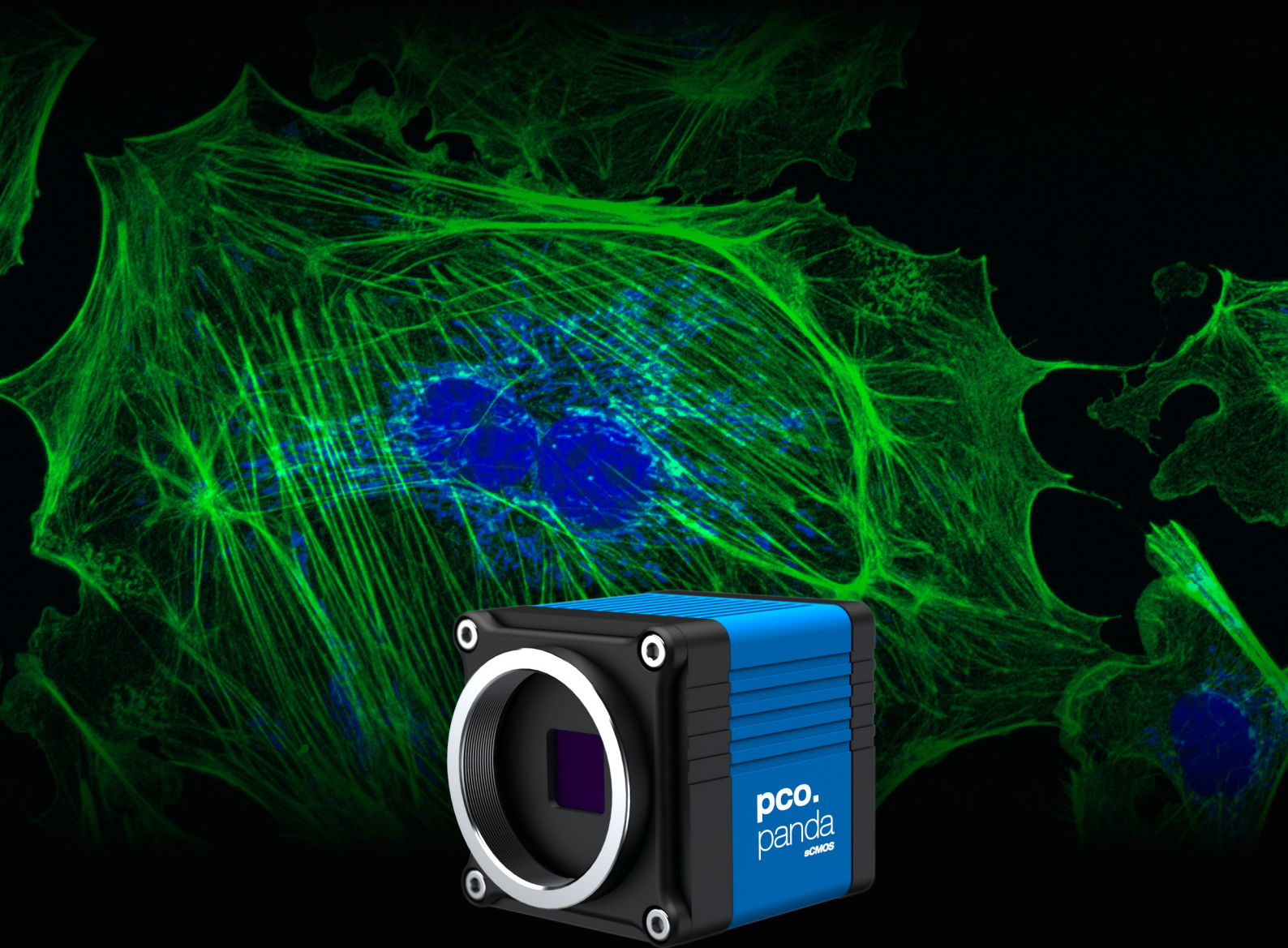# user manual

pco.panda 26
global shutter **sCMOS** camera

1288 ❄
EMVA Standard Compliant

pco.
An Excelitas Technologies Brand

PCO asks you to carefully read and follow the instructions in this document.
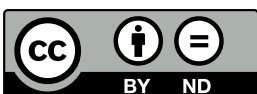**For any questions or comments, please feel free to contact us at any time.**

pco.

