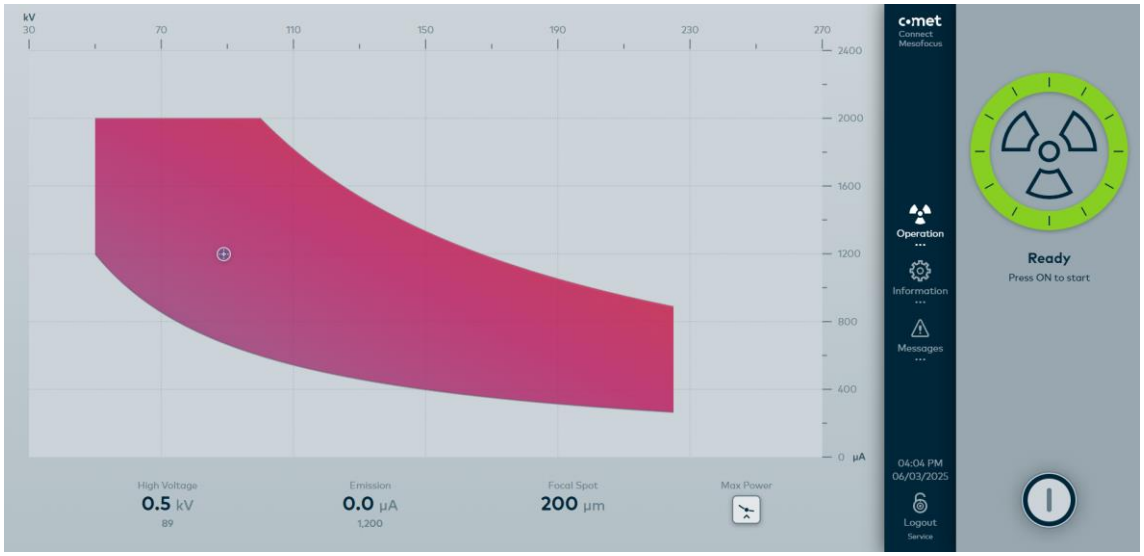
Operator manual

Comet Connect

Integrated user interface

Version 2.42



c•met
x-ray

Copyright

This is the original manual for Comet Connect user interface in English language.

Content

1 About this document

1.1 Contents in this document

This OEM manual is intended to enable integrators to integrate the X-ray module safely into his final product. It contains all the important instructions for safe operation of the module. The X-ray module must be operated in accordance with the statutory regulations for X-ray valid in the country of use and with the safety instructions in manual of the related product.

Notice

All instructions in this OEM manual must be strictly adhered to!

1.2 Style conventions and symbols

The symbols used in this OEM manual are intended to help installation technicians and integrators find information more quickly and more easily. These symbols are described below.

1.2.1 Markings in the text

- Bulleted lists are marked with a round dot.
- Text that is highlighted in this manner [> 8] identifies cross-references and hyperlinks that refer to linked topics, Internet addresses and additional information.
- Text printed in **bold** identifies highlights or sub-headings.
- *Italicized text* identifies names of menus on operating terminals or in the software.
- Numbering such as 1., 2., 3., etc., identifies action instruction steps (see below).

1.2.2 Action instructions

Action instructions have the following structure:

Heading of the action instruction

✓ Requirements that are necessary to implement the action can be optionally named here.

1. First operating step
2. Next operating step

   → Partial result after an operating step

3. Next operating step

→ Total result of an action instruction

1.2.3 Overview of safety instructions

Safety instructions are presented in this document using standardized representation and symbols. Three hazard classes are used corresponding to the probability of occurrence and severity of the consequences:

Danger

Serious risk!

This safety instruction warns of an **immediately** hazardous situation which can lead to serious or even fatal injury.

Warning

Medium-level risk!

This safety instruction warns of a **possibly** hazardous situation which can lead to serious or even fatal injury.

Caution

Minor risk!

This safety instruction warns of a **possibly** hazardous situation which can cause minor to serious injury.

Attention

Property damage

This safety instruction warns about potential damage to property.

In addition to the symbol and the signal word, a safety instruction consists of:

- Type and source of danger
- Consequences
- Avoidance (= measures to avoid the danger)

1.2.4 Instructions

Important or helpful instructions, information, and tips are structured as follows:

Notice

Application hints and important information is provided under this symbol. These will help you to make the best use of all the functions of your machine/module.

1.2.5 Symbols and definitions used

Warning symbols

A warning symbol is a triangle with a black border and yellow background displaying a symbol.

Symbol	Meaning
	General safety warning
	Risk of injury from X-ray radiation

Tab. 1: Warning symbols

Instruction symbols

A mandatory symbol is a blue circle displaying a white symbol.

Symbol	Meaning
	General information

Tab. 2: Instruction symbols

Other symbols used in this manual

Symbols are used in this manual to quickly and effectively provide the integrator with relevant information.

Symbol	Meaning
	This symbol indicates that the manual must be read.

Tab. 3: Additional symbols

1.2.6 Figures

The figures in this manual depict the machine/module in partially simplified or schematic representations.

1.3 Other applicable documents

Document	Document number
Xplorer 130 cube	50083558
ICON-Micro / Nano für OEM-Anwender	50092731

1.4 General business terms and conditions

The general business terms and conditions Comet AG apply as long as no conditions deviating from these have been mutually agreed in writing.

In general, all warranty claims become invalid in cases of unauthorized modifications or repairs, as well as in cases of inappropriate or inadequate maintenance.

Warranty claims are expressly precluded where the claims arise from any of the cases listed below (non-exhaustive list):

- Improper use of the product.
- Incorrect mounting, commissioning, operation, repair or maintenance of the product carried out by unauthorized and/or untrained personnel.
- Use of the product while any safety and protection devices are defective, incorrectly mounted or non-functional
- Failure to comply with the instructions in this manual regarding transport, storage, mounting, commissioning, operation, repair or maintenance of the product
- Unauthorized mechanical or electrical modifications to the product.
- Unauthorized modifications to the product (e.g. modifications to the tube housing, modifications to the cooling connections, modifications to the connecting cables).
- Unauthorized modifications to circuit boards (e.g. changing components).
- Inappropriate maintenance or failure to replace wear parts on schedule (e.g. cables, cooling agents or filter pads).
- Insufficient monitoring of wear parts.
- Any unauthorized repairs.
- Cases of force majeure.
- Comet accepts no responsibility for damage that occurs as a result of the use of this product or of the inability to use the product.

Notice

The operating instructions for the generators and X-ray tubes and their installation and safety instructions must be observed.

Notice

The **Comet Connect** software does not present a hazard. However, the software controls X-ray components whose operation can cause danger, e.g. high voltage and radiation.

1.5 Contact with Comet AG

If you have any questions about the module, please contact us at the following address or visit our website with the following details:

- Your name and address
- Name of a contact at your company
- Data on the nameplate: Module type, serial number and year of construction.

Main office contacts

Mailing address	Comet AG Industrial X-Ray Herrengasse 10 3175 Flamatt Switzerland
Internet	xray.comet.tech
E-mail	sales.xray.ch@comet.tech
Phone	+41 31 744 90 00

1.6 CE Declaration

Not applicable for any software product.

2 Information

2.1 Purpose

This manual describes how to operate and adjust the settings of an X-ray module with the **Comet Connect** user interface. All possible applications of the **Comet Connect** user interface are described, and corresponding functionalities are explained in detail. All default values are documented and allow configuring an X-ray set up with this user manual.

2.2 Scope

This document is intended for OEM users who configure or operate the X-ray module. This manual presumes basic knowledge about the configuration and an understanding of the X-ray modules. In principle, all Information from the manual of the related X-ray module must be observed.

3 Start conditions

To start **Comet Connect**, please proceed as follows:

- Connect all necessary signals to the X-ray module
- Connect a PC to the X-ray module with an Ethernet cable
- Start a browser on the PC
- Connect the auxiliary power supply to the X-ray module
- Switch on the auxiliary voltage
- Set the IP address 192.168.177.197 on the browser
- The connection is established
- The start screen appears

4 Description

4.1 Start screen

After the connection between the PC and the X-ray module has been established, the following start screen appears.

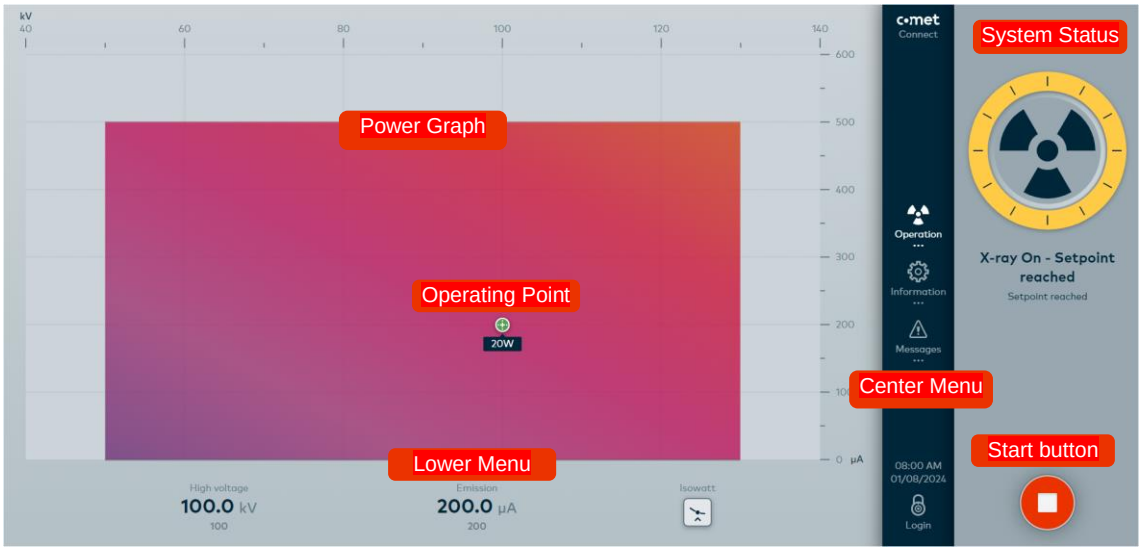


Fig. 1: Start screen

The screen is divided in three parts. The left side is an area that changes depending on the state and input. Normal operation with the dynamic values is shown there. The view is changed when a menu item is selected.
The middle and right area is fixed. In the middle area is the navigation menu. Different menus can be chosen.
The area on the right is used to display the status and to switch the radiation ON and OFF.

4.1.1 Power graph

The Power Graph shows the power range that can be adjusted. The x-axis represents the high voltage range and the y-axis the emission current range. The red area is the working range. The setpoint is displayed via a point in the power graph. After the radiation is switched on, this working point is set and displayed as a yellow dot.

