- Acetone
- Toluene
- Acids
- Detergents containing fluoride
- Detergents containing ammonia
- Detergents containing abrasives
- Steel wool
- Sponge with abrasives
- Steel blades
- Cloths with steel thread
- Paper-based cloths (e.g. paper towels, facial tissues, toilet paper)



CAUTION: Read and follow all instructions on the label of the cleaning product.



CAUTION: Take care not to damage or scratch the front glass or LCD. Be careful with rings or other jewelry and do not apply excessive pressure on the front glass or LCD.



CAUTION: When a small object or dust is tucked between the front bezel and the LCD surface (for displays without front glass), carefully remove with a soft object such as a plastic card or finger nail. Do not use sharp objects such as paperclips or tweezers to avoid damage to the LCD.



CAUTION: Do not apply or spray liquid directly to the display as excess liquid may cause damage to internal electronics. Instead, apply the liquid to a cleaning cloth.

Important information

6

6.1 Safety information

General recommendations

Read the safety and operating instructions before operating the device.

Retain safety and operating instructions for future reference.

Adhere to all warnings on the device and in the operating instructions manual.

Follow all instructions for operation and use.

Electrical Shock or Fire Hazard

To prevent electric shock or fire hazard, do not remove cover.

No serviceable parts inside. Refer servicing to qualified personnel.

Do not expose this apparatus to rain or moisture.

Modifications to the unit

Do not modify this equipment without authorization of the manufacturer.

Type of protection (Electrical)

Equipment with external power supply: Class I equipment

Degree of safety (flammable anesthetic mixture)

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.



Non-patient care equipment

- Equipment primarily for use in a health care facility that is intended for use where contact with a patient is unlikely (no applied part).
- The equipment shall not be used with life support equipment.
- The user should not touch the equipment, nor its signal input ports (SIP)/signal output ports (SOP) and the patient at the same time.

Child safety

Equipment not suitable for use in locations where children are likely to be present.

Power connection – Equipment with external 24 VDC power supply

- Power requirements: The equipment must be powered using the delivered medical approved 24 VDC () SELV power supply.
- The medical approved DC () power supply must be powered by the AC mains voltage.
- The power supply is specified as a part of the ME equipment or combination is specified as a ME system.
- To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.
- The equipment should be installed near an easily accessible outlet.
- The equipment is intended for continuous operation.

Transient over-voltage

If the device is not used for a long time, disconnect it from the AC inlet to avoid damage by transient over-voltage.

To fully disengage the power to the device, please disconnect the power cord from the AC inlet.

High magnetic environment

- The device shall not be used in the high magnetic environment of an MRI scanner.

- The installer shall assess the magnetic environment before installation or use of the device.

Power cords

- Do not overload wall outlets and extension cords as this may result in fire or electric shock.
- Mains lead protection (U.S.: Power cord): Power cords should be routed so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs and receptacles.
- Use a power cord that matches the voltage of the power outlet, which has been approved and complies with the safety standard of your particular country.
- Korea: Use KC certified products; Plug: 250 V~, 16 A; Power cord: 60227 IEC 53, 3G0.75 mm² / 60227 IEC 53, 3G1.0 mm²; Connector: 250 V~, 10 A

Water and moisture

Never expose the display to rain or moisture.

Never use the display near water - e.g. near a bathtub, washbasin, swimming pool, kitchen sink, laundry tub or in a wet basement.

Ventilation

Do not cover or block any ventilation openings in the cover of the set. When installing the device in a cupboard or another enclosed location, heed the necessary space between the set and the sides of the cupboard.

Installation

Place the device on a flat, solid and stable surface that can support the weight of at least 3 devices. If you use an unstable cart or stand, the device may fall, causing serious injury to a child or adult, and serious damage to the device.

Malfunctions

Disconnect the equipment's power cord from the AC inlet and refer servicing to qualified service technicians under the following conditions:

- If the power cord or plug is damaged or frayed.
- If liquid has been spilled into the equipment.
- If the equipment has been exposed to rain or water.
- If the equipment does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
- If the equipment has been dropped or the cabinet has been damaged.
- If the product exhibits a distinct change in performance, indicating a need for service.

