

Gas-Insulated Switchgear

GHA

Gas-Insulated Switchgear

Camera system for isolating and earthing switch
(Single Busbar Panels)

(Supplement to the operating manual)



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As our products are subject to continuous development, we reserve the right to make changes regarding the standards, illustrations and technical data described in this Technical Manual.

Purpose and target group

This technical manual is a supplement to the operating manual GHA. This Documentation describes a Camera system for the three positions switch in a busbar compartment. The three positions switch comprise the function:

- Isolating switch
- Earthing switch

The work described in this manual may only be performed by specialist electricians with proven experience regarding

- the GHA series (training certificate)
- all relevant safety provisions.

These instructions are an integral part of the product and must be stored so that they are readily accessible and can be used by persons who are working on the switchgear. If the switchgear is relocated, it must be accompanied by this documentation.

This technical manual cannot describe all imaginable cases or every customized version of the product. For information which is not included in this manual, please contact the manufacturer.

Reference documents

This technical manual is complementary to the following:

- Purchase contract with the agreements on the configuration of the switchgear and with legal details
- Operating Manual GHA
- the switchgear circuit diagrams / documentation

Terms and symbols used

This manual uses certain terms and symbols. They warn about dangers or provide important information in order to avoid danger to personnel and damage the equipment:



"Danger!"

This danger symbol warns about dangerous electrical voltage. Contact may result in fatal injury!



"Warning!"

This danger symbol warns about the risk of injury. Follow instructions to avoid death or serious injury.



"Important:"

This instruction symbol is used for information which is important to avoid material damage.

Disclaimer of liability

The manufacturer shall not be held responsible for damage which occurs if:

- instructions in this technical instruction are not followed,
- the switchgear is assembled, connected or operated incorrectly,
- accessories or spare parts that are used have not been approved by the manufacturer,
- the switchgear is modified without the manufacturer's approval, or if unapproved parts are attached.

No liability is accepted for parts provided by customers.

Any questions or suggestions?

Do you have any questions or suggestions regarding this manual, or do you require further information?

We always strive to provide you with the best information for optimum safe use of our products. Thus, do not hesitate to contact us if you have any recommendations, amendments or proposals for improvement.

Applicable standards and regulations:

The work described in this manual may only be performed by specialist electricians who have proved their experience with the GHA series (training certificate) and the applicable safety provisions.

Read the whole manual carefully before working on the switchgear.

- Metal-enclosed AC switchgear for rated voltages > 1kV up to including 52 kV: IEC 62271-200
- The locally applicable accident prevention, operating and work instructions must be followed.
- Assembly and maintenance: IEC 61936-1 / EN 50522¹
- Operation of electrical equipment: EN 50110-1¹

¹ The national standards applicable in the country where the equipment is to be installed must be followed.

Before performing work on the camera system, it is essential that you follow these instructions:



Danger!

Before performing work in the drive area of the switchgear panels, switch off and padlock the power supply.



Warning!

Risk of injury due to mobile parts in mechanical drives. For maintenance work

- isolate from auxiliary circuit
- release the circuit breaker's energy storing device by doing an OPEN-CLOSED-OPEN switching sequence



Warning!

After removing the covers, operator safety in accordance with IEC 62271-200 may be restricted if the appropriate part of the switchgear unit has not been isolated from the power supply.

Behaviour in case of incidents or accidents

In case of fire or of internal faults, toxic and caustic decomposition products may be produced. Follow the locally applicable accident and safety provisions.

In case of personal injury, take first aid measures.

2 Specifications for the camera system

2.1 Technical data of the camera system

- CMOS-sensor, 1/3", monochrome
- Resolution 752x480 (WVGA)
- Refresh rate: 18 fps
- USB 2.0/3.0
- Operating temperature: -25°C up to +75°C
- Sensivity < 0,1 lux
- Power supply: 5 V DC, 300mA via USB (incl. LED's)

2.2 User guidelines for operating the camera system

The explanations in this manual are based on Windows 7. If you are using another version of this operating system, the actual screen contents and procedures may vary slightly from those shown.

Precautions for connecting the camera to the computer



Warning!

Risk of camera damage and software malfunction.

Do not supply the computer with an AC power supply unit while connecting the computer to the camera via the USB port, due to EMC safety regulations. Only battery operation is admissible.

In this case only operate the computer with the integrated battery. Before connecting the camera system check that the integrated computer battery is fully charged.

- The connection may not operate correctly if you attach the camera to the computer with an interface cable via a USB hub.
- The connection may not operate correctly if you are using other USB devices, excluding USB mice or keyboards, at the same time as the camera. If this occurs, disconnect the other devices from the computer and try reconnecting the camera.
- Do not connect two or more cameras at the same time to the same computer. The connections may not operate correctly.
- Never allow the computer to go into standby (sleep) mode while a camera is connected via the USB interface cable. If it does happen, never disconnect the interface cable. Try to wake the computer with the camera in the connected state. Some computers will not wake up properly if you disconnect the camera while they are in standby (sleep) mode. Please refer to your computer manual for instructions regarding the standby (sleep) mode.

2 Specifications for the camera system

2.3 SCHNEIDER ELECTRIC SOFTWARE LICENSE TERMS

These license terms are an agreement between Schneider Electric and you. Please read them. They apply to the Schneider Electric software.

BY USING THE SOFTWARE, YOU ACCEPT THESE TERMS. IF YOU DO NOT ACCEPT THEM, DO NOT USE THE SOFTWARE.

IF YOU COMPLY WITH THESE LICENSE TERMS, YOU HAVE THE RIGHTS BELOW FOR EACH LICENSE YOU ACQUIRE.

1. OVERVIEW

License Model. The software is licensed on a per user basis.

2. INSTALLATION AND USE RIGHTS

- a. General. One user may install and use copies of the software.
- b. Included Schneider Electric Programs. These license terms apply to all Schneider Electric programs included with the software.
- c. Third Party Programs. The software contains third party programs. The license terms with those programs apply to your use of them.

3. MICROSOFT WINDOWS SOFTWARE

The software contains the Microsoft .NET Framework 2.0. This software is part of Windows. The license terms for Windows apply to your use of the .NET Framework 2.0.

4. SCOPE OF LICENSE

The software is licensed, not sold. This agreement only gives you some rights to use the software. Schneider Electric reserves all other rights. You may use the software only as expressly permitted in this agreement.

You may not reverse engineer, decompile or disassemble the software.

5. BACKUP COPY

You may make one backup copy of the software. You may use it only to reinstall the software.

6. NOT FOR RESALE SOFTWARE

You may not sell software marked as "NFR" or "Not for Resale."

7. UPGRADE

If this software is marked as an upgrade version, you may use it only if you have a license to use the software eligible for upgrade.

8. LIMITATION ON AND EXCLUSION OF DAMAGES. YOU CAN RECOVER FROM SCHNEIDER ELECTRIC AND ITS SUPPLIERS ONLY DIRECT DAMAGES UP TO THE AMOUNT YOU PAID FOR THE SOFTWARE. YOU CANNOT RECOVER ANY OTHER DAMAGES, INCLUDING CONSEQUENTIAL, LOST PROFITS, SPECIAL, INDIRECT OR INCIDENTAL DAMAGES.

2.4 Trademark Acknowledgments

- Microsoft, Windows 7 and Windows 8 and the Windows logos are trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.
- Acrobat Reader is either registered trademark or trademark of Adobe Corporation in the United States and/or other countries.

3 Installing the User-Software and the USB driver

3.1 Package content

- 1 m USB cable with two type A plugs
- CD “Schneider Electric ViewPort Camera” with user software, USB drivers and user manual (pdf)
- manual



3.2 Computer system requirements

The computer system is not in the scope of delivery.

Hardware

- 2 GHz Processor
- 1 GB RAM
- 10 MB free disk space
- 256 MB graphics memory
- Display 1,024 x 768 pixels
- USB 2.0/3.0 Port

Software

- Microsoft® Windows 7, Windows 8
- Adobe® Reader version 5 or higher

Please note, that we can not guarantee that the View Port Camera Software works correctly with each PC. We recommend to use a brand PC.