4.1.2 Lower menu

In the lower menu the current values and the setpoints are displayed. The target values are displayed below the current value. In addition, the working mode can be selected.

4.1.3 System status

The system status is displayed via the central symbol. The individual symbols are explained in more detail in chapter 4.3.
Below the system status, the status is displayed in text form and any error messages are reported.

4.1.4 Start/Stop button

The high voltage can be switched on and off with the start button. Pending warnings and errors can be acknowledged by starting the high voltage

4.1.5 Center menu

The center menu is described in chapter 4.2.

4.1.6 Operating Point

The operating point is displayed in the power graph. In addition, the current power is calculated and displayed below the operating point.

4.2 Center menu

Symbol	Menu and Submenu	Comment
	**Module type**	The type of the module is displayed at the top of the center menu
	**Operation** • *Normal Operation* • *Warmup*	The normal operation mode can be selected. It can be switched between two sub-screens
	**Information** • *System State* • *Statistics* • *Cooler*	It can be switched between three sub-screens

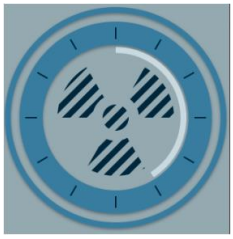
	**Messages** • *Active Messages* • *Logfiles*	It can be switched between two sub-screens

Tab. 4: Center menu

4.3 Status symbol

Various graphical status symbols are used to indicate the status of the system. The status symbols are described in more detail in the following table.

Symbol	Status line message	State, comment
	Warmup required	It is recommended to start a warmup procedure
	Not Connected	The client is not connected to the X-ray module
	Maintenance	The maintenance mode is active
	Main Safety	The interlock circuit is open and must be controlled
	Ready	The system can be switched on
	Warmup in progress	A warmup process is running

	Prewarning	A prewarning before the X-ray is switched is running
	X-ray ON	X-ray is switched ON
	Warning	The X-ray module is in a warning state. The failure messages must be checked
	Error	A failure occurred. The failure messages must be checked
	Not Ready	The module is in a not ready state.

Tab. 5: Status symbols

4.4 Language switching

The language can be switched through the browser settings. To do this, you must set the desired language in the browser settings. The **Comet Connect** user interface is then switched over automatically after a refresh.

English and German languages are currently supported. If an unknown language is selected in the browser settings, the default language is English.

5 Operation

5.1 Normal operation

To change the values for high voltage, emission current and focal spot please click on the lower display field. Also the Isowatt mode can be activated.

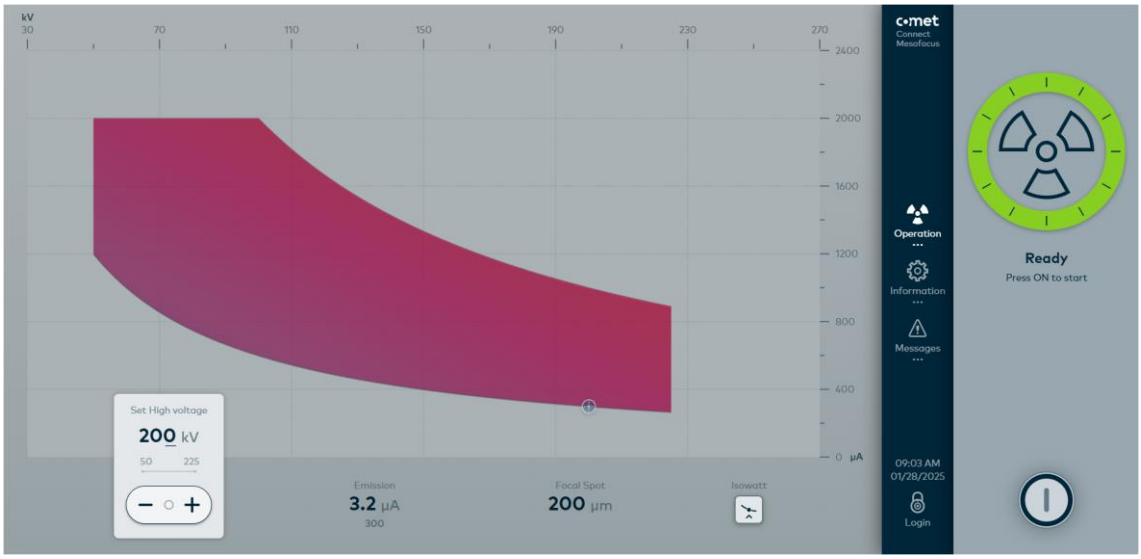


Fig. 2: High voltage setting

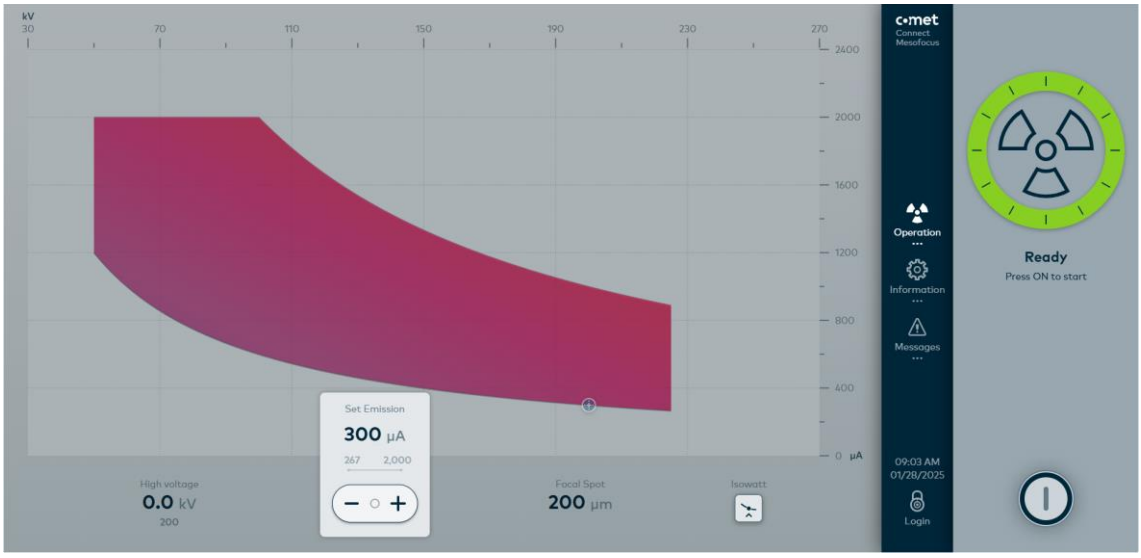


Fig. 3: Emission current setting

The focal spot selection is only active for modules that support tubes with multiple focal spots. These are in particular Mesofocus and Minifocus modules.

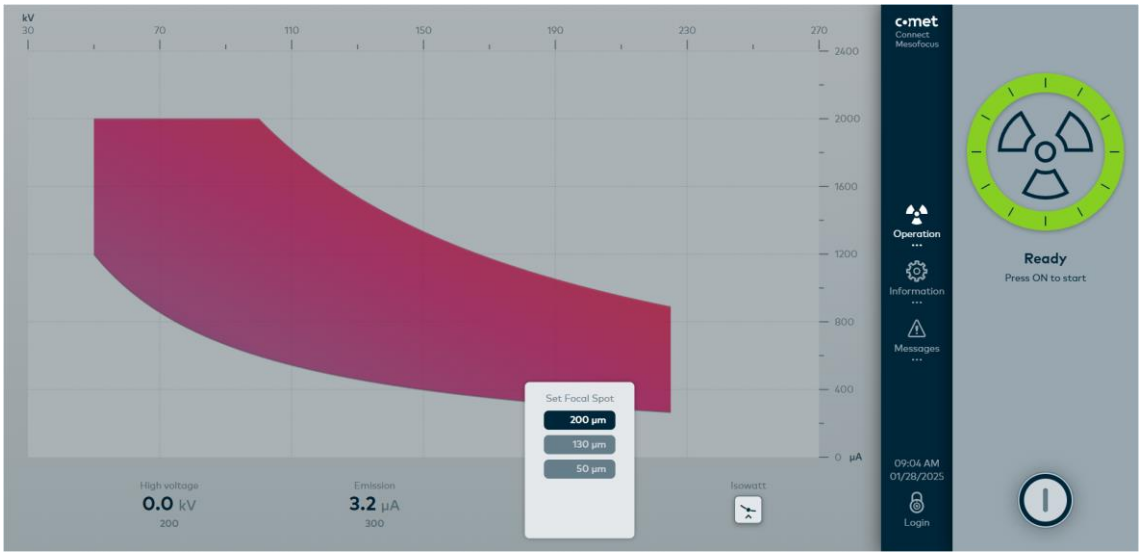


Fig. 4: Focal Spot selection

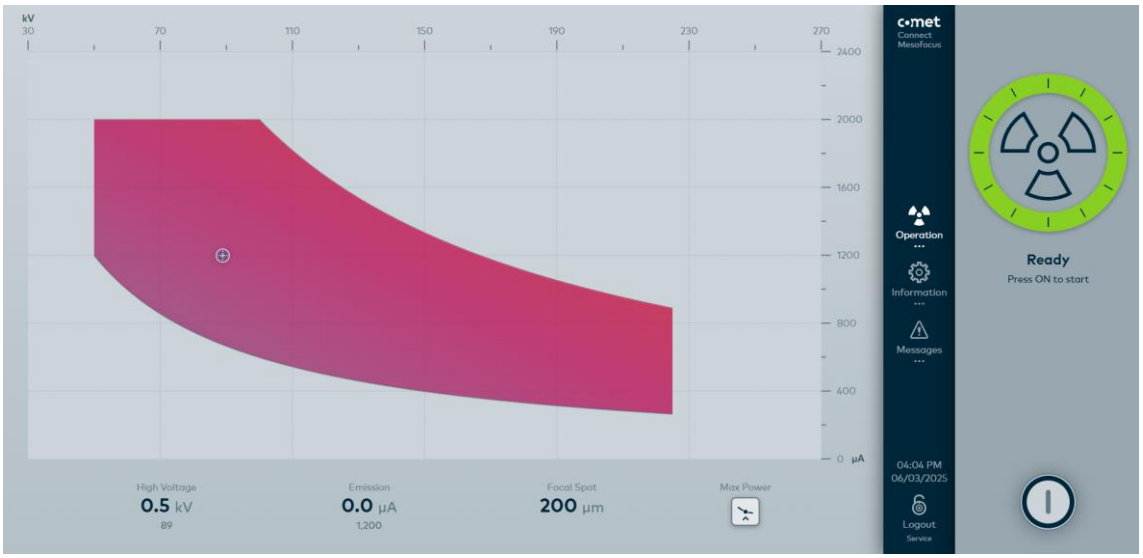


Fig. 5: Max Power

5.1.1 Plus and Minus buttons

The values can be changed by clicking on the plus or minus buttons.