National Scandinavian Deviations for CL. 1.7.2

Finland: "Laitte on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan"

Norway: "Apparatet må tilkoples jordet stikkontakt"

Sweden: "Apparaten skall anslutas till jordat uttag"

6.2 Cybersecurity

Security objectives

The Nio 5.8MP Gray will be used for displaying and viewing digital images. Therefore, ensuring the availability of the digital images has been identified as the primary security objective of this product.

Nevertheless, the availability, integrity, and confidentiality of information processed by the product relies on the non-mandatory security recommendations described below.

The lack of storage or processing of patient or personal information, combined with the limited (network) connectivity, results in the Nio 5.8MP Gray entailing a low cybersecurity risk profile.

Security recommendations

The security measures listed below should be considered as a non-exhaustive list of possible security controls for the operating environment. The operating environment must not hinder the application of security measures on the product or force the device to operate in a lower security setting.

The operator shall maintain the necessary state-of-the-art policies, processes, standards and other security controls to incorporate, support and protect the product. This shall include the application of risk management (e.g. by implementing relevant standards).

The operating environment should provide physical security via security measures such as:

- Regulated and authenticated physical access enforced via suitable technical measures (e.g. badges)
- Physical security policy defining roles and access rights, including for physical access to the product
- Use of segregated, secure areas with appropriate access controls

The operating environment should include appropriate security controls such as:

- User access management (credentials for accessing software applications or devices, user access policy, etc.)
- Antivirus / anti-malware software
- Firewall
- Application whitelisting / system hardening
- Exclusive use of genuine software and ban of all illegitimate software and applications
- Session management measures (e.g. session timeouts)

The operating environment should provide control and security of network traffic via appropriate measures, such as:

- Network segmentation & network access control
- Traffic filtering
- Encrypted communication

Specifically for workstations connected to the product, appropriate security measures include:

- Operating system hardening and application whitelisting
- Use of strong passwords
- Install only software necessary for the intended use of the operating environment.

To ensure that the security posture of the operating environment and of the product itself remain at a suitable level, appropriate provisions regarding patch management should be in place, such as:

- The operating environment should support patching without compromising interoperability/compatibility
- The operator should have appropriate patch management processes to ensure that security patches for the product are deployed in a timely manner
- The operator should have appropriate patch management processes to ensure that the operating environment (e.g. operating systems, applications) is up-to-date in terms of security

6.3 Environmental information

Disposal Information



Waste Electrical and Electronic Equipment (WEEE)

This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service. For details, please visit the Barco website at: <https://www.barco.com/about/sustainability/waste-of-electronic-equipment-customers>

Turkey RoHS compliance



Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

中国大陆 RoHS

Chinese Mainland RoHS

根据中国大陆《电器电子产品有害物质限制使用管理办法》（也称为中国大陆RoHS），以下部分列出了Barco产品中可能包含的有毒和/或有害物质的名称和含量。中国大陆RoHS指令包含在中国信息产业部MCV标准：“电子信息产品中有毒物质的限量要求”中。

According to the “Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products ” (Also called RoHS of Chinese Mainland), the table below lists the names and contents of toxic and/or hazardous substances that Barco's product may contain. The RoHS of Chinese Mainland is included in the MCV standard of the Ministry of Information Industry of China, in the section “Limit Requirements of toxic substances in Electronic Information Products”.

零件项目(名称) Component name	有毒有害物质或元素 Hazardous substances and elements					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
印制电路配件 Printed Circuit Assemblies	X	O	O	O	O	O
液晶面板 LCD panel	X	O	O	O	O	O
外接电(线)缆 External Cables	X	O	O	O	O	O
内部线路 Internal wiring	O	O	O	O	O	O
金属外壳 Metal enclosure	O	O	O	O	O	O
塑胶外壳 Plastic enclosure	O	O	O	O	O	O
散热片(器) Heatsinks	O	O	O	O	O	O
风扇 Fan	O	O	O	O	O	O
电源供应器	X	O	O	O	O	O

零件项目(名称) Component name	有毒有害物质或元素 Hazardous substances and elements					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
Power Supply Unit						
文件说明书 Paper Manuals	O	O	O	O	O	O
光盘说明书 CD manual	O	O	O	O	O	O
本表格依据SJ/T 11364的规定编制 This table is prepared in accordance with the provisions of SJ/T 11364. 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 GB/T 26572 标准规定的限量要求以下。 O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572. X: 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 GB/T 26572 标准规定的限量要求。 X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.						