3.3 Installing the User Software

Install the software once at the beginning. Confirm that the camera is not connected to the computer. If it is, disconnect the cable. The software cannot be properly installed if the camera is connected to the computer at the start.

Close any programs that are running.

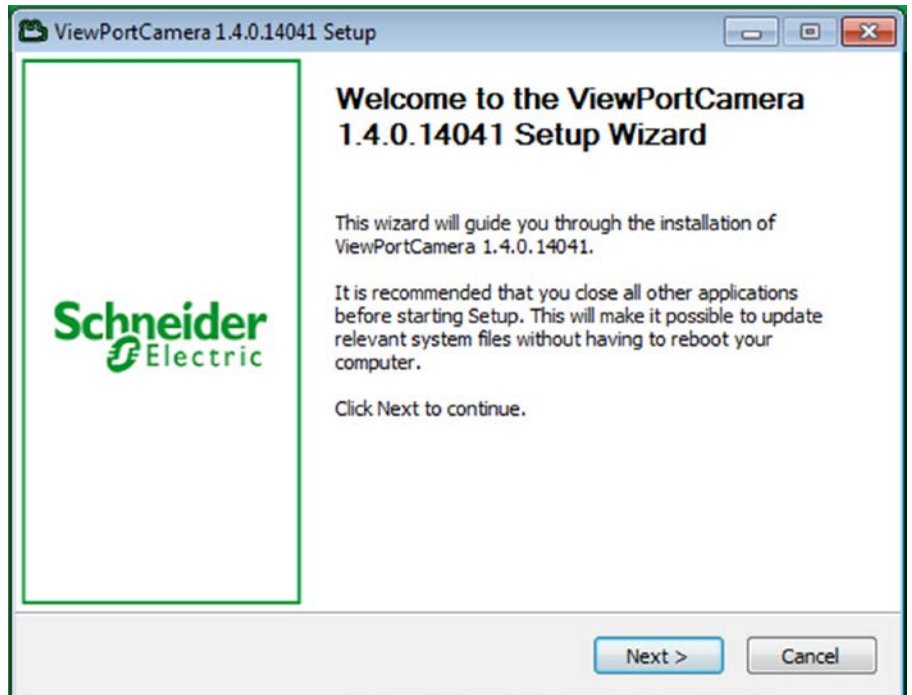
You must have administrator rights to be able to install the software.

1. Insert the installation CD. The installation process should start automatically. If not, select “Computer” from the “Start” menu. Right-click the CD-ROM icon and select “Open”. Double-click “Open”. Double-click “SetupUser.exe”.

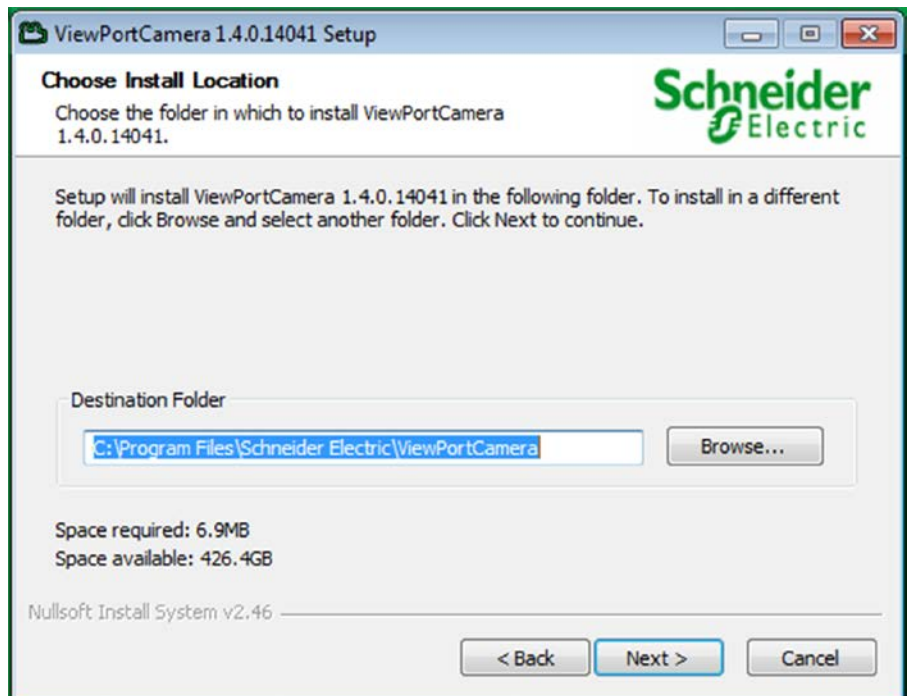


3 Installing the User-Software and the USB driver

2. Click "Next" to continue:

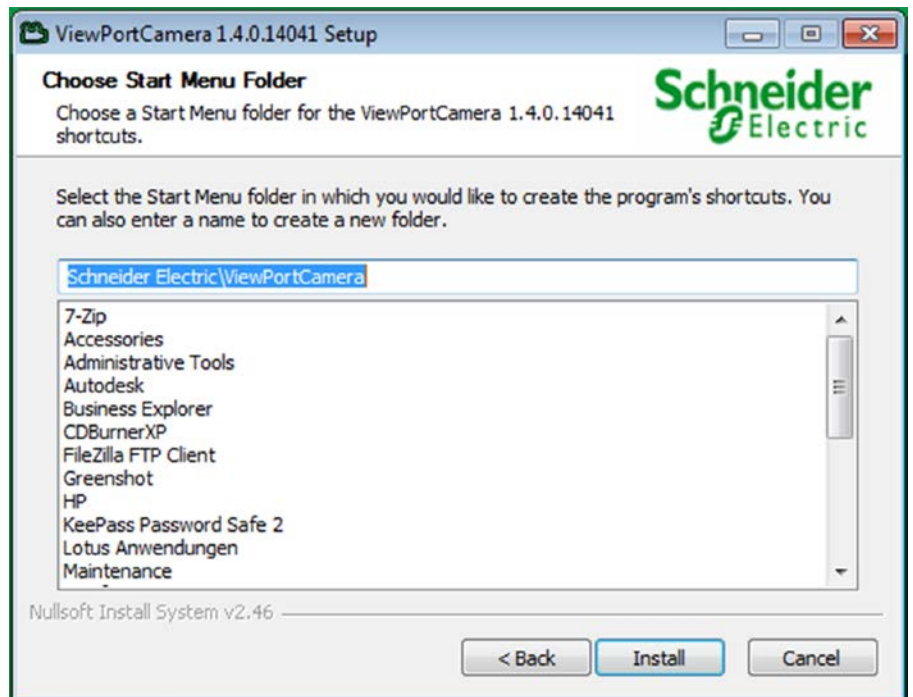


3. Choose the Install Location and click "Next":



3 Installing the User-Software and the USB driver

4. Select the Start Menu Folder and click "Install":



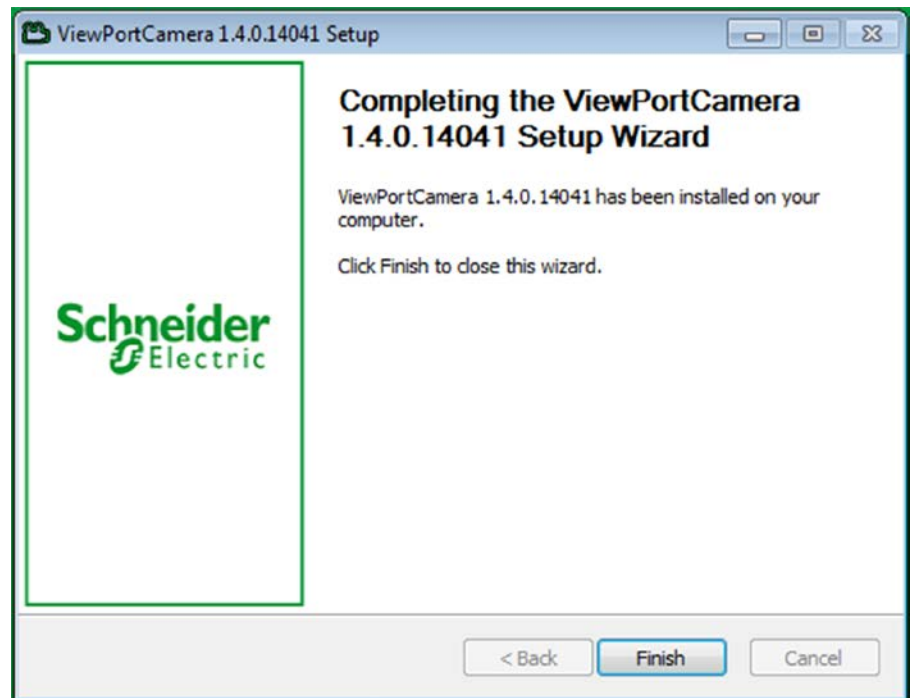
The camera software will now be installed.