5.1.2 Direct input

It is also possible to directly enter a number using a keyboard.

5.1.3 Mouse wheel

As soon as the input field for the high voltage or the emission current has been activated, it is possible to adjust the setpoints with the mouse wheel.

5.1.4 Pre-heating

For XPLORER modules a pre-heating procedure is automatically started after the auxiliary supply of the module is switched on. Warming up the heater can take 1 minute. The status will change to ready automatically after the procedure.

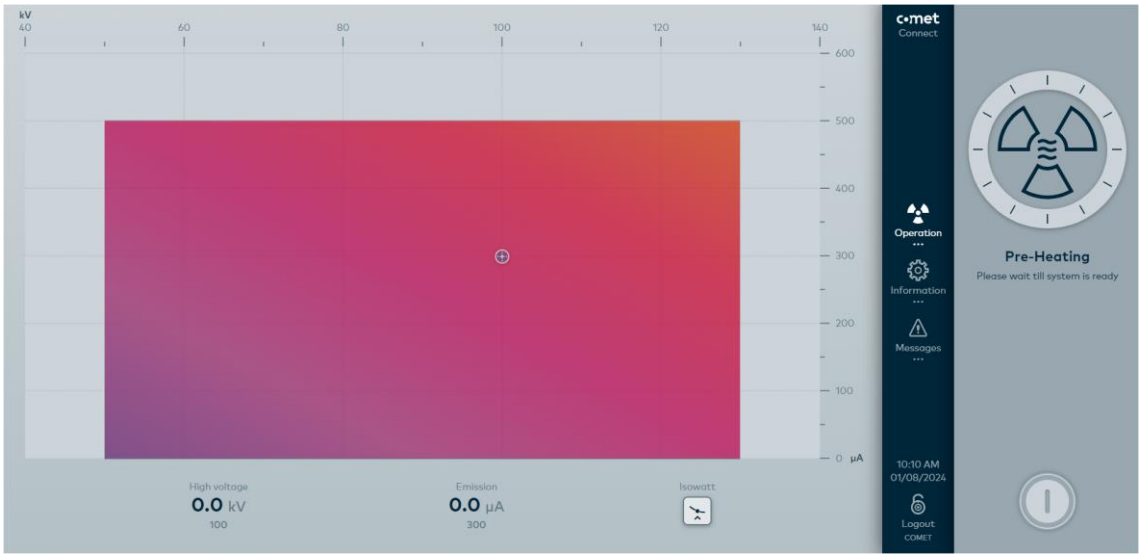


Fig. 6: Pre-heating

5.1.5 HV Operation

Danger

Danger of X-ray

Switching on the high voltage can lead to the generation of X-rays. Only trained personnel is allowed to switch on the X-rays.

Pressing the Start button the X-ray can be switched on. The module switched into a ramping mode until the setpoints are reached.

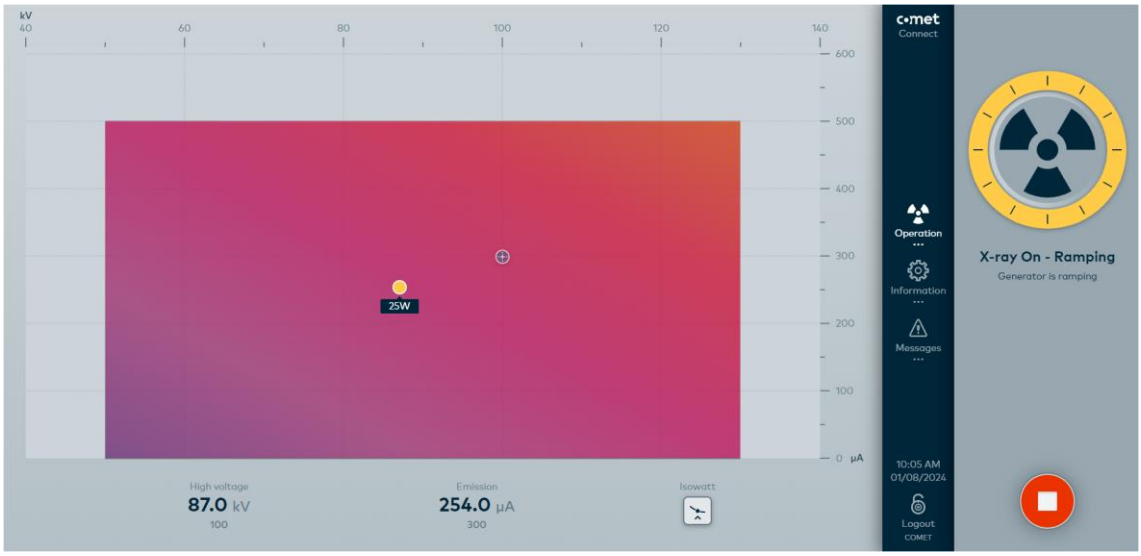


Fig. 7: X-ray ramping

A message “Setpoint reached” is displayed after the ramping.

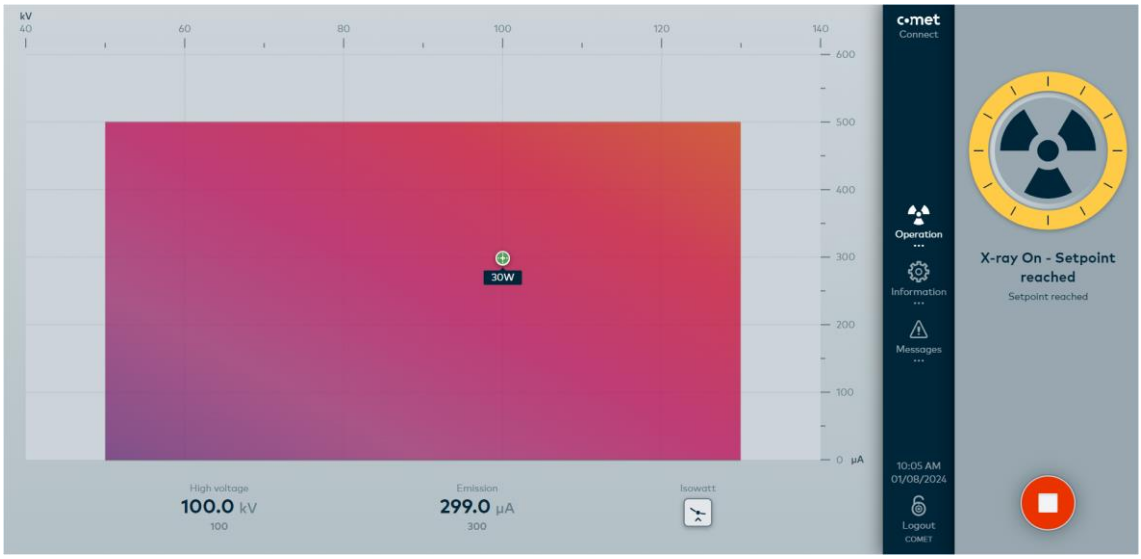


Fig. 8: X-ray operation

5.1.6 Max Power

With the Max Power function, it is always possible to operate the X-ray module at the maximum possible power limit for a given high voltage value. If a high voltage is selected, the highest possible value of the emission current is automatically selected.

The limits for high voltage, emission current and power can be specified on a system-specific basis. See chapter 9.3.4.

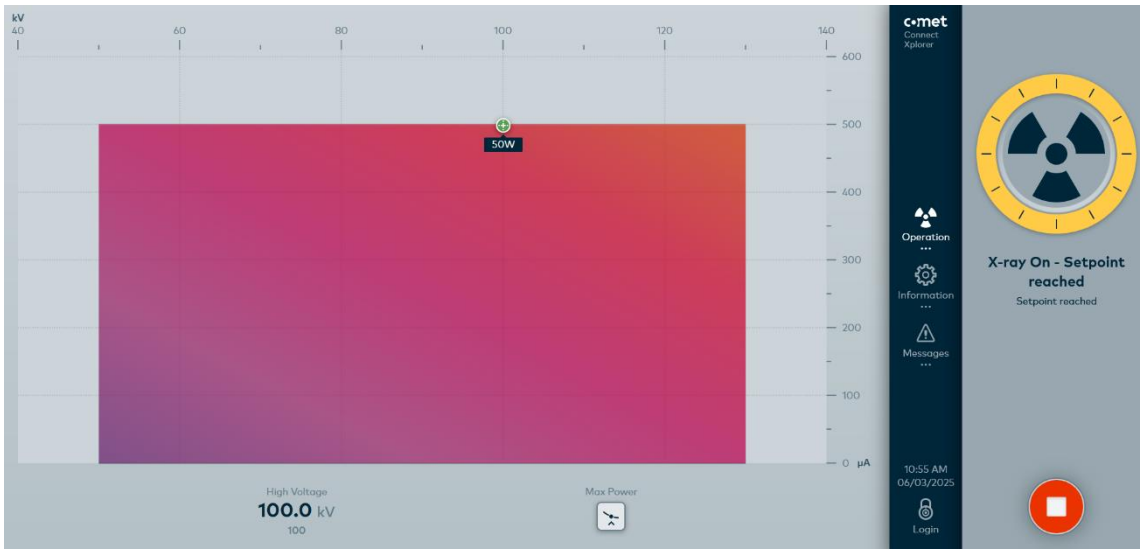


Fig. 9: Isowatt operation

5.2 Warmup

A warmup is used to prepare the module for the normal operating mode. Different manual warmups can be selected. The module will automatically recommend a warmup if necessary.

Please also refer to the manual of the X-ray module for further information about warmups.

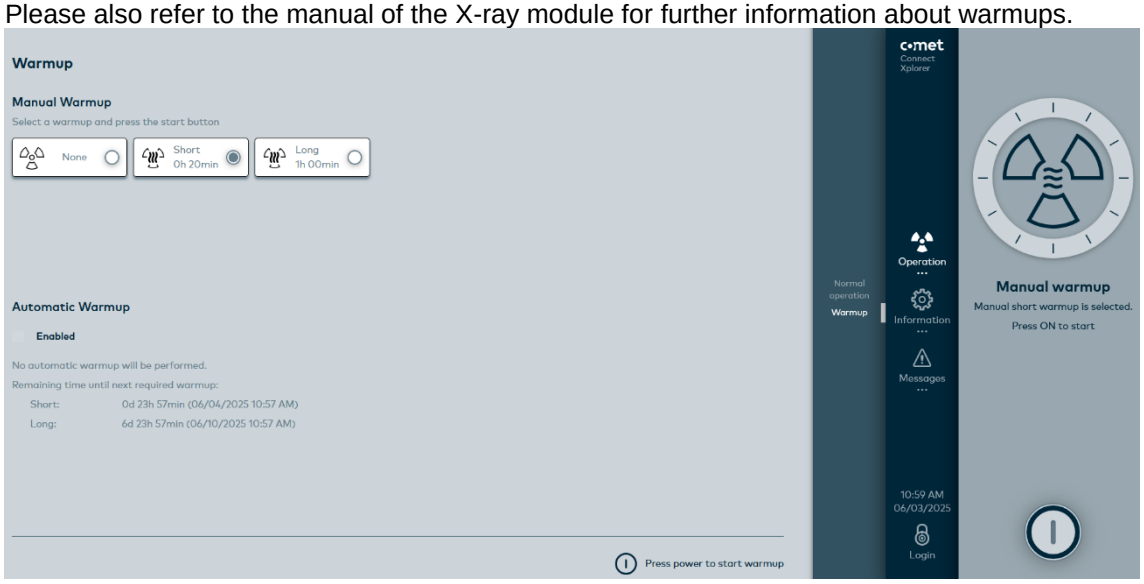


Fig. 10: Warmup selection

Starting manually a short and long warmup

Danger

Danger of X-ray

Starting the warmup can lead to the generation of X-rays. Only trained personnel is allowed to switch on the X-rays.