在中国大陆销售的相应电子信息产品（EIP）都必须遵照中国大陆《电子电气产品有害物质限制使用标识要求》标准贴上环保使用期限（EFUP）标签。Barco产品所采用的EFUP标签（请参阅实例，徽标内部的编号用于指定产品）基于中国大陆的《电子信息产品环保使用期限通则》标准。

All Electronic Information Products (EIP) that are sold within Chinese Mainland must comply with the “Marking for the restriction of the use of hazardous substances in electrical and electronic product” of Chinese Mainland, marked with the Environmental Friendly Use Period (EFUP) logo. The number inside the EFUP logo that Barco uses (please refer to the photo) is based on the “General guidelines of environment-friendly use period of electronic information products” of Chinese Mainland.



中国RoHS自我声明符合性标志 / China RoHS – SDoC mark

本产品符合《电器电子产品有害物质限制使用管理办法》和《电器电子产品有害物质限制使用达标管理目录》的要求。

This product meets the requirements of the “Management Rule on the Use Restriction of Hazardous Substances in Electrical and Electronic Products” and the “Management Catalogue for the Use Restriction of Hazardous Substances in Electrical and Electronic Products”.



绿色自我声明符合性标志可参见电子档文件

The green SDoC mark is visible in the digital version of this document.

限用物質含有情況標示聲明書 / Taiwan BSMI RoHS

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr+6)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
印刷電路(含零組件) PCBA (including the components)	—	O	O	O	O	O
液晶顯示屏 LCD	—	O	O	O	O	O
電源适配器 Power adapter	—	O	—	O	O	O
電纜/連接器 Cable / connector	—	O	O	O	O	O
風扇 Fan	—	O	O	O	O	O
機械部件-金屬件 Mechanical parts – Metal	O	O	O	O	O	O
塑膠殼 Plastic cover	O	O	O	O	O	O
電源線/信號線 Power supply/ signal cable	—	O	O	O	O	O
機械部件-其他 Mechanical Parts – Others	O	O	O	O	O	O
紙/油墨(標籤、說明書、包裝盒等) Paper/Ink (Label, Instruction and packaging etc.)	O	O	O	O	O	O
背光燈管部件 Backlight assembly	O	O	O	O	O	O
<p>備考1. “超出0.1 wt %” 及 “超出0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note 1: “exceeding 0.1 wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.</p> <p>備考2. “O” 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2: “O” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.</p> <p>備考3. “—” 係指該項限用物質為排除項目。 Note 3: The “—” indicates that the restricted substance corresponds to the exemption.</p>						

6.4 Regulatory compliance information

Indications for use

The display is intended to be used in displaying and viewing digital images, including standard and multiframe digital mammography, for review, analysis, and diagnosis by trained medical practitioners. It is specially designed for breast tomosynthesis applications.

Intended usage environment

- The display is not in contact with patients.
- The display is not in the same environment as the patient.

- The display is intended to be used in a dedicated diagnostic reading room.

Caution (USA): Federal law restricts this device to sale by or on the order of a physician. (Details & exemptions are in the Code of Federal Regulations Title 21, 801 Part D).

Contra-indications

Not applicable

Intended users

Barco diagnostic and mammography displays are intended to be used for primary diagnosis by trained medical practitioners. The device is initially set up by trained integrators or medical IT staff.

Notice to the user and/or patient

Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

Factory addresses

- **Barco NV**, President Kennedypark 35, 8500 Kortrijk, Belgium
- **Fimi S.r.l.**, Via Saul Banfi 1, 21047 Saronno, VA, Italy
- **巴可 (苏州) 医疗科技有限公司**, 苏州工业园区苏桐路111号
Barco (Suzhou) Healthcare Technology Co., Ltd., No.111, Sutong Road, Suzhou Industrial Park, 215021 Suzhou China

Manufacturing country

The manufacturing country of the product is indicated on the product label ("**Made in ...**").