5. Select "Always trust software from "Kappa optronics GmbH"" and click "Install":



6. The end of the installation process is indicated by the following message:

3 Installing the User-Software and the USB driver



3 Installing the User-Software and the USB driver

3.4 USB driver

**Notice:**

Do not connect the computer to the switchgear panel without the camera software being installed. Install the user software first (see chapter 3.3 "Installing the User Software", page 9).

You must have administrator rights to be able to install the USB driver.

1. When the user software has been installed (see previous chapter), connect the USB cable to the computer system (laptop) with the installed software. Remove the cover of a USB-view port on the front of a switchgear panel equipped with view port camera and connect the USB cable:



Fig. 1
USB connection

2. The USB driver installation process starts automatically.

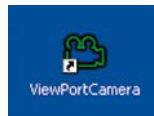
4.1 Starting the monitoring system

**Notice:**

Do not connect the computer to the switchgear panel without the camera software and the USB driver have been installed. Install the user software and driver first (see chapter 3 “Installing the User-Software and the USB driver”, page 9).

Before performing switching operations with the isolating switch or earthing switch in accordance with the GHA operation manual, start the monitoring system:

1. Start the ViewPort Camera application:
either by double-clicking the desktop icon:



or select and click “ViewPort Camera” in the programs listing:

Start -> Program Files -> Schneider Electric -> ViewPortCamera -> ViewPortCamera

2. Remove the cover of the USB view port A or B on the front of the switchgear panel (Fig. 2). For view port assignment, see chapter 4, page 19 and 20.
3. Connect the USB cable to the computer system (laptop) and to the view port (Fig. 2).

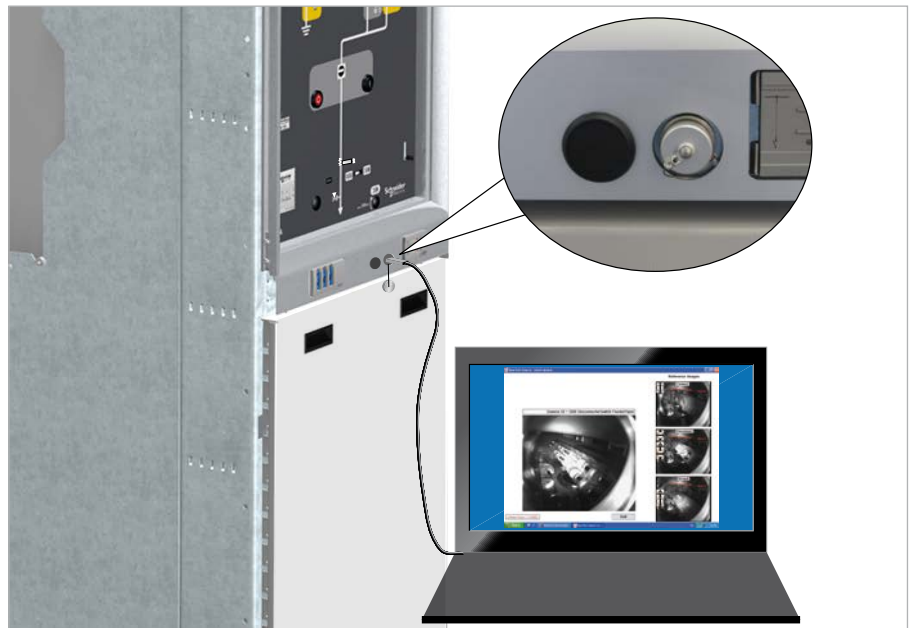


Fig. 2
USB connection

4.2 Monitoring system for three position switch

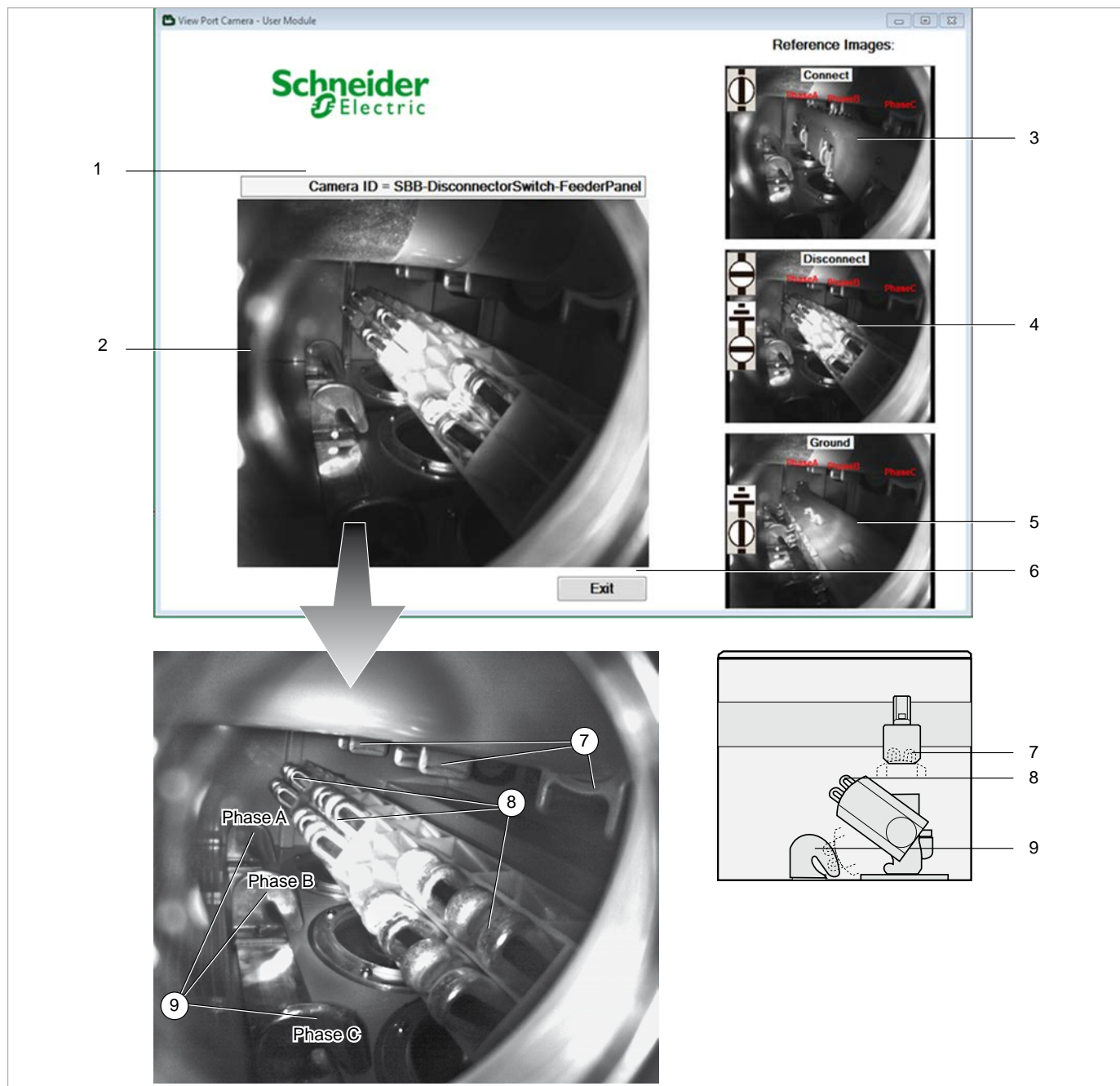


Fig. 3

Camera monitoring of the three positions switch

- 1 Camera ID. When there is no connection between the camera and the computer, instead of the ID of the camera a message with "Unconnected" is shown.
- 2 Live image. The live image shows the actual position of the three positions switch. When the user operates the three positions switch moving from one position to the other (connected, disconnected, earthed), the live image of the software will present this procedure. For each position of the three positions switch, the images can be compared with the reference images shown on the right side (positions 3 to 5). The example shows the three positions switch in disconnected position (compare to reference image no. 4).
- 3 Reference image: three positions switch in connected position
- 4 Reference image: three positions switch in disconnected position
- 5 Reference image: three positions switch in earthing position
- 6 "Exit" button to close the software
- 7 Busbar contacts
- 8 Three positions switch contacts
- 9 Earthing contacts