An Excelitas Technologies Brand

telephone:	+49 (0) 9441 2005 50
fax:	+49 (0) 9441 2005 20
postal address:	Excelitas PCO GmbH Donaupark 11 93309 Kelheim, Germany
email:	info@pco.de
web:	www.pco.de

pco.panda 26 user manual 1.0.1

Released December 2021

©Copyright Excelitas PCO GmbH

Contents

1. Introduction

The pco.panda 26

Welcome to the **pco.panda 26** manual. This document will help you to familiarize yourself with the camera and its functions. If you have any questions, please contact **PCO** directly.

Main Features

- True charge domain global shutter
- Ultra high resolution: 5120 x 5120 pixel
- Exposure time: 5 µs ... 20 s
- Pixel size (h x v): 2.5 µm x 2.5 µm
- Dynamic range 66 db
- Ultra compact design
- Up to 65 % quantum efficiency
- USB 3.1 Gen 1 Type C data interface

1.1. Intended Use

This camera system is designed for use by technicians, engineers, and scientists. It is a scientific measuring instrument which also provides images.

The camera may only be used according to the instructions of this manual. The operator agrees to respect the disclosures and operating conditions in these operating instructions. Unauthorized modifications and changes to the device are forbidden to ensure safe use.

1.2. Conventions

The following typographic conventions are used in this manual:

Typing	Meaning
bold italics	Terms that can be found in software
A1.3 / pco.panda	Links to chapters, product names, important terms

2. Safety Instructions

Read the safety instructions completely. Failure to follow them can result in injury or death.

DAMAGED POWER CABLE OR POWER PLUG
Mortal danger due to electric shock.
Check the power cable for damage each time the camera
is used.

**ELECTRIC SHOCK WARNING DUE TO VOLTAGE
PARTS INSIDE**
Risk of injury due to electric shock.
Never slide any items through slits or holes into the
camera.

MOISTURE
Risk of injury due to electric shock if moisture enters the
camera.
To avoid the risk of water condensation, protect the
camera against extreme changes of ambient temperature.

TRIPPING HAZARD
Risk of injury from tripping over loose cables.
Never position the cable in such a way as to become a
tripping hazard.

HUMIDITY, DUST OR RADIATION
Humidity, dust or X-rays can damage the camera.
Never operate the camera in humid or dusty environments
or in places with high levels of x-ray radiation.

VIBRATION
Camera must be firmly mounted and protected against
strong shocks or vibrations to avoid damage.
Use the camera's mounting threads to secure it.

LENS MOUNTING
Screw in the lens gently to avoid thread damage.
Use minimal force when attaching a lens to the camera to
protect the lens connector thread from damage.

LIQUIDS DAMAGE CAMERA
If liquids have penetrated the device:
Switch the camera off immediately, detach it from power
and contact the **PCO** customer support.

NOTICE

DAMAGED CAMERA HOUSING
If the camera has been dropped or the camera body is
damaged:
Switch the camera off immediately, detach it from power
and contact the **PCO** customer support.

NOTICE

IF CAMERA IS NOT WORKING PROPERLY
If the troubleshooting steps in this manual are
unsuccessful:
Switch the camera off immediately, detach it from power
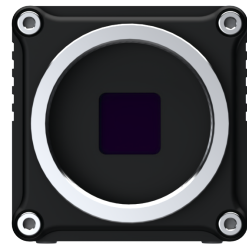and contact the **PCO** customer support.

NOTICE

3. System Components

The camera system includes the following parts.

Front

Camera

- C-mount optical connection
- For standard C-mount lenses and adapters

Rear

Rear Panel

- USB 3.1 Gen 1 Type C connector
- LED indicates camera status
- SMA connectors
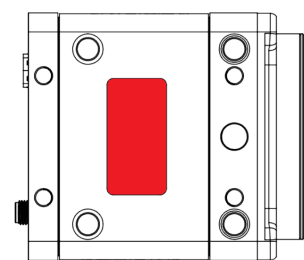- Power connector

Bottom

Serial Number Tag

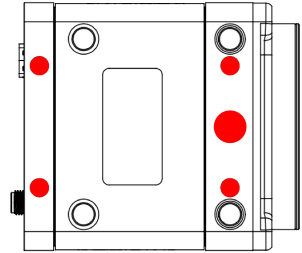- The serial number tag can be found at the bottom of the camera housing

Bottom

Mounting Thread

- 1x 1/4" - 20 UNC

- 4x M4 threads

USB Cable

- USB 3.1 Gen 1

- 2x USB Type C connector

- Other cables are available on request

USB 3.1 Gen 2 Interface Card

- 1x Type A socket, 1x Type C socket

- 4x PCIe V3.0

- Other cards are available on request

Power Supply

- via the USB cable

- PC slot: USB 3.1 (Gen 1 or 2) + power supply

Digital Camera Tools (USB flash drive content)

- **pco.camware**: software for camera control and image acquisition (see our website)

- Camera driver and tools

- Software Development Kit (**pco.sdk**) (see our website) and demo programs in C and C++

4. Installation

All necessary files can be found on the accompanying USB flash drive. You may also download the latest versions of our software, camera driver, and third party software drivers from our website.