- Select the short or long warmup
- Start the warmup by pressing the Power button

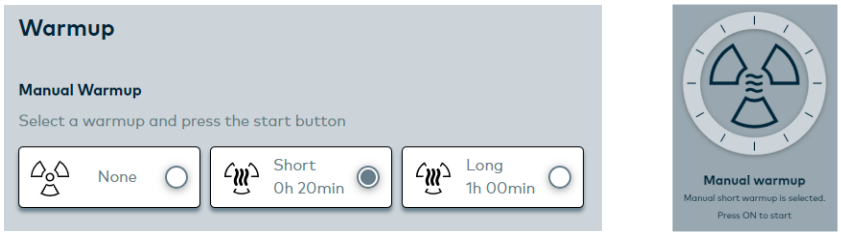


Fig. 11: Warmup selection and display

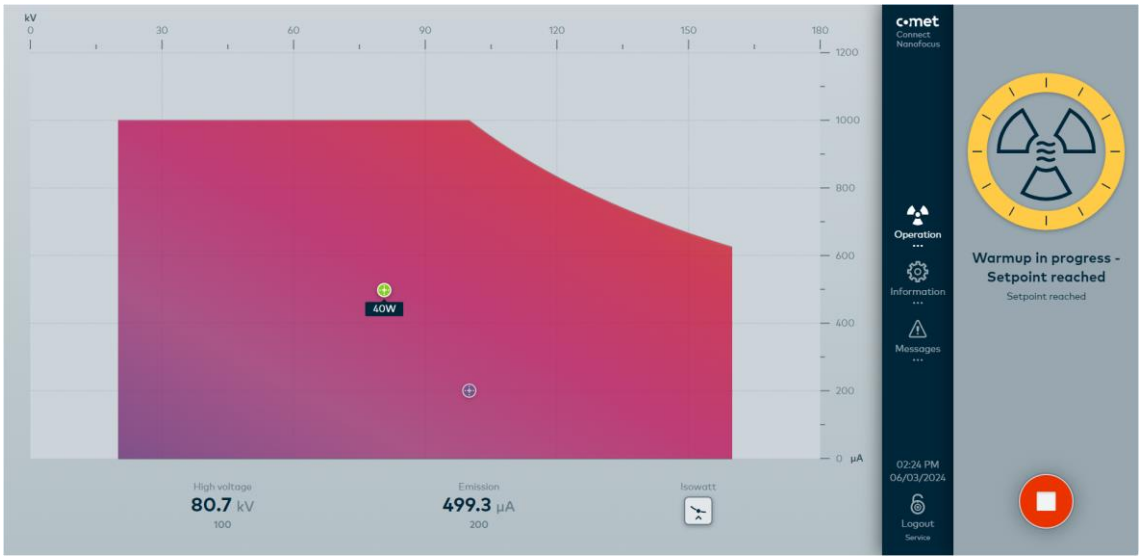


Fig. 12: Warmup in progress

6 Information

6.1 System state

The system status can be displayed graphically. This type of display simplifies the assignment of the most important measured values and error states. The image that corresponds to the connected product will be displayed automatically.

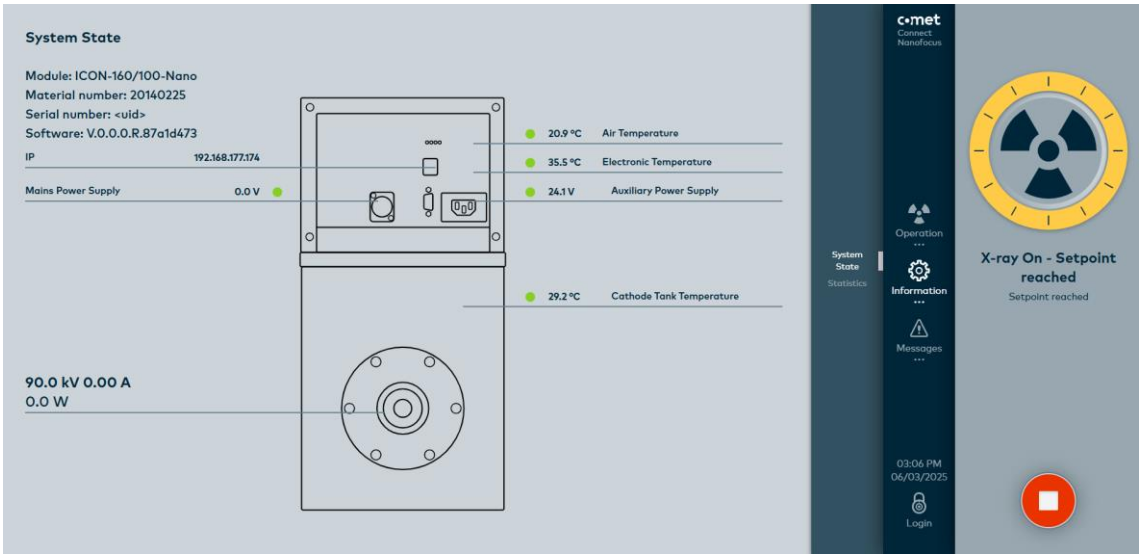


Fig. 13: System state example Nanofocus

6.2 Statistics

The generator permanently records events and saves them. This data can be loaded using the export function.

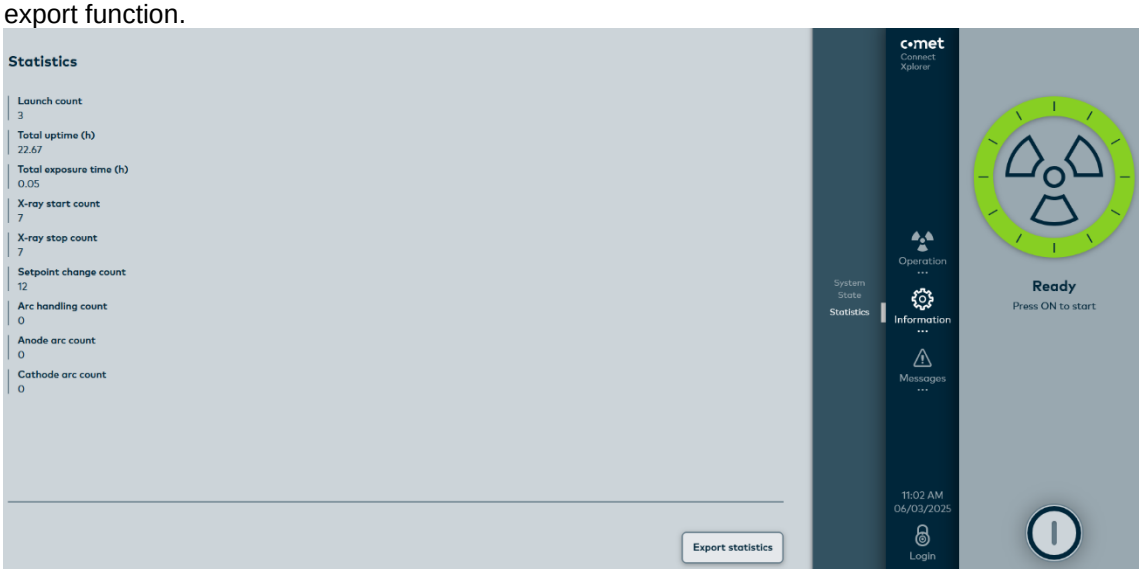


Fig. 14: Statistics

A ZIP file containing various text files is loaded. The ZIP file can be sent to Comet for further analysis.

6.3 Cooler

The status of the temperature and the cooling flow of the cooler is displayed

Please note that this sub-screen is only visible for Comet supported products

Fig. 15: Cooler screen

7 Messages

7.1 Active Messages

As soon as a warning or an error message occurs, this is indicated by a number in the central menu next to the message menu item.
The error is displayed in the message screen. Additional help texts can be displayed by clicking on the arrow in the message.

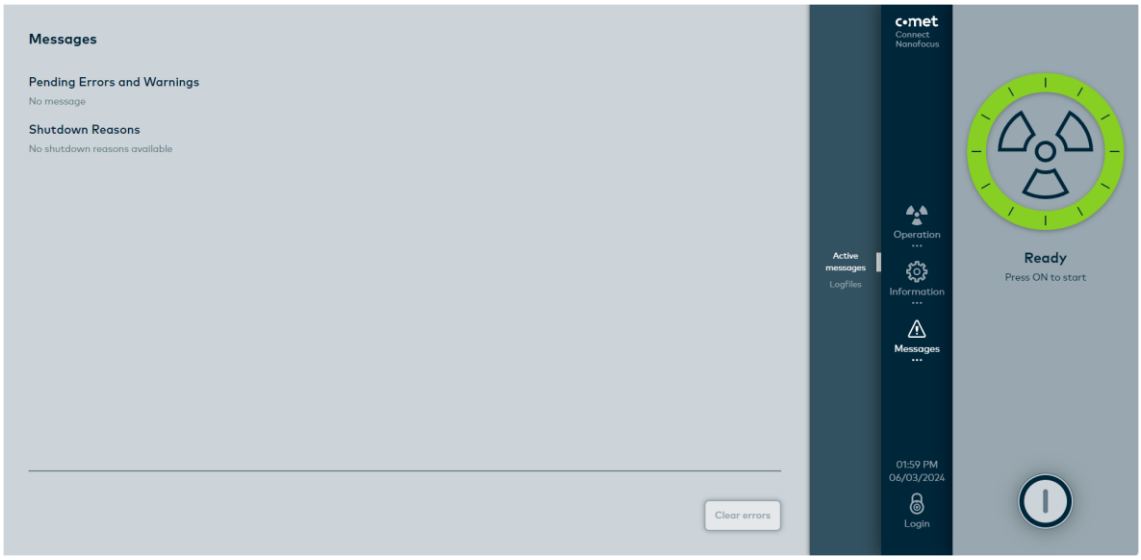


Fig. 16: Message screen

7.2 Warnings and Errors

If values are outside the specified range, they are shown in color in front of the displayed values. Warnings are highlighted in yellow and errors in red.