Feeder Panel

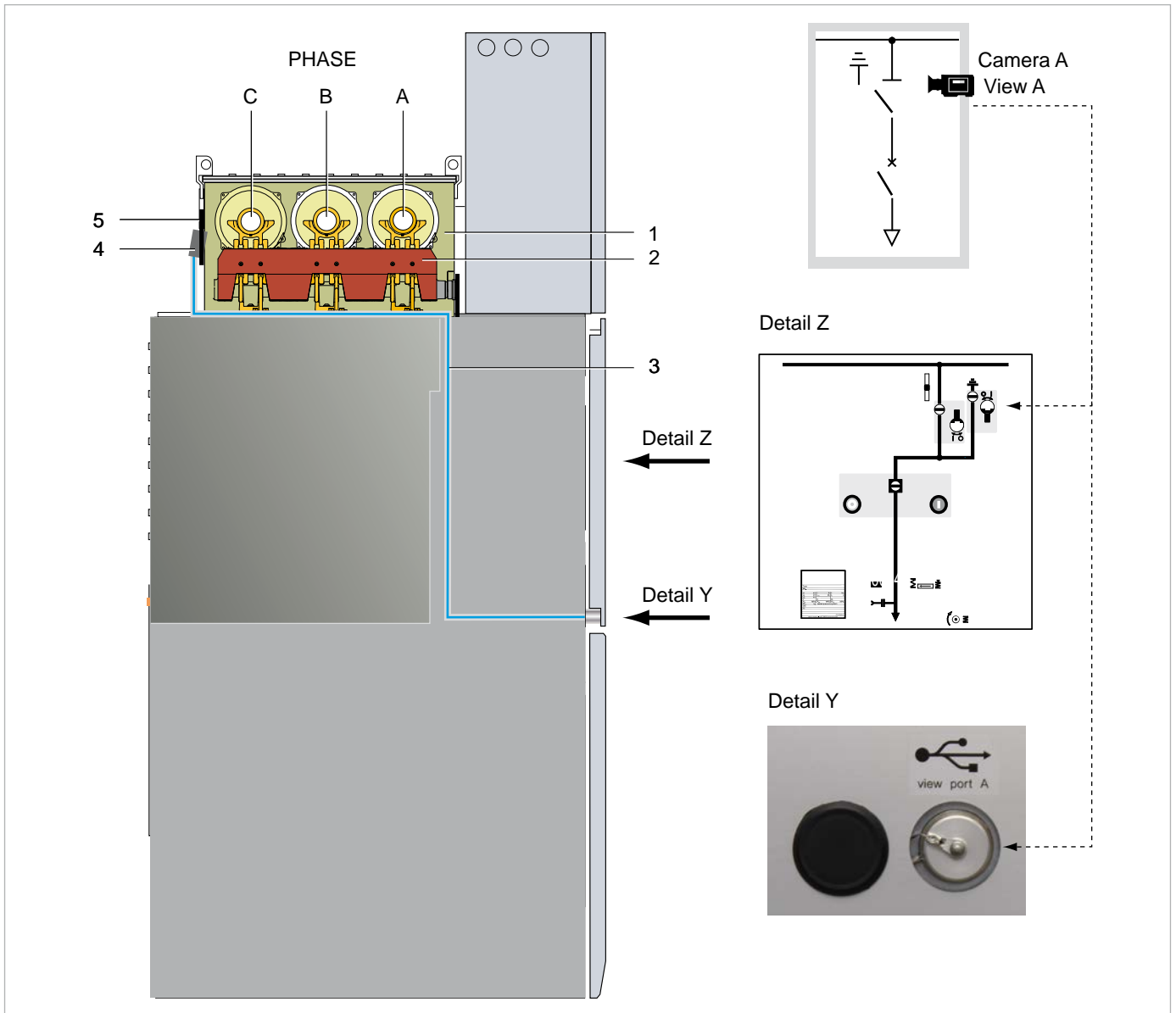


Fig. 4
GHA single busbar panel with camera system

- 1 Busbar compartment
- 2 Three positions switch (isolating switch and earthing switch)
- 3 Connecting lead from camera A to USB view port A
- 4 Camera A for three position switch
- 5 Pressure relief lid