Minimum system requirements:

- Intel© Core™ i7
- RAM > 8 GB DDR3
- Windows 7 or higher
- Full-HD resolution display
- USB 3.1 Gen 1

4.1. Driver

Install PCO USB 3.0/3.1 Driver

Always install the latest USB driver version. Install the driver from screen **1**.

You will see screen **2** after the driver is successfully installed.

NVIDIA Cuda Driver

This is only relevant if an NVIDIA graphics card is used!

GPU Processing only functions with NVIDIA graphics cards.

Update your NVIDIA driver for **pco.camware**. If an old driver version is installed, *GPU Processing* will not function, and image processing will be slow.

Check if *GPU Processing* is activated from the *Proc config* settings **4** in the *Convert Control* window **3**
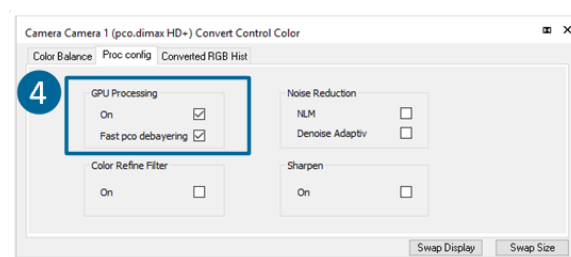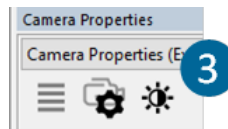
(see the **pco.camware** manual on the **PCO** website).

If *GPU Processing* is disabled and greyed out, update your NVIDIA driver.
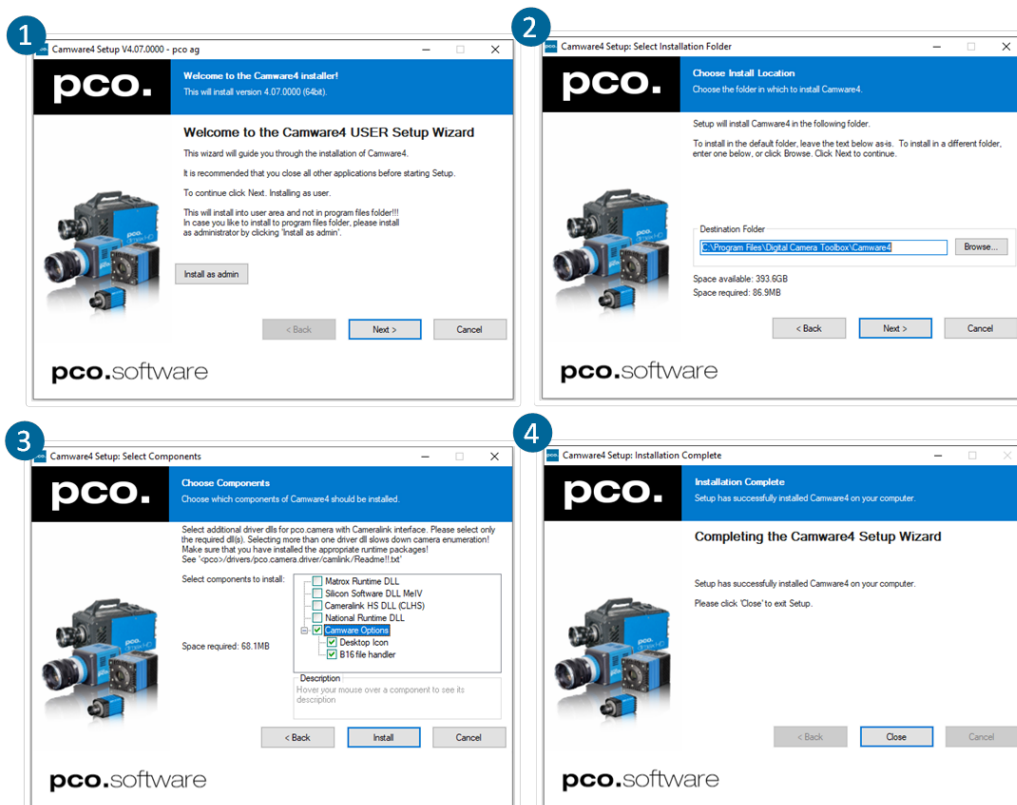
4.2. pco.camware Software

The **pco.camware** software controls every camera parameter or setting. Images can be displayed on a monitor and may be downloaded and stored. The USB flash drive contains the installation files for Windows operating systems in 64 bit.