Warnings

Cathode Tank Temperature
24.7 °C
Anode Tank Temperature
74.2 °C

Errors

Cathode Tank Temperature
19.4 °C
Anode Tank Temperature
97.3 °C

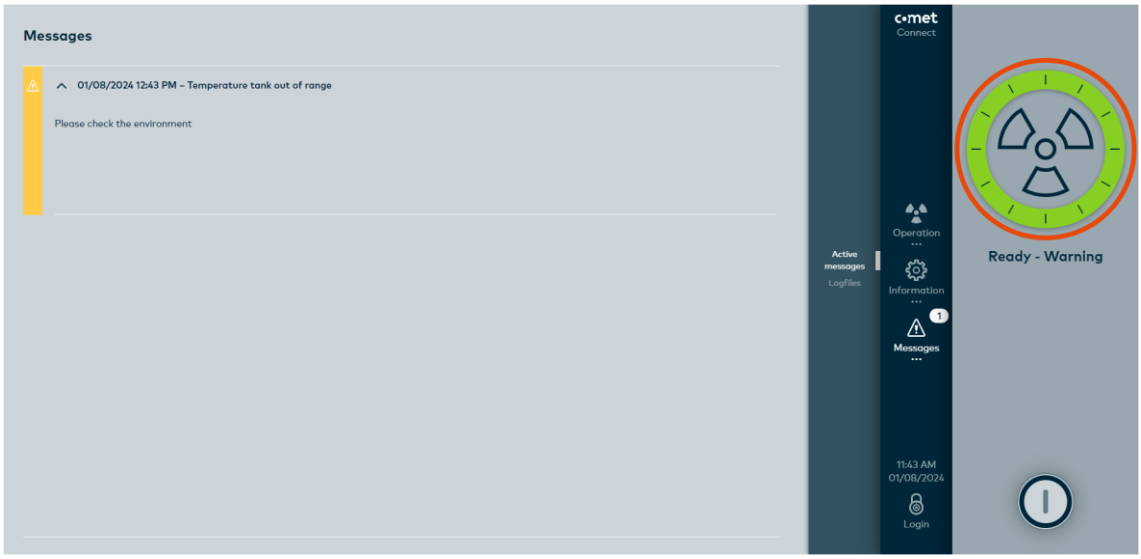


Fig. 17: Warning messages

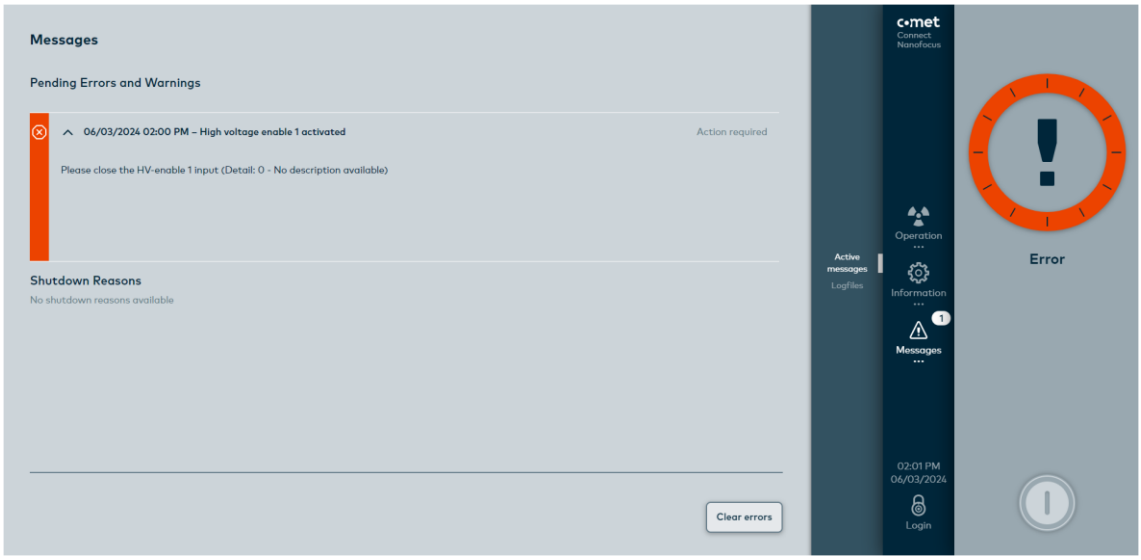


Fig. 18: Error messages

7.3 Clearing of warnings and errors

Warnings do not have to be acknowledged. As soon as the problem is no longer present, the warning message is cleared.

In the case of errors, there are errors that reset themselves and errors that must be cleared by the operator. A typical example of an error that is reset automatically is the monitoring of the power supply. If the power supply is outside the specified range, an error is triggered. As soon as the voltage is back within the range, the error is cleared.

An example of an error that must be cleared by the operator is a switch-off after too many high-voltage arcs. The fault can be cleared with the clear button.

7.4 Shutdown reasons

If an error has led to the high voltage being switched off, the error reason is displayed under Shutdown Reasons, even if the error has already been cleared or reset automatically. As soon as the high voltage is switched on, the Shutdown Reasons display is deleted.

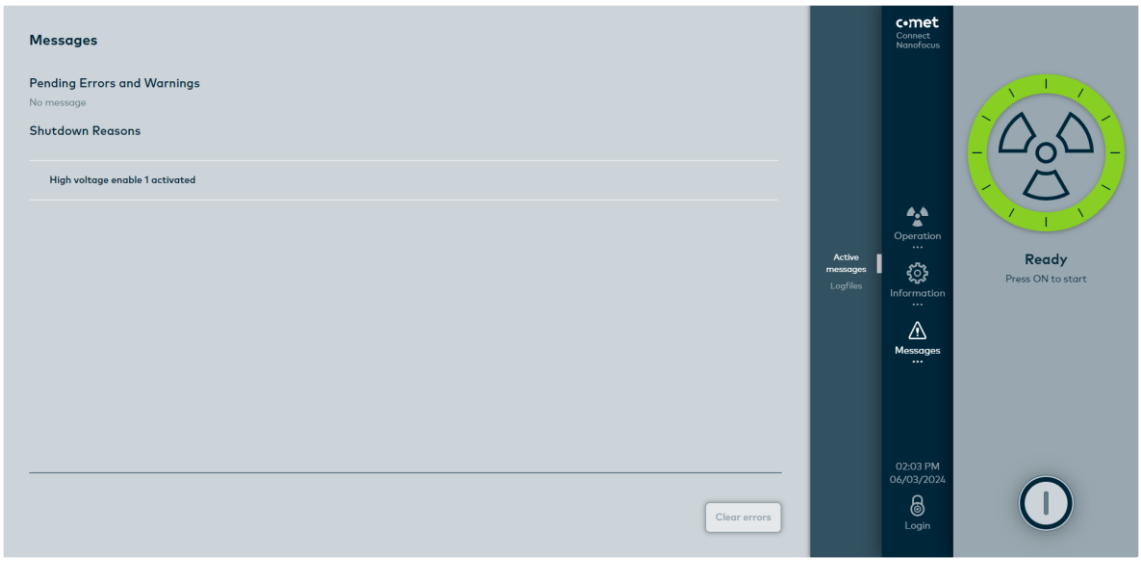


Fig. 19: Shutdown reasons example 1

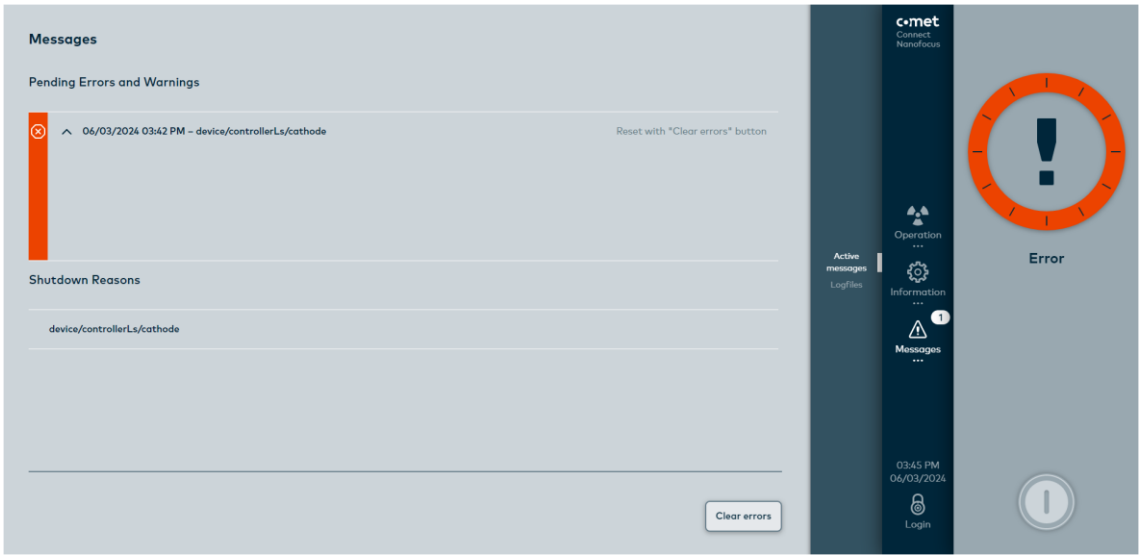


Fig. 20: Shutdown reasons example 2

7.5 Logfiles

A log file can be loaded to obtain detailed information about the history of the X-ray module. Information about the operating status and errors is permanently stored in the log file.

As soon as the export has been started, the process is shown in a display below the button. The logfile will be stored in the download folder of the host system.

The logfile can be sent to the Technical Customer Service for analyzing purposes.