Bus Tie

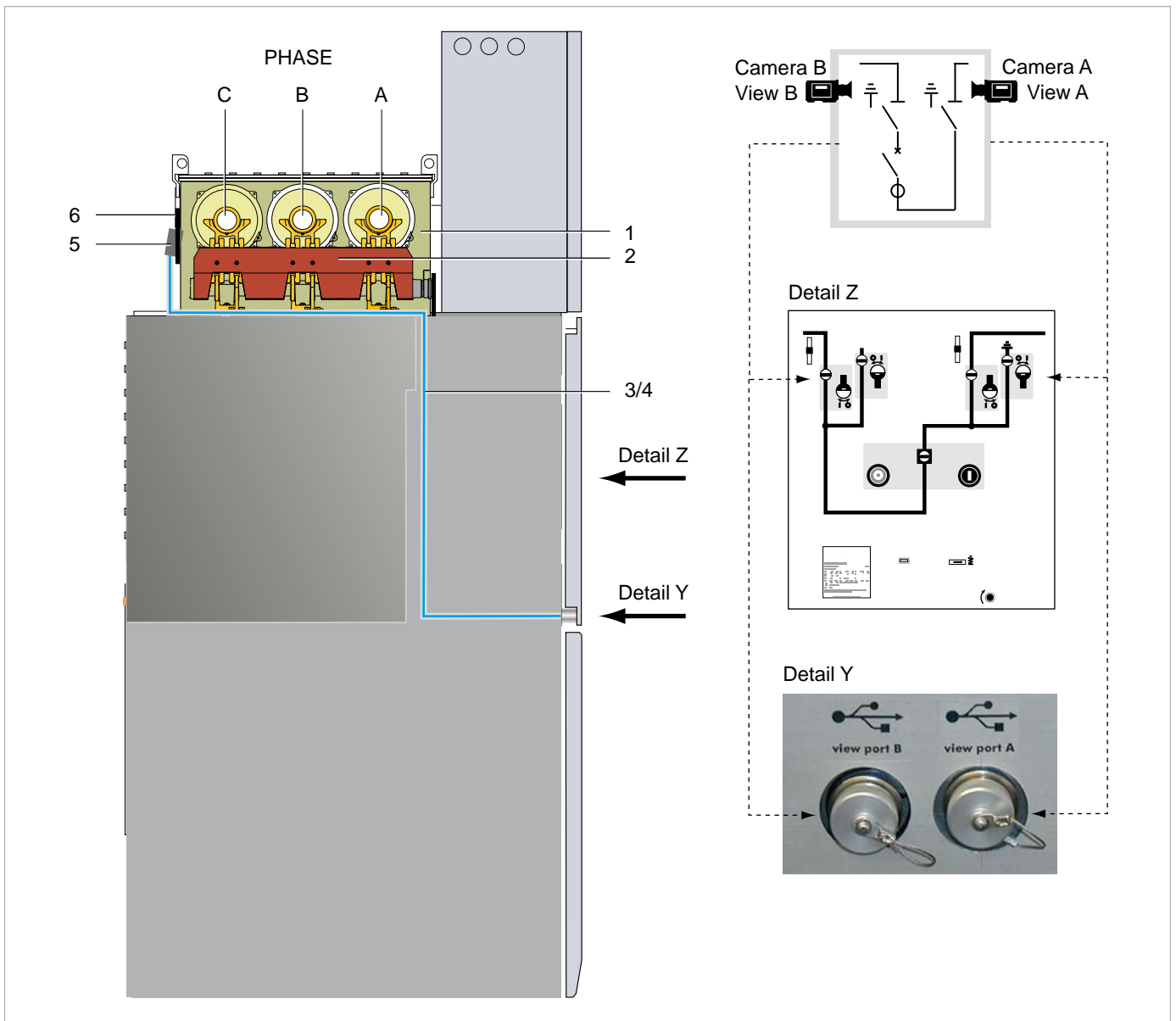


Fig. 5

GHA bus tie with camera system

- 1 Left busbar compartment
- 2 Left busbar three positions switch (isolating switch and earthing switch)
- 3 Connecting lead from camera A to USB view port A
- 4 Connecting lead from camera B to USB view port B
- 5 Pressure relief lid
- 6 Right busbar compartment (not shown)

**Notice:**

- When performing switching operations, pay attention to the real time movement, displayed on the live image, to exclude a freeze image.
- Check the correct position of the three positions switch. After a switching operation with the isolating or earthing switch, compare the live image with the represented reference image.

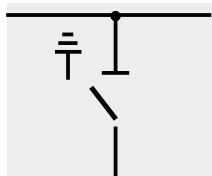
Three positions switch in the disconnected position

Fig. 6
Single Line

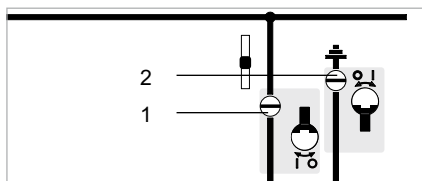


Fig. 7
Mimic diagram
1 Isolating switch OPEN
2 Earthing switch OPEN

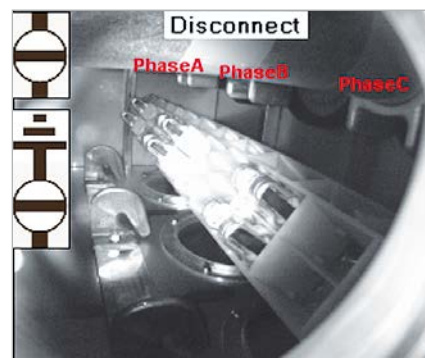


Fig. 8
Reference image

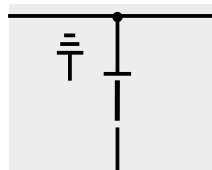
Three positions switch in the connected position

Fig. 9
Single Line

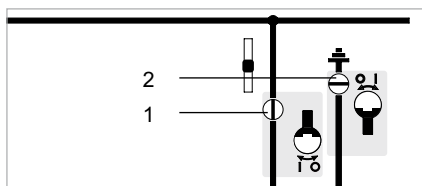


Fig. 10
Mimic diagram
1 Isolating switch CLOSED
2 Earthing switch OPEN

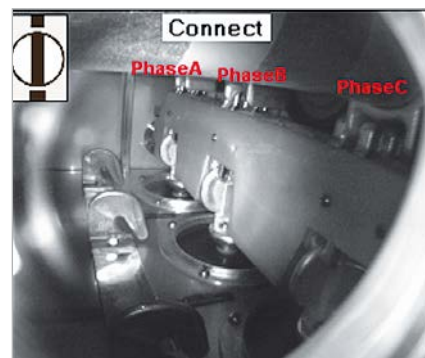


Fig. 11
Reference image

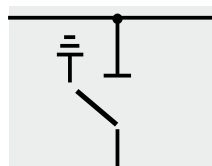
Three positions switch in the earthed position

Fig. 12
Single Line

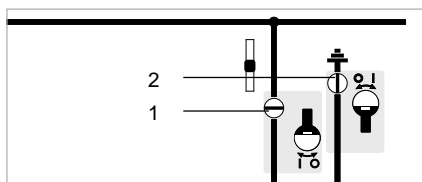


Fig. 13
Mimic diagram
1 Isolating switch OPEN
2 Earthing switch CLOSED

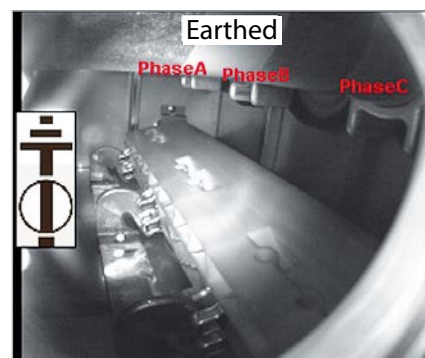


Fig. 14
Reference image

4.3 Monitoring system for busbar earthing switch

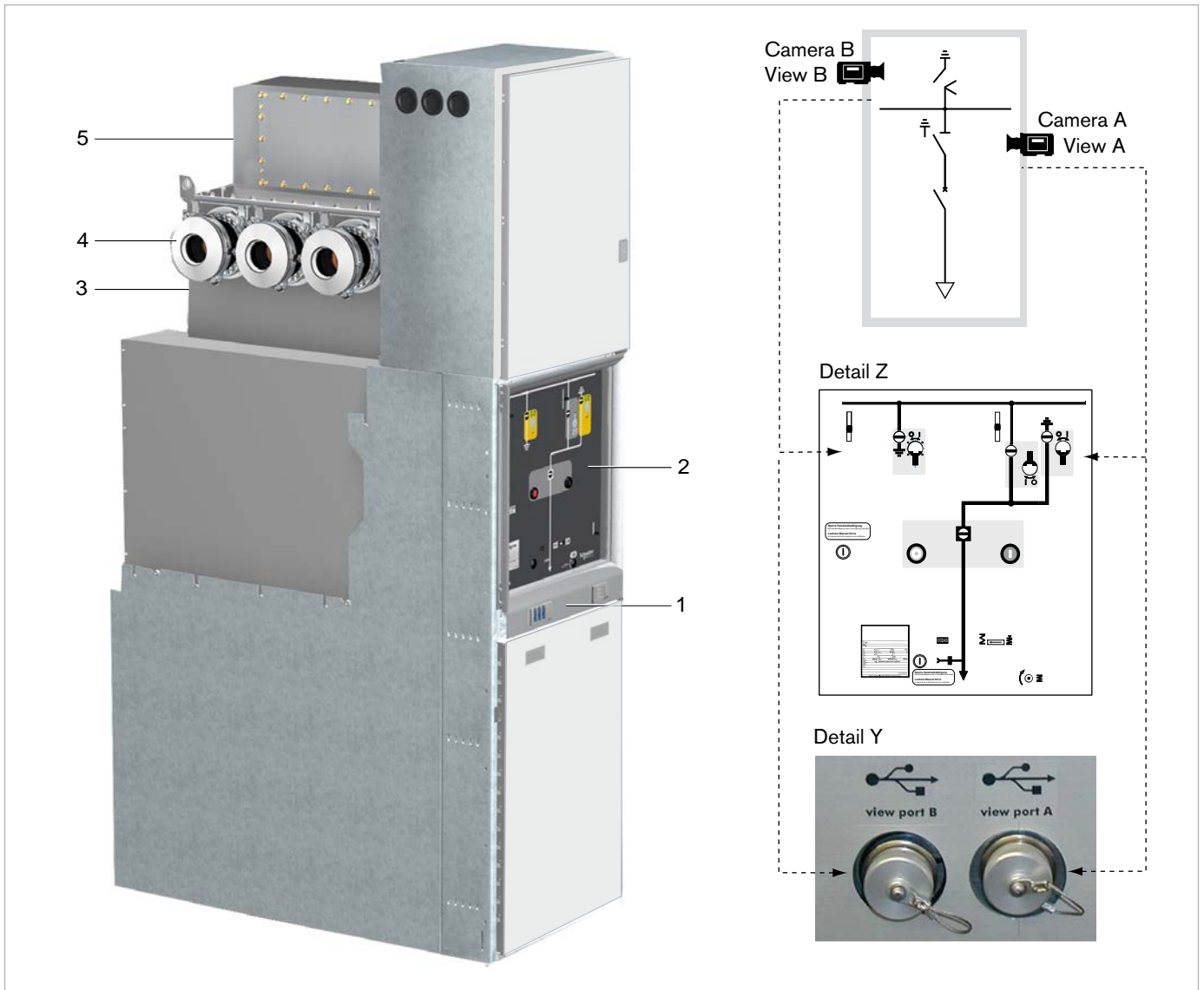
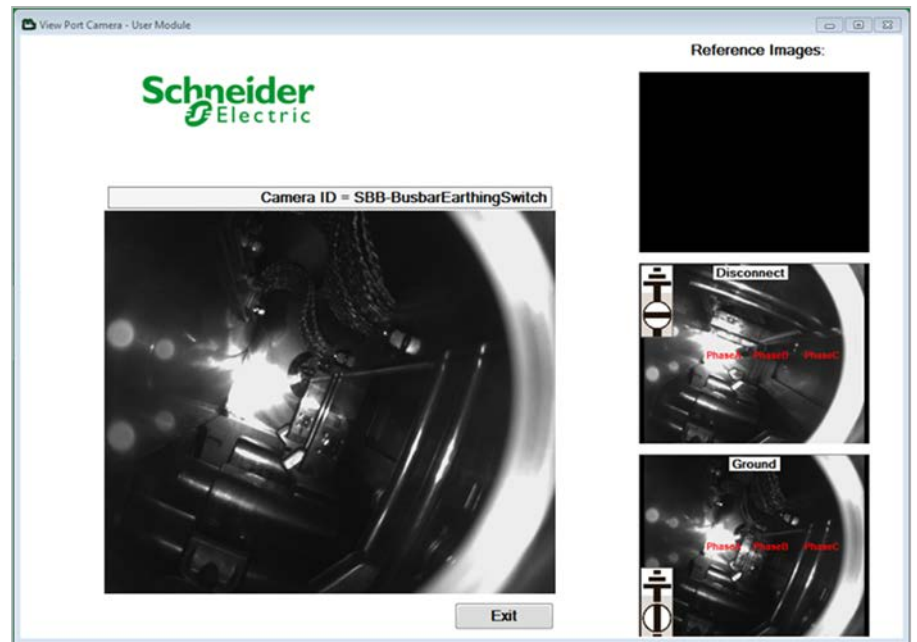