After a successful installation, you will find the program file *Digital Camera Toolbox* in your program directory and a **pco.camware** 64 button on your desktop.

To uninstall **pco.camware**, navigate to Windows. Add or remove programs via the system settings.

Follow the Installation Wizard

- *Install as admin* to install to program folder, otherwise it is installed only to user folder **1**

- Choose the installation directory **2**

- Choose components: select additional drivers (not recommended for **pco.panda 26**) and select Install **3**

- The installation is complete **4**

For more information on **pco.camware**, including the respective manual, see our website.

5. Quick Start

To familiarize yourself with your new camera and software, it is helpful to first aim at an object that is easy to focus on and can be seen in standard light conditions.

5.1. Preparation

Before beginning, ensure that:

- The computer is turned on
- The installation is finished (see chapter **4**)
- An appropriate lens is attached (remove cap) or the camera is properly attached to the microscope, spectrograph, or other scientific device
- The camera is connected to the PC

5.2. Start

Start **pco.camware** to begin working with the graphical user interface.

Note   Always install the latest version of **pco.camware** via our website to access the full function of your camera.

5.3. First Image

Follow the instructions
The following list shows the basic workflow of getting a first image in **pco.camware**.

- Start **pco.camware** **1**

- A ***View Window*** **2** is shown automatically or open a new one **3**

- Start ***Live Preview*** **4**

- Right-click in the view window and apply ***Continuous Auto Range*** **5**

- You may adjust the ***Exposure*** time **6** , aperture, and focus of the mounted lens

- You should clearly see the object in the window **7**
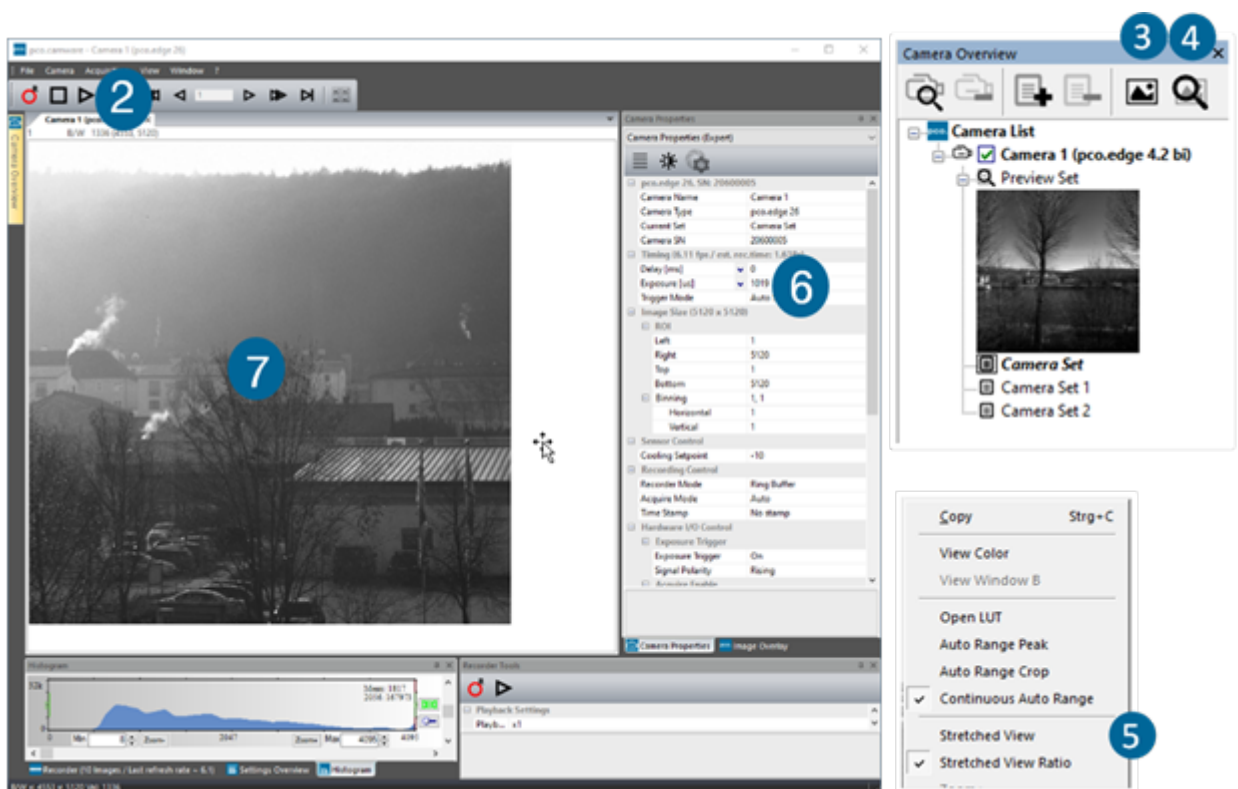
To change the exposure time (e.g. the image is still either too dark or too bright) and to record and save images, see the **pco.camware** manual on our website for detailed information.