Importers contact information

To find your local importer, contact one of Barco's regional offices via the contact information provided on our website (www.barco.com).

FCC class B

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

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the device and receiver.
- Connect the device into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

FCC responsible: Barco Inc., 3059 Premiere Parkway Suite 400, 30097 Duluth GA, United States, Tel: +1 678 475 8000

Canadian notice

CAN ICES-001(B) / NMB-001(B)

Brazilian local representative

Barco Ltda, Av. Ibirapuera, 2332 - Andar 8 - Bloco 2 - Conj 82, Bairro:Ibirapuera, Distrito:Moema, 4028-002, São Paulo, Brasil

Taiwan notice

義務信

- 一、商品在國內產製時，為商品之產製者或輸出者。
但商品委託他人產製，並以在國內有住所或營業所之委託者名義，於國內銷售或輸出時，為委託者。
- 二、商品在國外產製時，為商品之輸入者。
但商品委託他人輸入，並以在國內有住所或營業所之委託者名義，於國內銷售時，為委託者。
- 三、商品之產製者、輸出入者、委託產製或委託輸出入者不明或無法追查時，為銷售者。
前項所稱產製者，包括具有下列情形之一者：
組裝者：商品由個別零組件以組裝銷售。
修改者：符合檢驗規定之商品於進入市場前，為銷售目的而修改。

6.5 EMC notice

General information

This device is for use in professional healthcare facility environments only.

With the installation of the device, use only the delivered external cables and power supply or a spare part provided by the legal manufacturer. Using another can result in a decrease of the immunity level of the device.



WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.



WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.



WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Nio 5.8MP Gray, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Electromagnetic emissions

The Nio 5.8MP Gray is intended for use in the electromagnetic environment specified below. The customer or the user of the Nio 5.8MP Gray should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment – Guidance
RF emissions CISPR 11	Group 1	The Nio 5.8MP Gray uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The Nio 5.8MP Gray is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class D	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

This Nio 5.8MP Gray complies with appropriate medical EMC standards on emissions to, and interference from surrounding equipment. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Interference can be determined by turning the equipment off and on.

If this equipment does cause harmful interference to, or suffer from harmful interference of, surrounding equipment, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna or equipment.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced technician for help.

Electromagnetic immunity

The Nio 5.8MP Gray is intended for use in the electromagnetic environment specified below. The customer or the user of the Nio 5.8MP Gray should assure that it is used in such an environment.

Immunity test	IEC 60601-1-2 test levels	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/ output lines 100 kHz repetition frequency	± 2 kV for power supply lines ± 1 kV for input/ output lines 100 kHz repetition frequency	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC61000-4-5	Line to line: ± 0.5 kV, ± 1 kV Line to ground: ± 0.5 kV, ± 1 kV, ± 2 kV	Line to line: ± 0.5 kV, ± 1 kV Line to ground: ± 0.5 kV, ± 1 kV, ± 2 kV	Mains power quality should be that of a typical commercial or hospital environment
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% residual voltage for 0.5 period at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% residual voltage for 1 period at 0° 70% residual voltage for 25 periods at 0° Voltage interruptions: 0% residual voltage for 250 periods at 0°	0% residual voltage for 0.5 period at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% residual voltage for 1 period at 0° 70% residual voltage for 25 periods at 0° Voltage interruptions: 0% residual voltage for 250 periods at 0°	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Nio 5.8MP Gray requires continued operation during power mains interruptions, it is recommended that the Nio 5.8MP Gray be powered from an uninterruptible power supply or a battery
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m	Not applicable ⁴	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment
Conducted RF IEC 61000-4-6	3 Vrms (6 Vrms in ISM bands) 150 kHz to 80 MHz	3 Vrms (6 Vrms in ISM bands)	-

4. Nio 5.8MP Gray doesn't contain components that are susceptible to magnetic fields.

Immunity test	IEC 60601-1-2 test levels	Compliance level	Electromagnetic environment – guidance
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz	3 V/m	