Fig. 15

GHA single busbar panel with camera system for three position switch and busbar earthing switch

- 3 View ports A and B (detail Y)
- 4 Mimic diagram (detail Z)
- 5 Camera A for three position switch A (not visible in the figure)
- 6 Busbar compartment with three position switch and busbar earthing switch
- 7 Camera B for busbar earthing switch (not visible in the figure)

For detailed explanation please see page 13.



Busbar earthing switch in disconnected position

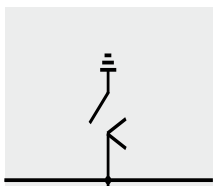


Fig. 16
Single Line

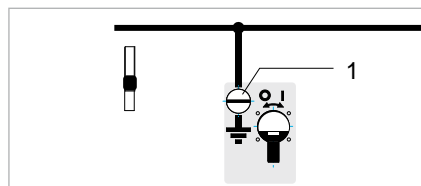


Fig. 17
Mimic diagram
1 Busbar earthing switch "OPEN"

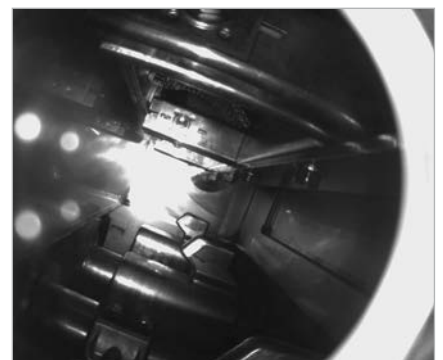


Fig. 18
Reference image

Busbar earthing switch in connected position

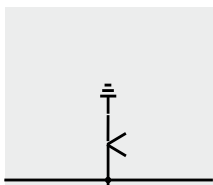


Fig. 19
Single Line

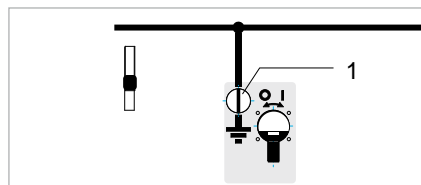


Fig. 20
Mimic diagram
1 Busbar earthing switch "CLOSED"