Note   Live preview: useful for fast and easy camera adjustment and focusing.

6. Global Shutter

The **pco.panda 26** uses the global shutter mode for image acquisition.

First, all pixels are globally reset and its reset values are stored internally on the sensor. The image exposure starts. After exposure and readout, the sensor completes the correlated double sampling (CDS). During the readout phase, a new exposure can start.
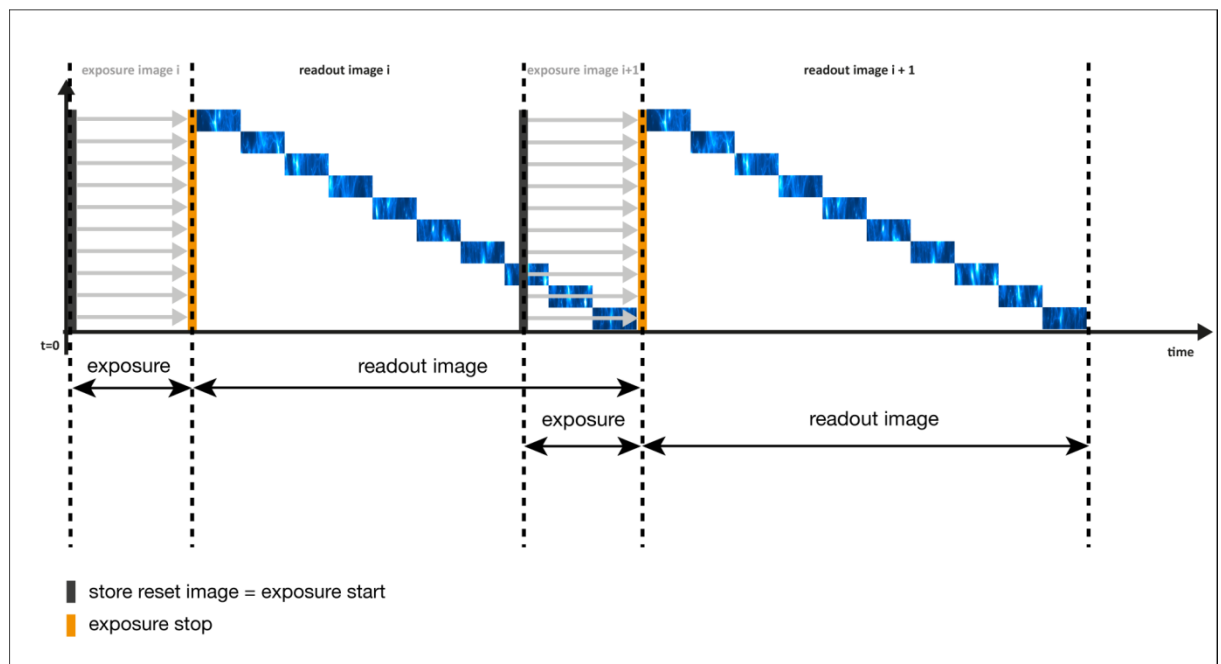
Timing   The exposure and delay time can be adjusted in a step size of 30 µs.