Immunity to RF wireless communications equipment
















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

6.6 Explanation of symbols









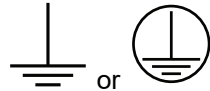
Symbols on the device

On the device or power supply, you may find the following symbols (nonrestrictive list):

	Indicates the device meets the requirements of the applicable EC directives/ regulations.
	Indicates compliance with Part 15 of the FCC rules (Class A or Class B).
	Indicates the device is approved according to the UL regulations
	Indicates the device is approved according to the UL regulations for Canada and US
	Indicates the device is approved according to the UL regulations for Canada and US
	Indicates the device is approved according to the UL Demko regulations.
	Indicates the device is approved according to the CCC regulations.
	Indicates the device is approved according to the VCCI regulations.
	Indicates the device is approved according to the KC regulations.
	Indicates the device is approved according to the BSMI regulations.
	Indicates the device is approved according to the PSE regulations.
	Indicates the device is approved according to the RCM regulations.
	Indicates the device is approved according to the EAC regulations.
	Caution: Federal law (United States of America) restricts this device to sale by or on the order of a licensed healthcare practitioner.




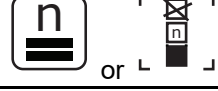


	Indicates the device is approved according to the BIS regulations.
	Indicates the device is approved according to the INMETRO regulations.
	Indicates the USB connectors on the device.
	Indicates the DisplayPort connectors on the device.
	Indicates the legal manufacturer.
	Indicates the manufacturing date.
	Indicates the entity importing the medical device into the locale.
	Indicates the temperature limitations ⁵ for the device to safely operate within specs.
	Indicates that the device is a Medical Device.
	Indicates the device Serial Number.
	Indicates the device part number or catalogue number.
	Indicates the Unique Device Identifier.
	Indicates the Authorised Representative for the European Union.
	Indicates the Authorised Representative for Switzerland.
	Warning: dangerous voltage

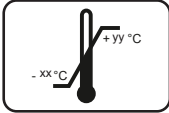

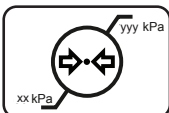
5. Values for xx and yy can be found in the technical specifications paragraph.

	Caution
	Consult the Instructions For Use.
 eIFU indicator	Consult the Instruction For Use on the website address that is provided as eIFU indicator.
	Indicates this device must not be thrown in the trash but must be recycled, according to the European WEEE (Waste Electrical and Electronic Equipment) directive.
	Indicates Direct Current (DC).
	Indicates Alternating Current (AC).
	Stand-by
	Equipotentiality
	Protective earth (ground)

Symbols on the box

On the box of the device, you may find the following symbols (nonrestrictive list):

	Indicates a device that can be broken or damaged if not handled carefully when being stored.
	Indicates a device that needs to be protected from moisture when being stored.
	Indicates the storage direction of the box. The box must be transported, handled and stored in such a way that the arrows always point upwards.
	Indicates the maximum number of identical boxes which may be stacked on each other, where "n" is the limiting number.
	Indicates the weight of the box and that it should be carried with two persons.
	Indicates that the box should not be cut with a knife, a cutter or any other sharp object.

	Indicates the temperature limits ⁶ to which the device can be safely exposed when being stored.
	Indicates the range ⁶ of humidity to which the device can be safely exposed when being stored.
	Indicates the range ⁶ of atmospheric pressure to which the device can be safely exposed when being stored.

6.7 Legal disclaimer

Disclaimer notice

Although every attempt has been made to achieve technical accuracy in this document, we assume no responsibility for errors that may be found. Our goal is to provide you with the most accurate and usable documentation possible; if you discover errors, please let us know.

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Patent protection

Please refer to www.barco.com/about-barco/legal/patents.

Product Security Incident Response

As a global technology leader, Barco is committed to deliver secure solutions and services to our customers, while protecting Barco's intellectual property.

When product security concerns are received, the product security incident response process will be triggered immediately. To address specific security concerns or to report security issues with Barco products, please inform us via contact details mentioned on <https://www.barco.com/psirt>.

To protect our customers, Barco does not publicly disclose or confirm security vulnerabilities until Barco has conducted an analysis of the product and issued fixes and/or mitigations.