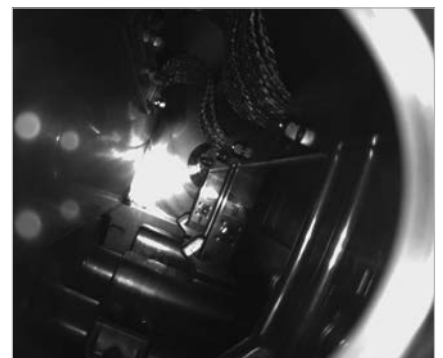


Fig. 21
Reference image

4.4 Monitoring system for busbar voltage transformer

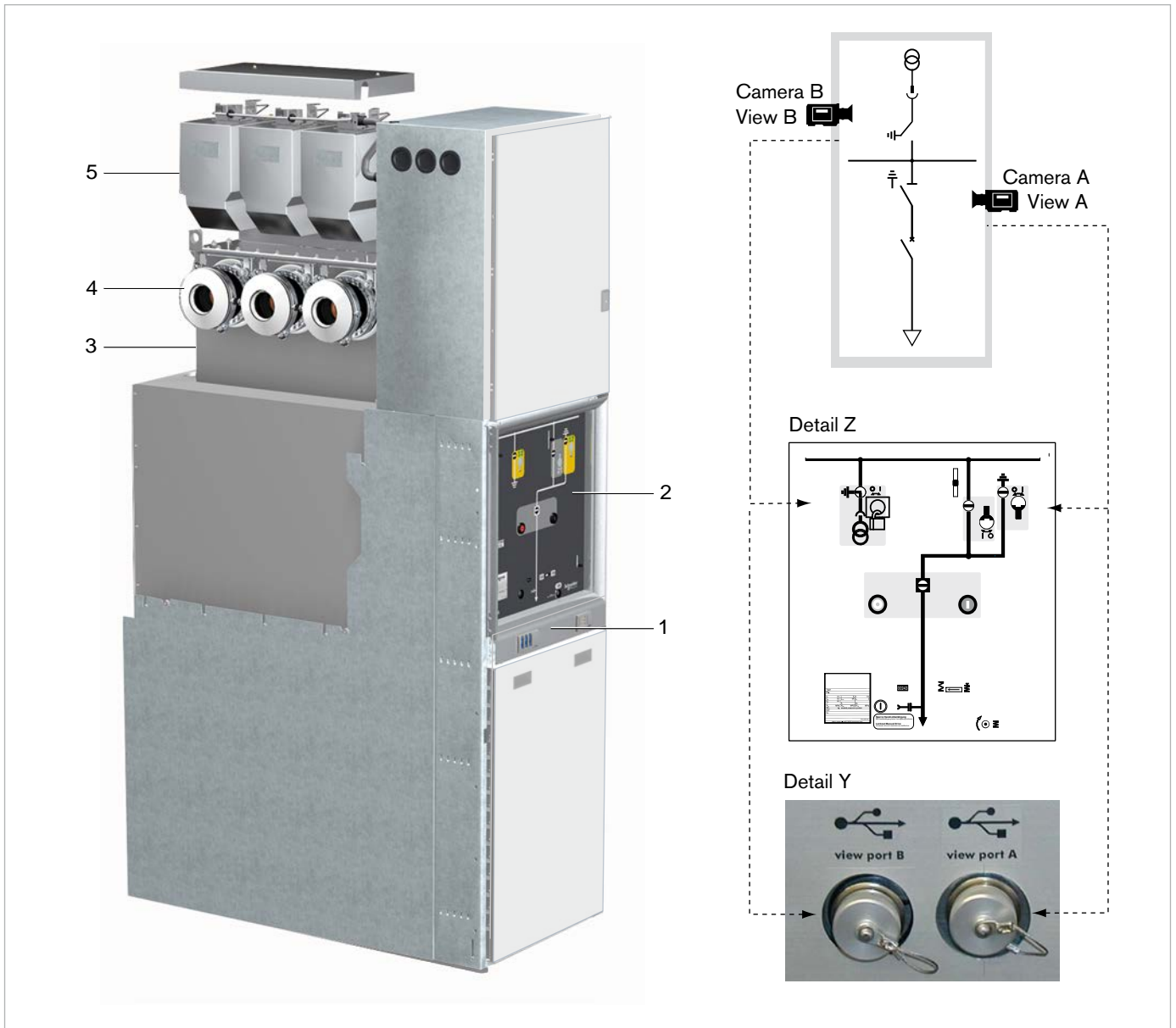
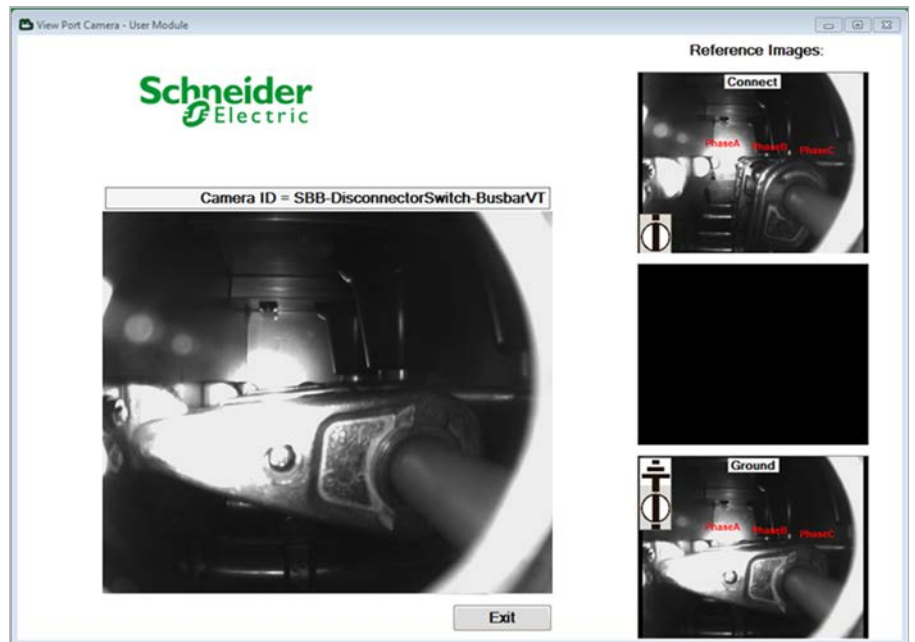


Fig. 22

GHA single busbar panel with camera system for three position switch and busbar voltage transformer

- 2 View ports A and B (detail Y)
- 3 Mimic diagram (detail Z)
- 4 Camera A for three position switch (not visible in the figure)
- 5 Busbar compartment with three position switch and busbar voltage transformer
- 6 Camera B for busbar voltage transformer (not visible in the figure)

For detailed explanation please see page 13.



Busbar voltage transformer in earthed position

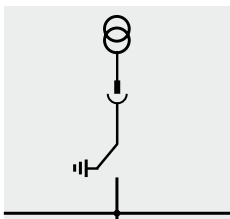


Fig. 23
Single Line

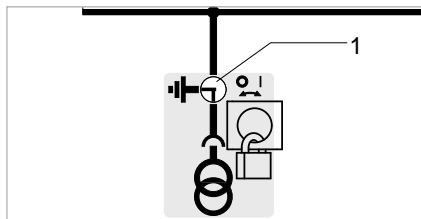


Fig. 24
Mimic diagram
1 Busbar voltage transformer
"EARTHED"



Fig. 25
Reference image

Busbar voltage transformer in connected position

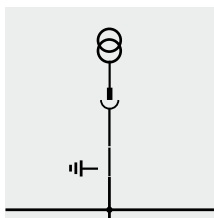


Fig. 26
Single Line

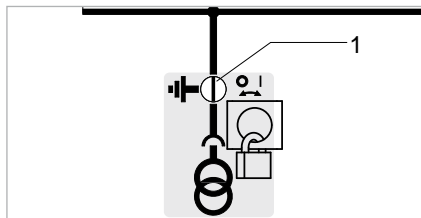


Fig. 27
Mimic diagram
1 Busbar voltage transformer
"CLOSED"



Fig. 28
Reference image

4.5 Monitoring system for busbar surge arrester

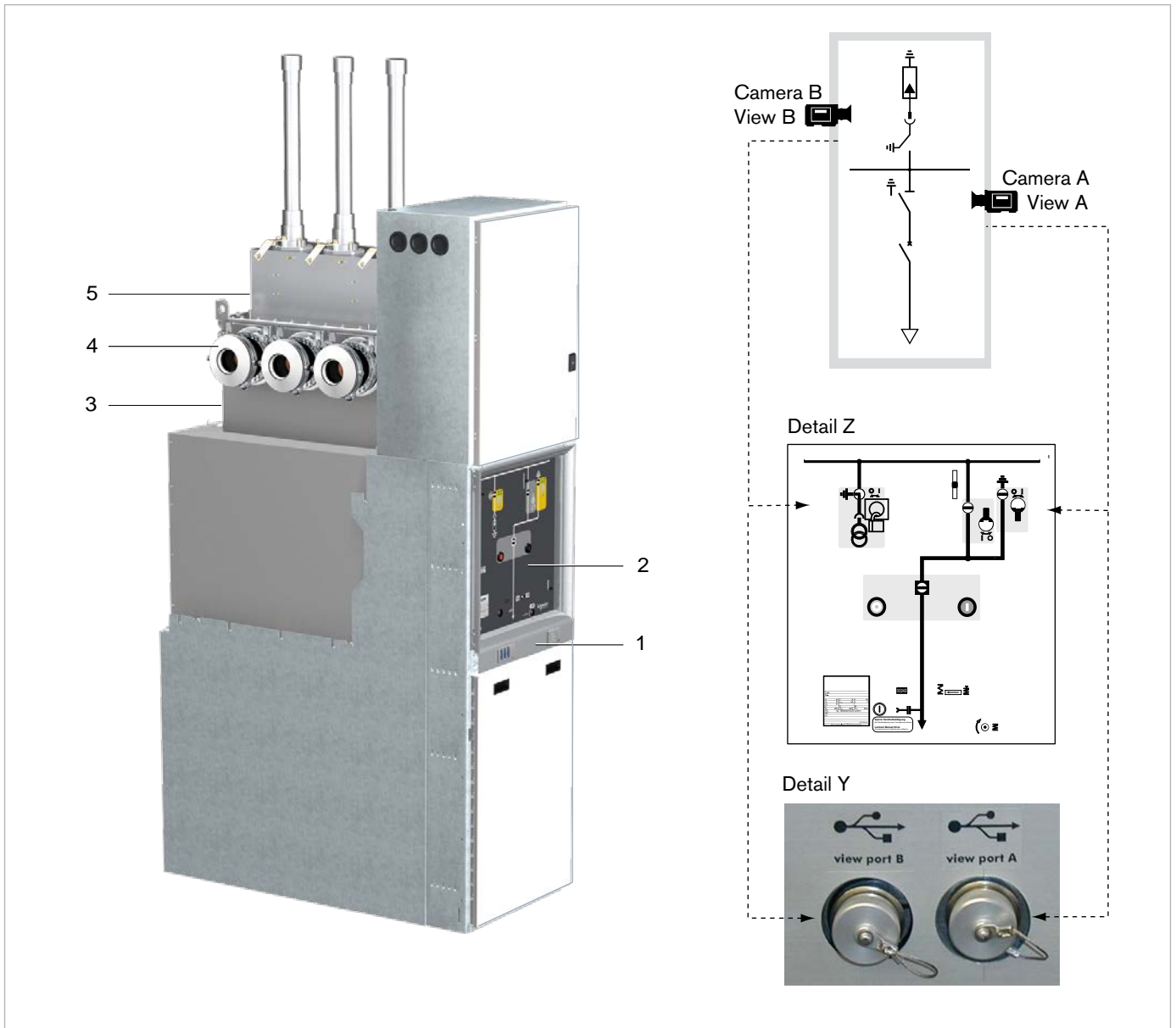
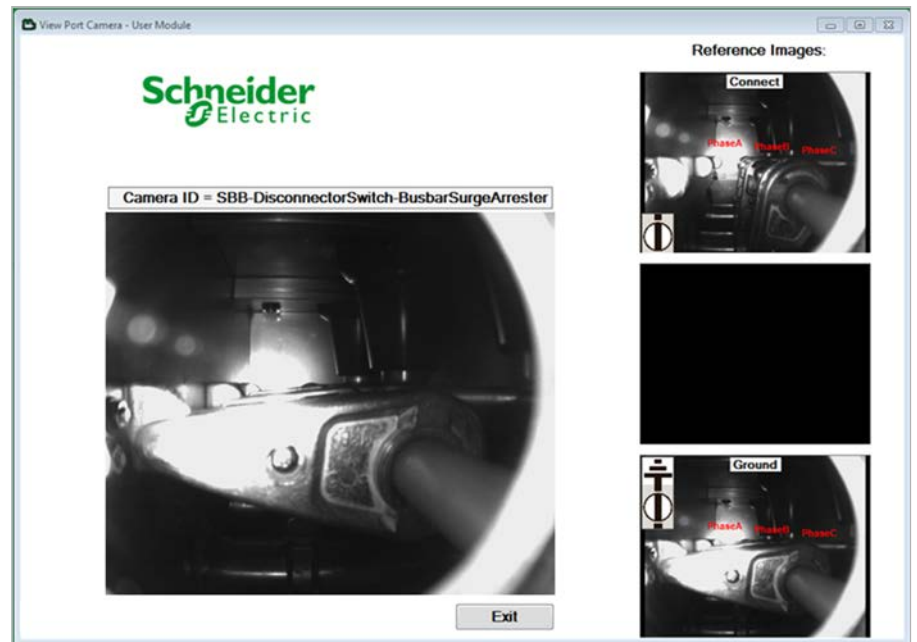