Camera	Exposure time	Delay time
pco.panda 26	20 µs … 60 ms	0 µs … 1 s

Global Shutter GMAX0505 (exposure time < readout time)
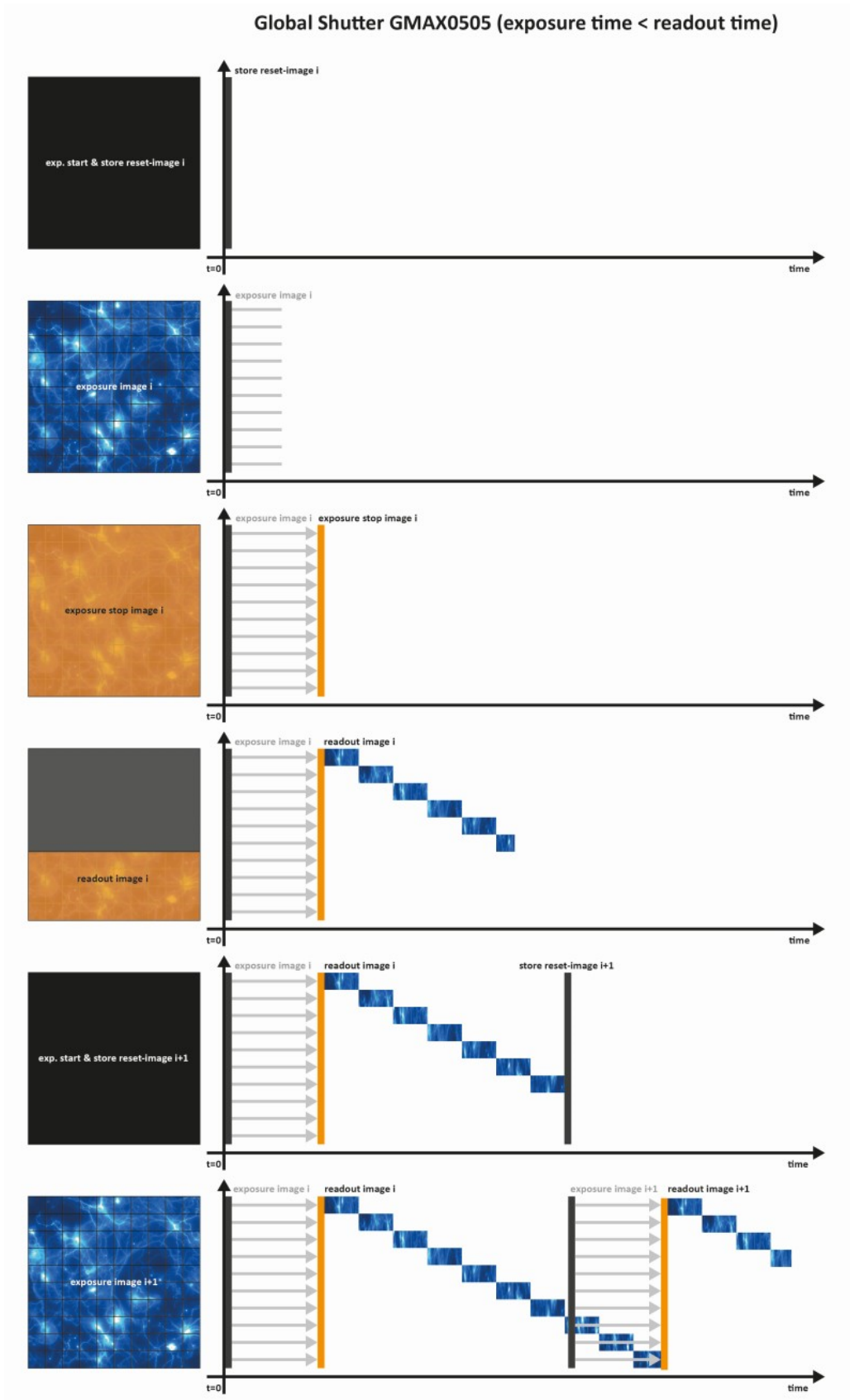
7. Camware 4 Software

This chapter contains camera-specific additions to the **pco.camware** manual on our website. Consult this manual for all main functions and explanations.

7.1. Hardware IO Control

The settings can be changed with a drop-down menu.

1 Exposure Trigger

If On, a signal for External Exposure Start Trigger Mode is accepted at the Exposure Trigger SMA input #1.

Exposure Trigger: On; Off
Signal Polarity: Rising; Falling

2 Acquire Enable

If On, a signal for Acquire Mode is accepted at the Acquire Enable SMA input #2.

Acquire Enable: On; Off
Signal Polarity: High; Low

3 Status Busy

If On, a signal indicating busy status is provided at the Status Busy output. Once an acceptable trigger edge is received, 'busy' goes to status high. As soon as 'busy' goes low again, a new trigger edge is accepted.

Status Busy: On; Off
Signal Polarity: High; Low

4 Status Expos

If On, a signal indicating exposure is given at the status output. Status Expos indicates the actual exposure window for one frame.

Select IO Signal: Status Expos
Status Expos: On; Off
Signal Polarity: High; Low

Enabling and Polarity of IO Signals

The polarity of the input and output signals indicating their active states is selectable (positive or negative logic).
The polarity of level-sensitive signals can be set to *High* (positive logic) or *Low* (negative logic).
The polarity of edge-sensitive signals can be set to *Rising* (positive logic) or *Falling* (negative logic).