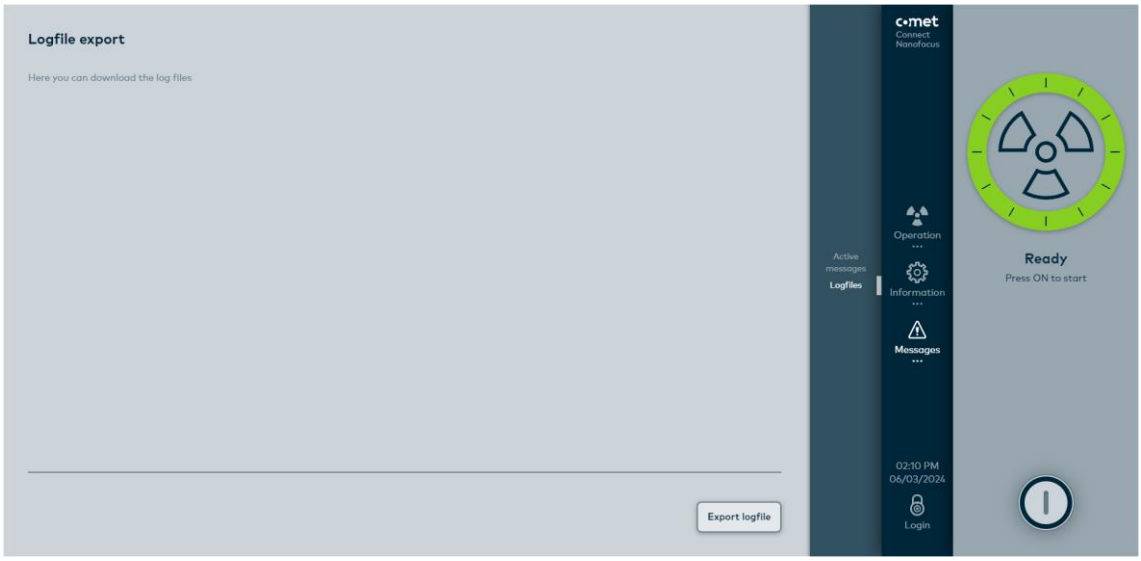


Fig. 21: Export Logfiles

After pressing the "Export Logfile" button, the download is started. A display appears below the button while the download is running.

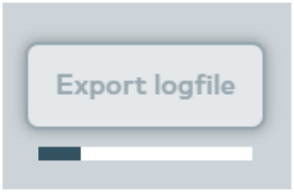


Fig. 22: Logfile download in progress

8 General information

8.1 Connection Error

If the connection to the module is interrupted the following status symbol is displayed.

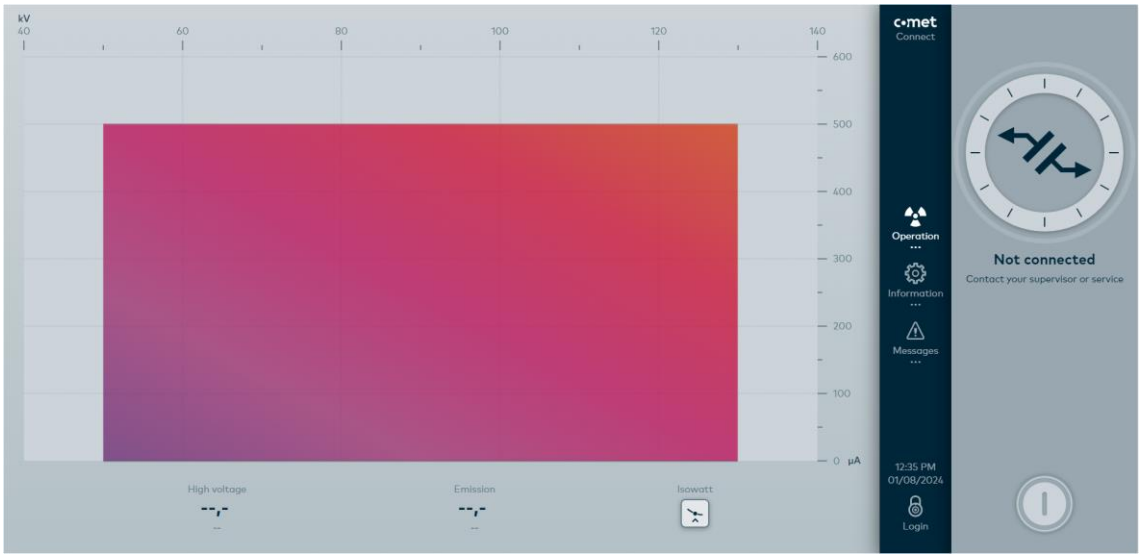
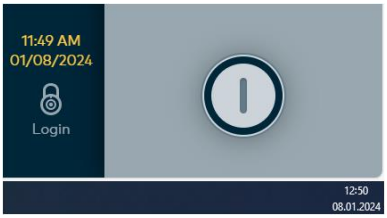


Fig. 23: Connection errors

Please check the connection to the module.

8.2 Time and date synchronization

The time and date can be adjusted to the control system. A discrepancy between the time setting of the X-ray module and the control system can be recognized by the yellow display in the central menu. By clicking on the yellow display of the time/date field, the time of the control system is read and set.

Different module and system time	Synchronized by clicking on the time/date values
	

9 Appendix User Level

Additional functions in the software are activated with different user levels.

9.1 Login

The system has three user levels:

- Operator
- Service
- Comet

After pressing the Login icon at the bottom of the center screen, the Login screen appears.

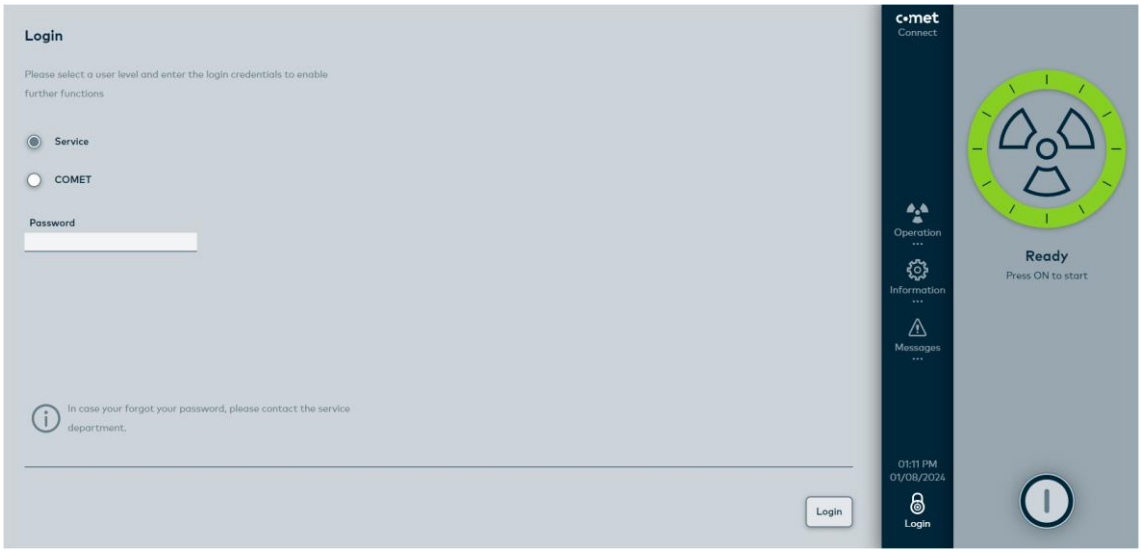


Fig. 24: Login screen

The user can be selected, and the password can be entered. After entering the correct password, the Login icon changes, and the user is displayed.

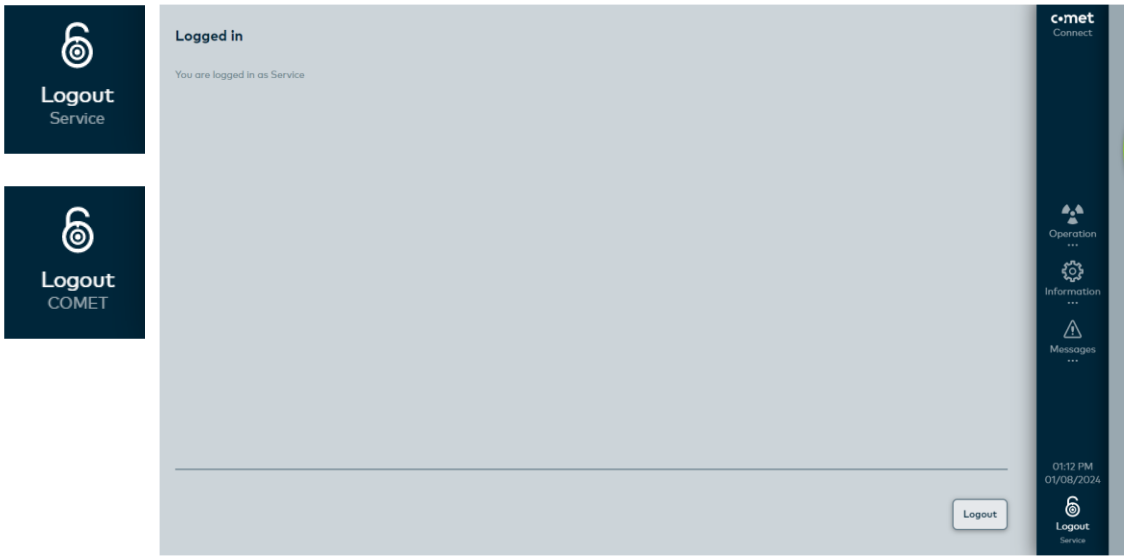


Fig. 25: Logged in

9.2 User Role *Service*

The following menu items and functions are activated with the User Service.

Symbol	Menu and Submenu	Comment
	**Operation** • *Normal operation* • *Warmup*	The normal operation mode can be selected. It can be switched back to the power graph The Warmup procedure screen can be activated
	**Information** • *System state* • *Device* • *Software* • *Tube* • *Connection* • *Limits* • *Values* • *Statistics* • *Pre-warning* • *Cooler*	It can be switched between ten sub-screens
	**Messages** • *Active messages* • *Logfiles*	No differences to the other roles *Operator* or *Service*

Tab. 6: Functions User Service

Notice

Only the additional menus are explained on the following pages. Descriptions of menu items from the operator role are not repeated.

9.2.1 Warmup

A warmup is used to prepare the module for the normal operating mode. Different manual warmups can be selected. The module will automatically recommend a warmup if necessary. This automatic warmup can be skipped by activating the “Enable” check box.
Please also refer to the manual of the X-ray module for further information about warmups.