Fig. 29

GHA single busbar panel with camera system for three position switch and busbar surge arrester

- 1 View ports A and B (detail Y)
- 2 Mimic diagram (detail Z)
- 3 Camera A for three position switch (not visible in the figure)
- 4 Busbar compartment with three position switch and busbar surge arrester
- 5 Camera B for busbar voltage transformer (not visible in the figure)

For detailed explanation please see page 13.



Busbar surge arrester

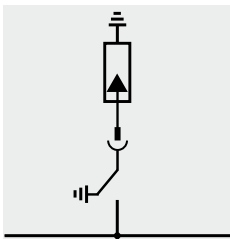


Fig. 30
Single Line

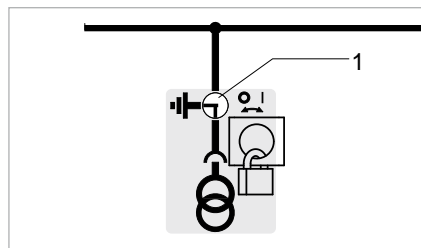


Fig. 31
Mimic diagram
1 Busbar surge arrester



Fig. 32
Reference image

Busbar surge arrester

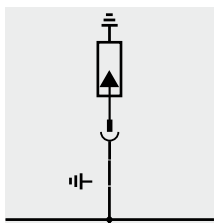


Fig. 33
Single Line

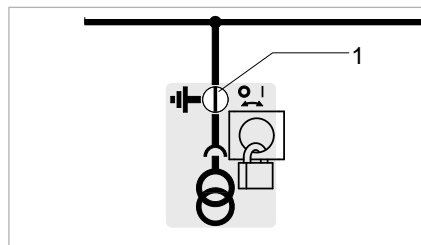


Fig. 34
Mimic diagram
1 Busbar surge arrester



Fig. 35
Reference image

4.6 Changing to another USB view port

The user software doesn't have to be shut down.

1. Unplug the USB cable from the view port of the camera system.
2. Close the view port with the cover.
3. Remove the cover of the other view port and connect the USB cable.

4.7 Closing the monitoring system

1. Click the "Exit" button in the software user interface (see chapter 4.2 on page 15).
2. Unplug the USB cable from the view port of the camera system.
3. Close the view port with the cover.
4. Unplug the USB cable from the computer system and store it.

**Warning!**

Risk of insulating gas loss. Do not open gas tanks, in particular do not remove screws/nuts which are not mentioned in this chapter for the camera replacement.

Requirements

- Camera, order number: AGS 003113-01
- Allen key: Size 3 (not included in the scope of delivery)

Dismantling of the camera

1. Unscrew the cable fixation of the camera (1) and then disconnect the cable plug.
2. Unscrew the 3 screws of the camera fixation (2).
3. Remove the camera.

Assembly of a new camera

4. Make sure the camera lens and sealing surfaces are clean. If required clean them in a professional way.
5. Insert the new camera and check the correct position as shown in Fig. 36.
6. Tighten the camera with the 3 screws (torque: 2.6 Nm \pm 15%).
7. Connect the cable plug to the camera and screw the cable fixation to the camera.

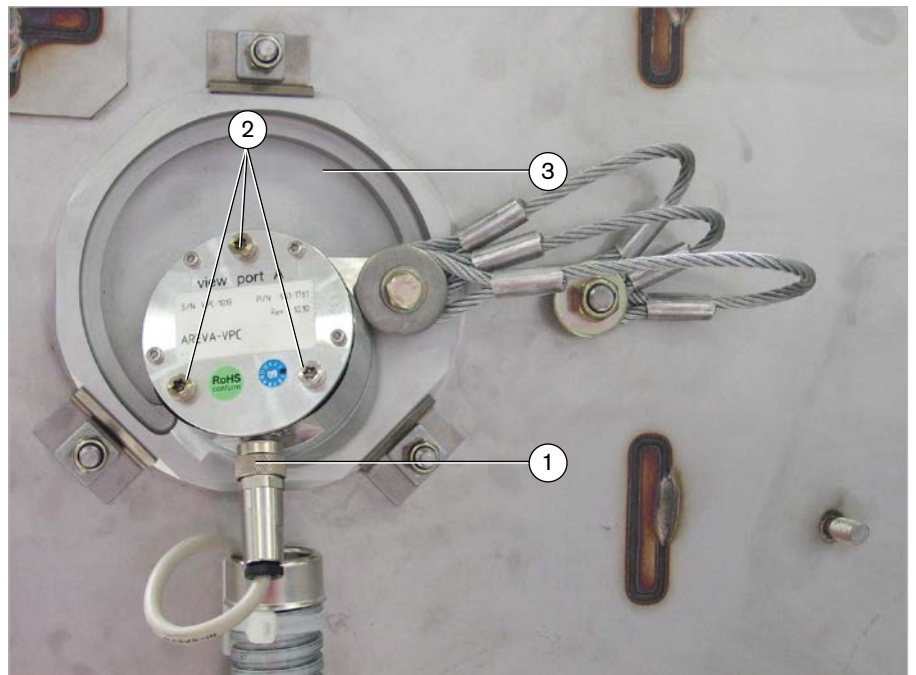


Fig. 36
Camera replacement

- 1 Cable fixation
- 2 Fixation screws
- 3 Pressure relief lid – DO NOT REMOVE!

If you have any questions regarding replacement of components, please contact the manufacturer's Service Center.

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As our products are subject to continuous development, we reserve the right to make changes regarding the standards, illustrations and technical data described in this Technical Manual. For any requests, please contact the address given below.

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