Appendix

A. Technical Data

A.1. Data Sheet

Image sensor	pco.panda 26
Type of sensor	customized sCMOS
Resolution (h x v)	2.5 µm x 2.5 µm
Sensor format / diagonal	12.8x12.8 mm/18.1 mm
Shutter mode	Global/Snapshot Shutter (GS)
MTF	200 lp/mm (theoretical)

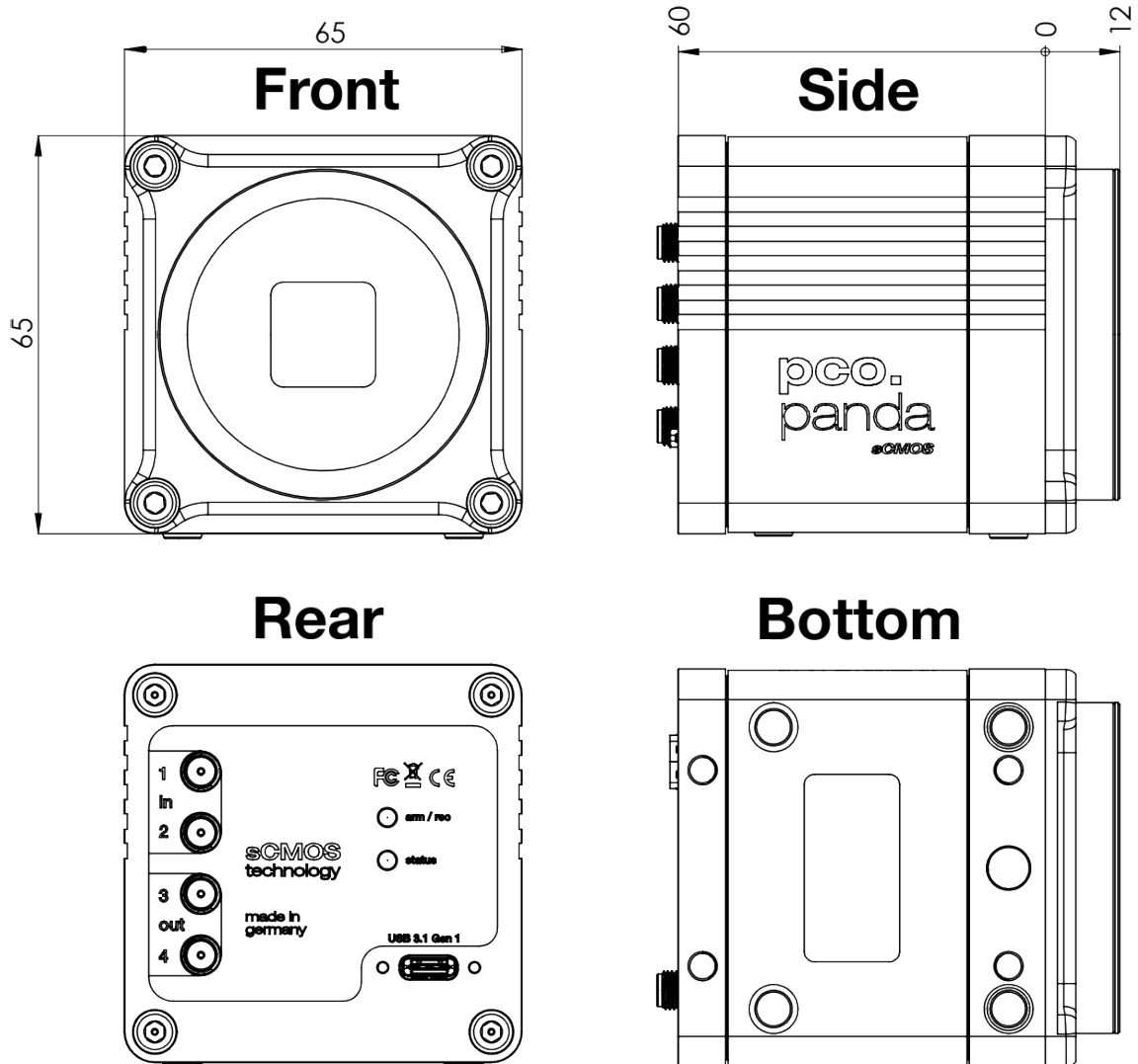| Camera	
Frame rate	7.1 fps @ full resolution
Exposure/shutter time	5 µs ... 20 ms
Dynamic range A/D	12 bit
Binning (h x v)	1x1 ... 4x4
Cooling method	passive
Trigger input signals	frame trigger, sequence trigger, programmable input (SMA connectors)
Trigger output signals	exposure, busy, programmable output (SMA connectors)
Data interface	USB 3.1 Gen1
Timestamp	in image (1 µs resolution)