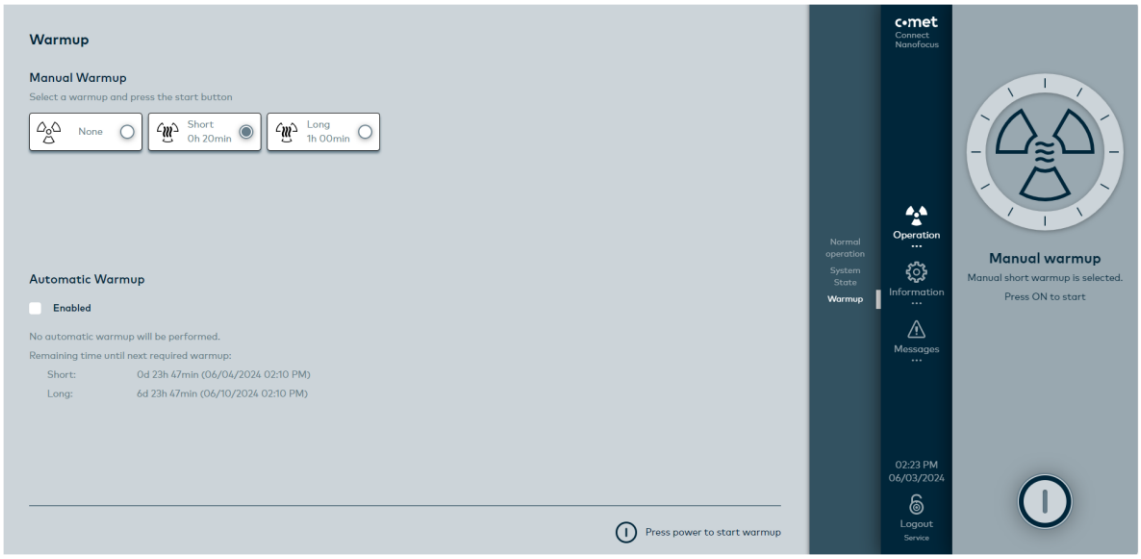


Fig. 26: Warmup selection

Starting manually a short and long warmup

Danger

Danger of X-ray

Starting the warmup can lead to the generation of X-rays. Only trained personnel is allowed to switch on the X-rays.

Enabling an automatic warmup

- Select the “Enable” check box
- Warmups will be automatically performed
- The remaining time until the next warmup is displayed

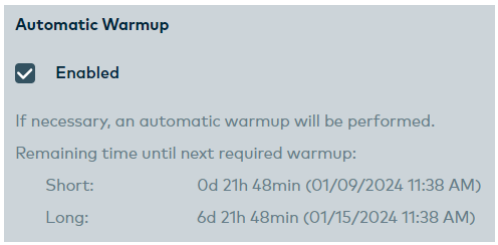


Fig. 27: Automatic warmup

9.2.2 Device

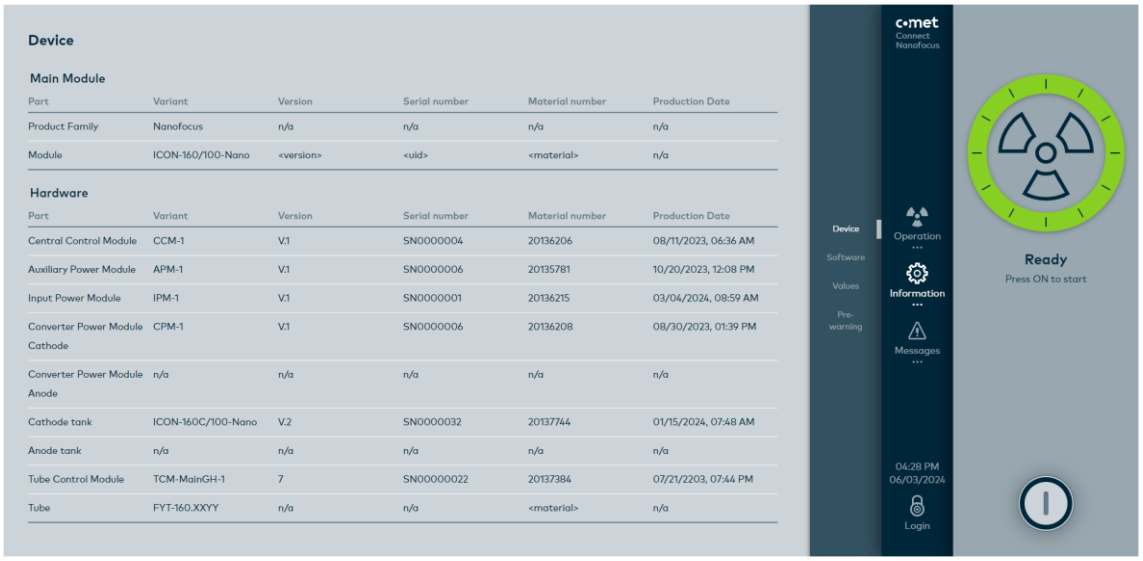


Fig. 28: Device

Hardware version overview

9.2.3 Values

This screen displays the most important actual system values.

Fig. 29: Values

9.3 Pre-warning

Pre-warning is available for Mesofocus and Minifocus modules. This function can be used to set an output that can trigger an external warning function for an adjustable time before the high voltage starts. This makes it possible to warn people before the high voltage is switched on.

Please note that this sub-screen is only visible for Comet supported products

Fig. 30: Pre-warning

9.3.1 Software

To start a software update, press the “Start Software Update” button and select a file. Confirm the selection and follow the instructions.

Fig. 31: Software update

A progress bar will be displayed during the update process.

Apply user config to module

A new configuration file can be loaded onto the module.

Save user config to module

The current configuration file can be loaded from the module and saved on the control PC.

9.3.2 Tube

It is possible to change the tube type for various products. A different tube is selected via the menu. The selection must then be confirmed and the module is restarted.

Please note that this sub-screen is only visible for Comet supported products

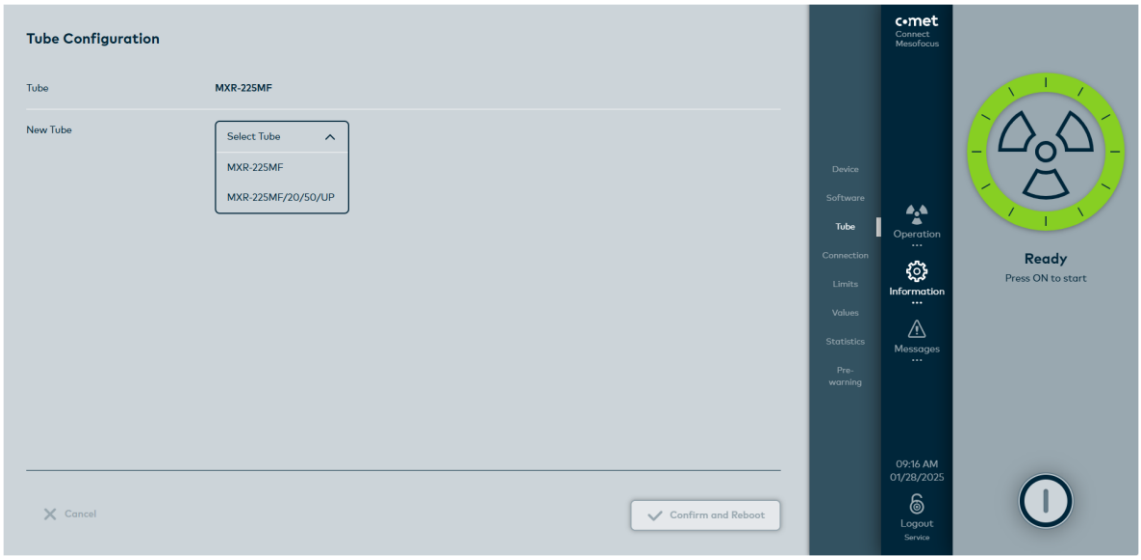


Fig. 32: Tube selection

9.3.3 Connection

To set up a communication through ethernet it is required to set the network parameters according to the values from the network to which the module is connected.

Default settings

DHCP enable	inactive
IP	192.168.177.197
Subnet Mask	255.255.255.0
Gateway	192.168.177.1
DNS server	192.168.177.1

Tab. 7: Network settings

IP Setting and guarding

The IP address of the module can be changed by the Service user role. Just type in a new IP address and press the “Update IP” button. The module can be reached with the new IP address. To change the network address, the high voltage must be off.

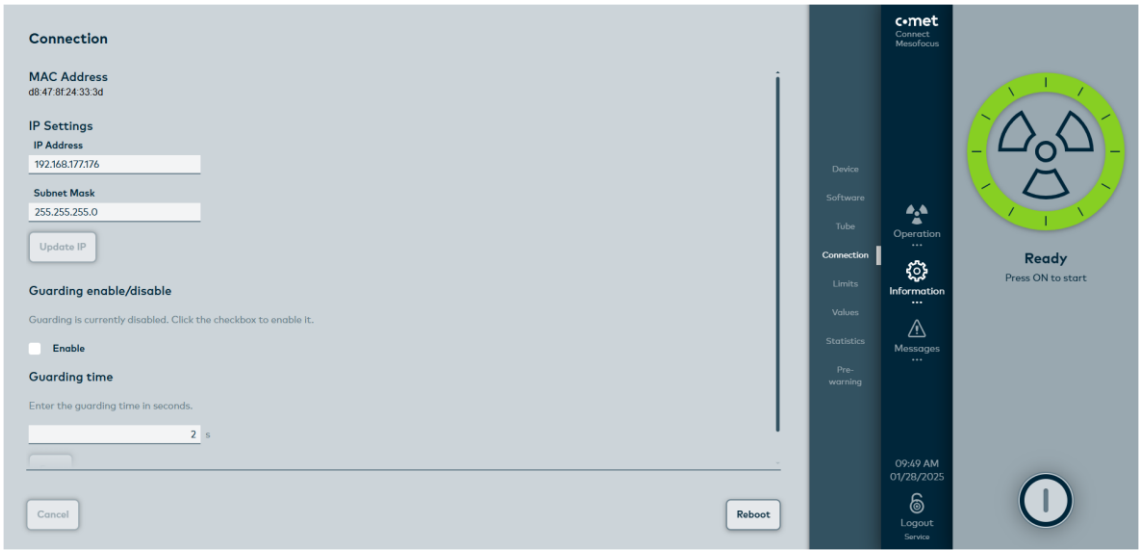
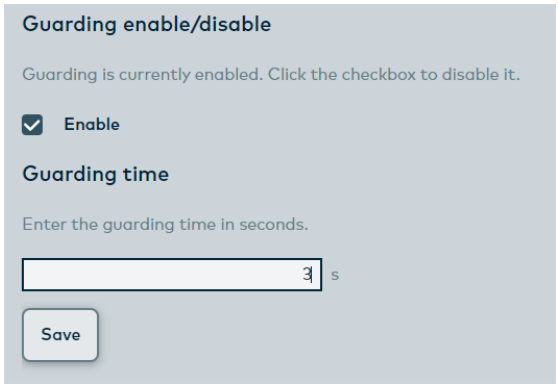


Fig. 33: Network configuration

Guarding

The Ethernet connection between the generator and the control system can be monitored. As soon as the connection is interrupted, the generator is automatically switched off if guarding is activated. This functionality serves to increase safety, as the status of the generator is no longer visible if the connection is interrupted. It therefore makes sense to switch off the generator in some applications.

The guarding time can be set. The numerical value must be changed and saved.