⁶. Values for xx and yy can be found in the technical specifications paragraph.

6.8 Technical specifications

MDNG-6221 (option SNEF and SPEF)

Screen technology	LCD
Active screen size (diagonal)	541 mm (21.3")
Active screen size (H x V)	324 x 433 mm (12.77" x 17")
Aspect ratio (H:V)	3:4 for each display in portrait mode, 3:2 overall
Resolution	5.8 MP (2100 x 2800 pixels)
Pixel pitch	0.1545 mm
Gray imaging	Yes
Bit depth	10 bit
Viewing angle (H, V)	178°
Optical glass	MDNG-6221 option SPEF: Yes MDNG-6221 option SNEF: No
Uniformity correction	ULT
I-Luminate	Yes
SteadyGray	Yes
Ambient light presets	Yes, reading room selection
Ambient light sensor	MDNG-6221 option SPEF: Yes MDNG-6221 option SNEF: No
Front sensor	Yes
Maximum luminance	1300 cd/m ²
DICOM calibrated luminance	Warrantied maximum: 1000 cd/m ² Factory default: 600 cd/m ²
Contrast ratio (panel typical)	1400:1
Response time ((Tr + Tf)/2) (typical)	12.5 ms
Housing color	RAL 9003 / RAL 9004
Video input signals	DVI-D Dual Link (2x) DisplayPort (2x)
USB ports	1x USB 2.0 upstream (endpoint) 2x USB 2.0 downstream
Power rating	24 VDC, 5 A; 5 VDC, 0.1 A
Power requirements	This device shall only be powered by the following medical approved power supplies: Adapter Technology, type CMD160-P240 Ratings marked on the medical power supply: <ul style="list-style-type: none"> • Input rating: 100–240 VAC, 1.9–0.8 A, 50/60 Hz • Output rating: 24 VDC, 6.3 A; 5 VDC, 0.5 A

Power consumption	60 W (nominal) < 0.5 W (standby)
Dimensions with stand (W x H x D)	Portrait: 378 x 528~628 x 235 mm Landscape: 491 x 472~572 x 235 mm
Dimensions w/o stand (W x H x D)	Portrait: 378 x 491 x 81 mm Landscape: 491 x 378 x 81 mm
Dimensions packaged (W x H x D)	500 x 280 x 670 mm
Net weight with stand	MDNG-6221 option SPEF: 11.6 kg MDNG-6221 option SNEF: 10.2 kg
Net weight w/o stand	MDNG-6221 option SPEF: 6.6 kg MDNG-6221 option SNEF: 5.2 kg
Net weight packaged	MDNG-6221 option SPEF: 17.0 kg (without optional accessories) MDNG-6221 option SNEF: 15.7 kg (without optional accessories)
Tilt	-10° to +30°
Swivel	-45° to +45°
Pivot	90°
Height adjustment range	100 mm
Mounting standard	VESA (100 mm)
Screen protection	MDNG-6221 option SPEF: Protective, anti-reflective glass cover MDNG-6221 option SNEF: N/A
Recommended modalities	All digital images, including digital mammography and breast tomosynthesis
Certifications	CE0123 (Medical Device) FDA 510(k) K170476 CCC (China), KC (Korea), INMETRO (Brazil - Product numbers K9300370B, K9300372B), BIS (India), EAC (Russia, Kazakhstan, Belarus, Armenia and Kyrgyzstan) Safety specific: IEC 60950-1:2005 + A1:2009 EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013 IEC 62368-1:2018 EN IEC 62368-1:2020 IEC 60601-1:2005 + A1:2012 EN 60601-1:2006 + A1:2013 + A12:2014 ANSI/AAMI ES 60601-1:2005 + R1:2012 CAN/CSA C22.2 No. 60601-1:14 EMI specific: IEC 60601-1-2:2014 (ed4) EN 60601-1-2:2015 (ed4) FCC part 15 Class B ICES-001 Level B VCCI (Japan) Environmental:

	China Energy Label, EU RoHS, China RoHS, REACH, Canada Health, WEEE, Packaging Directive
Supplied accessories	User guide Documentation disc System sheet Video cable (1 x DisplayPort) Mains cable(s) USB 2.0 cable External power supply
Optional accessories	Display controller
QA software	QAWeb
Warranty	5 years, including 40000 hrs backlight warranty
Operating temperature	0 °C to 40 °C (15 °C to 30 °C within specs)
Storage temperature	-20 °C to 60 °C
Operating humidity	8% to 80% (non-condensing)
Storage humidity	5% to 85% (non-condensing)
Operating pressure	70 kPa minimum
Storage pressure	50 to 106 kPa

MDNG-6221 (option NC EM)

Screen technology	LCD
Active screen size (diagonal)	541 mm (21.3")
Active screen size (H x V)	324 x 433 mm (12.77" x 17")
Aspect ratio (H:V)	3:4 for each display in portrait mode, 3:2 overall
Resolution	5.8 MP (2100 x 2800 pixels)
Pixel pitch	0.1545 mm
Gray imaging	Yes
Bit depth	10 bit
Viewing angle (H, V)	178°
Uniformity correction	ULT
SteadyGray	Yes
Ambient light presets	Yes, reading room selection
Front sensor	Yes
Maximum luminance	650 cd/m²
DICOM calibrated luminance	500 cd/m²
Contrast ratio (panel typical)	1400:1
Response time ((Tr + Tf)/2) (typical)	12.5 ms

Housing color	RAL 9003 / RAL 9004
Video input signals	DVI-D Dual Link (2x) DisplayPort (2x)
USB ports	1x USB 2.0 upstream (endpoint) 2x USB 2.0 downstream
Power rating	24 VDC, 5 A; 5 VDC, 0.1 A
Power requirements	This device shall only be powered by the following medical approved power supply: Adapter Technology, type CMD160-P240 Ratings marked on the medical power supply: <ul style="list-style-type: none"> • Input rating: 100–240 VAC, 1.9–0.8 A, 50/60 Hz • Output rating: 24 VDC, 6.3 A; 5 VDC, 0.5 A
Power consumption	60 W (nominal) < 0.5 W (standby)
Dimensions with stand (W x H x D)	Portrait: 378 x 528~628 x 235 mm Landscape: 491 x 472~572 x 235 mm
Dimensions w/o stand (W x H x D)	Portrait: 378 x 491 x 81 mm Landscape: 491 x 378 x 81 mm
Dimensions packaged (W x H x D)	500 x 280 x 670 mm
Net weight with stand	10.2 kg
Net weight w/o stand	5.2 kg
Net weight packaged	15.7 kg (without optional accessories)
Tilt	-10° to +30°
Swivel	-45° to +45°
Pivot	90°
Height adjustment range	100 mm
Mounting standard	VESA (100 mm)
Screen protection	N/A
Recommended modalities	All digital images, including digital mammography and breast tomosynthesis
Certifications	CE0123 (Medical Device) INMETRO (Brazil - Product numbers K9300371B), BIS (India) Safety specific: IEC 60950-1:2005 + A1:2009 EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013 IEC 62368-1:2018 EN IEC 62368-1:2020 IEC 60601-1:2005 + A1:2012 EN 60601-1:2006 + A1:2013 + A12:2014 ANSI/AAMI ES 60601-1:2005 + R1:2012 CAN/CSA C22.2 No. 60601-1:14 EMI specific:

	IEC 60601-1-2:2014 (ed4) EN 60601-1-2:2015 (ed4) Environmental: EU RoHS, REACH, WEEE, Packaging Directive
Supplied accessories	User guide Documentation disc System sheet Video cable (1 x DisplayPort) Mains cable(s) USB 2.0 cable External power supply
Optional accessories	Display controller
QA software	QAWeb
Warranty	3 years, including 20000 hrs backlight warranty
Operating temperature	0 °C to 40 °C (15 °C to 30 °C within specs)
Storage temperature	-20 °C to 60 °C
Operating humidity	8% to 80% (non-condensing)
Storage humidity	5% to 85% (non-condensing)
Operating pressure	70 kPa minimum
Storage pressure	50 to 106 kPa

CE
0123



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President Kennedypark 35
8500 Kortrijk
Belgium



K5902142 /09 | 2023-11-15

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