9.3.4 Limits

The limits of a module can be set specifically for the system. To do this, enter the desired values in the fields for high voltage, emission current and power and confirm them. The module is rebooted after confirmation.

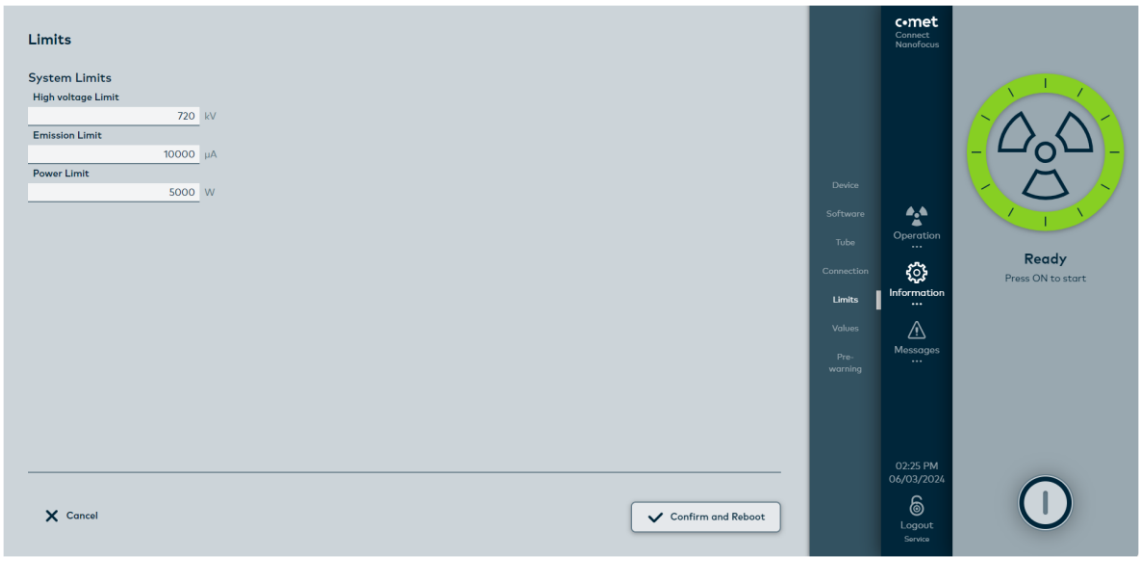


Fig. 34: Limit configuration

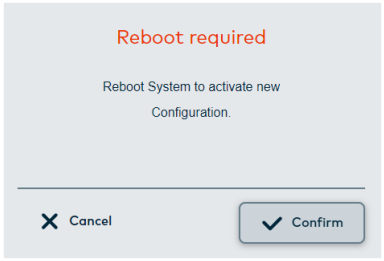


Fig. 35: Reboot confirmation

The limitations are shown in the power graph. The maximum values are adjusted, and the power is limited.

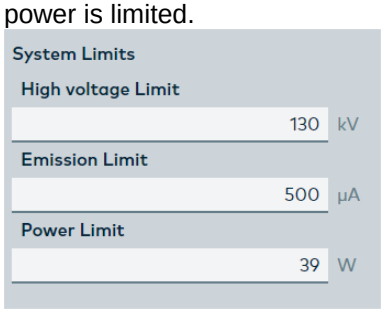


Fig. 36: Example for a limitation

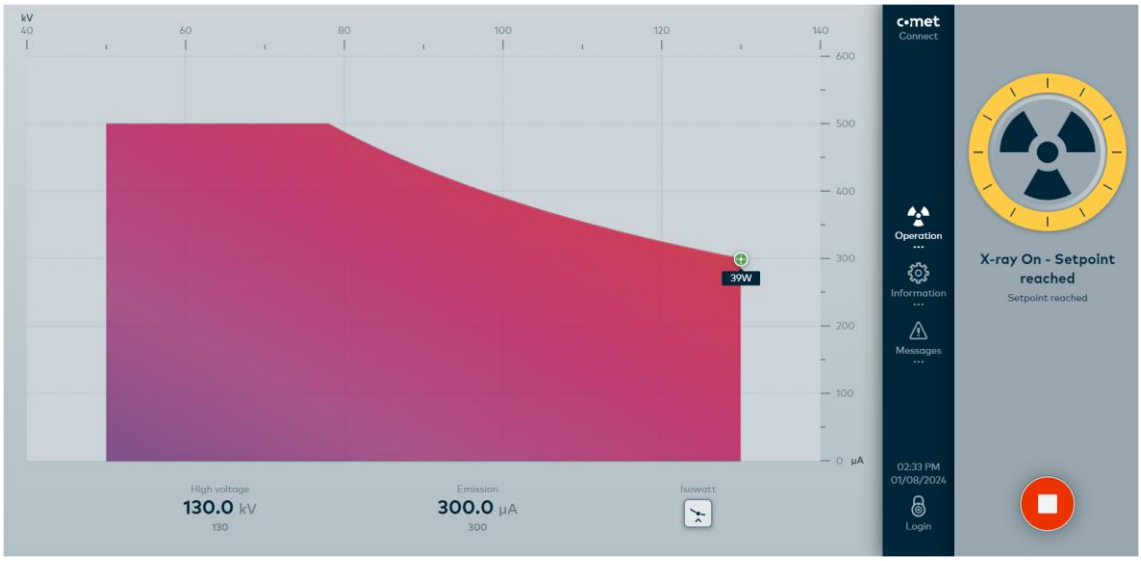


Fig. 37: Limited power graph

9.3.1 Limits

It can be set whether the cooler should be controlled and monitored by the generator. The generator then switches the cooling on and off and monitors the cooling.
If controlled by the generator, a post-cooling time can also be set. This is the time after which the cooler is switched off by the generator once the high voltage has been switched off.

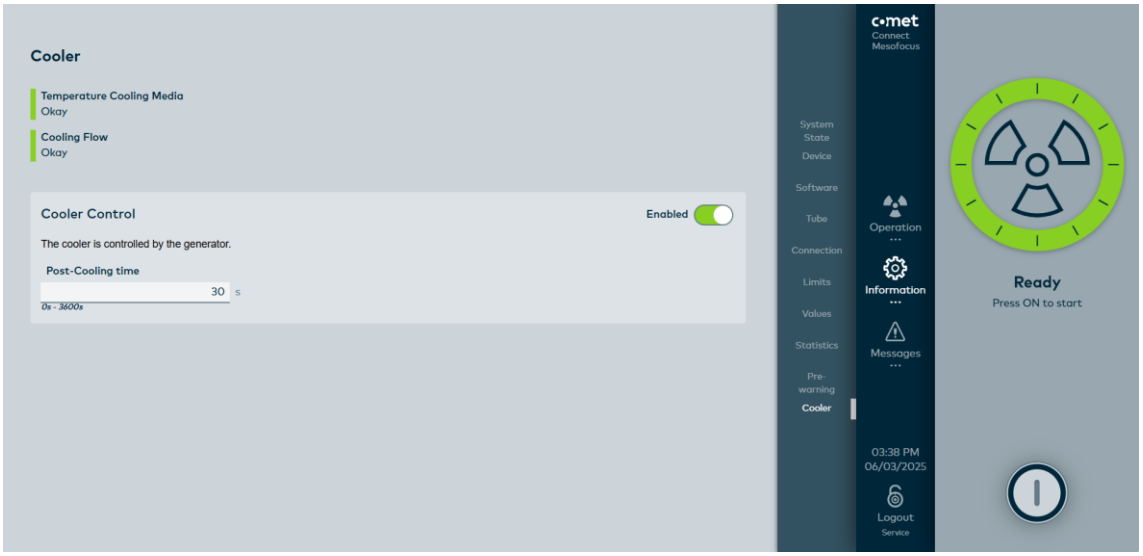


Fig. 38: Cooler controlled by generator

If the function is deactivated, there must be an external cooling system that cannot be controlled by the generator. Monitoring is then carried out externally or the monitoring inputs of the generator can be used

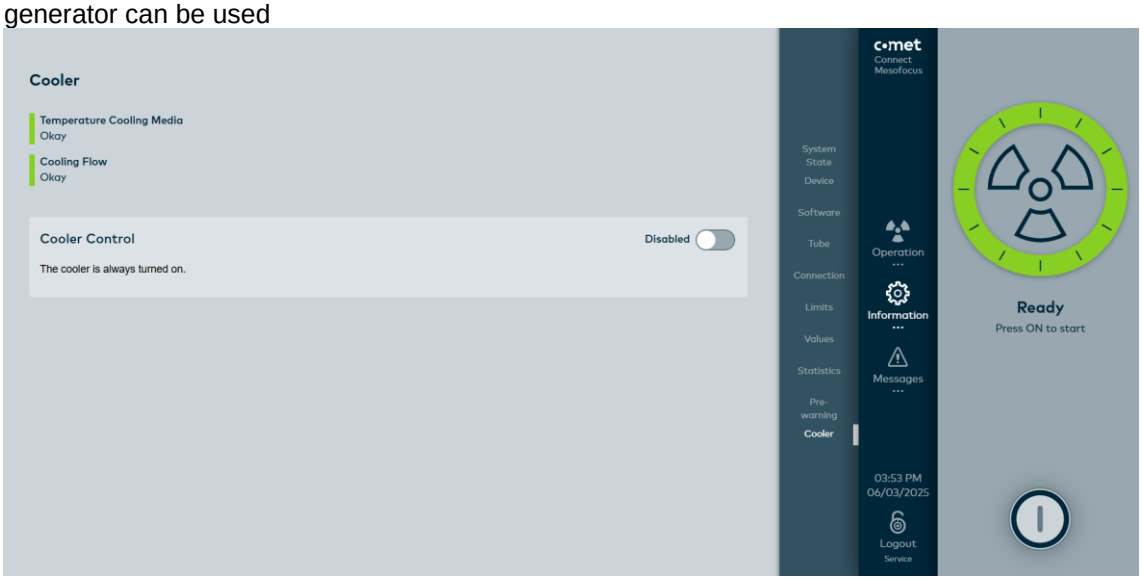


Fig. 39: Cooler externally controlled

9.4 User Role *Comet*

The User Comet is for internal use only.

List of Figures

List of tables

Europe & RoW

Comet AG
Herrengasse 10
CH-3175 Flamatt
Switzerland

T +41 31 744 90 00
F +41 31 744 90 90
info@comet-xray.com
xray.comet.tech

USA

Comet Technologies USA, Inc.
100 Trap Falls Road Extension
Shelton, CT 06484
USA

T +1 203 447 31 65
F +1 203 925 03 64
xray.us@comet.tech
xray.comet.tech

Asia

Comet China
1201 Gui Qiao Road
Building 10, 1st floor
Pudong, Shanghai 201206
P.R.China

T +86 21 6879 9000
F +86 21 6879 9009
xray.cn@comet.tech
xray.comet.tech