General	
Power supply	power via USB cable/PC connection
Power consumption	typ. 4.5 W via USB 3.1 Gen1 (max 6.0 W)
Weight	600 g
Operating temperature	+10 °C ... +40 °C
Operating humidity range	10 % ... 80 % (non-condensing)
Storing temperature range	-10 °C ... +60 °C
Optical interface	F-mount, C-mount
CE/FCC certified	yes

| ROI step sizes	
Horizontal steps	steps of 32 pixels (min. 32)
Vertical steps	steps of 1 pixel (min. 8)
Minimum ROI	32 x 8 pixels

Subject to change, refer to current data sheet (available on our website).

A.2. Mechanical Dimensions

- All dimensions are given in milimeters.
- Mechanical drawings are available on our website.
- 3D step files and further mechanical drawings are available on request.
- F-mount and C-mount lens adapter are exchangeable.

A.3. Rear Panel
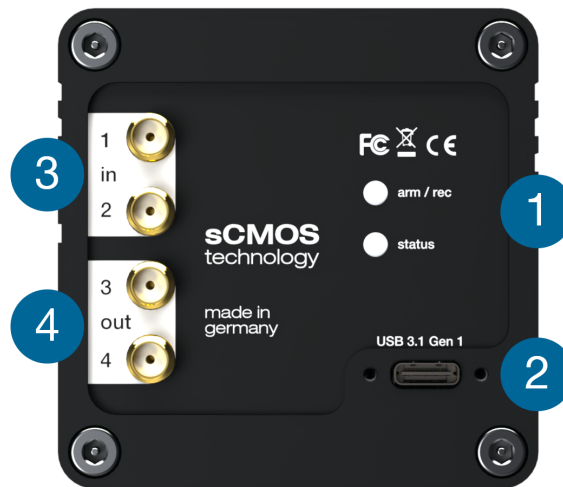
Status LEDs ①
(LED1: green / red; LED 2: orange)

Color	Description
Red / green continuous	Camera is booting
Green	Camera is ready for operation
Orange continuous	Arm camera / rec state off
Orange blinking	Recording on
Red continuous	Error

Interface Connector ②
USB 3.1 Gen 1 plug Type C (screwable)

SMA Inputs ③
(see chapter **7**)

Input (1 = Exposure Trigger; 2 = Acquire Enable)	
Type	Digital
Level	3.3 V LVTTL (5 V tolerance)
Coupling	DC
Impedance	1 kΩ
Slew rate	> 1 V/ms

SMA Outputs 4
(see chapter **7**)

Output (3 = Status Busy; 2 = Status Expos)	
Type	Digital
Level	3.3 V LVTTL
Coupling	DC

B. Hardware Mounting

Follow these instructions to correctly mount the **pco.panda 26** hardware components.

B.1. USB Card Installation

An external Delock USB 3.1 Gen 2 host controller card (incl. a CD that contains the necessary driver) comes along with each **pco.panda 26** camera.

Note: In multi-camera operation, each camera needs its own USB host controller card.

Hardware Installation

First shut down your computer and install the USB 3.1 Gen 2 host controller card.

HIGH VOLTAGE

Hardware installation must be performed by a technician, because high voltages can occur on the device.
Always pull the main plug before you open the computer.
Wear anti-static ESD boots to prevent irreparable damage.

Driver Installation

The driver installation differs, depending on your operating system and controller card:

OS	Controller Card	Driver
Win 7/8	Delock 90299	Manual installation of ASMedia3142
Win 10	Delock 90299	Automatic Installation of ASMedia3142
Win 7/8	Delock 89391/89325	Manual installation of Renesas 30230
Win 10	Delock 89391/89325	Automatic Installation of Renesas 30230

ASMedia3142 Installation

Follow these steps to install the **ASMedia3142** driver under Win 7/8.

- Insert the Delock driver CD **SE-CD5D-DL-PCIEU** in your CD drive and open the folder *ASMedia*.
- Alternatively, browse for the folder *USB3.0pciboard* on the USB stick that comes with the camera.
- Open the subfolder *ASM3142* and run the *setup.exe*
- If your *User Account Control* is enabled, a dialog may ask you to launch the setup. Accept with *Yes*.

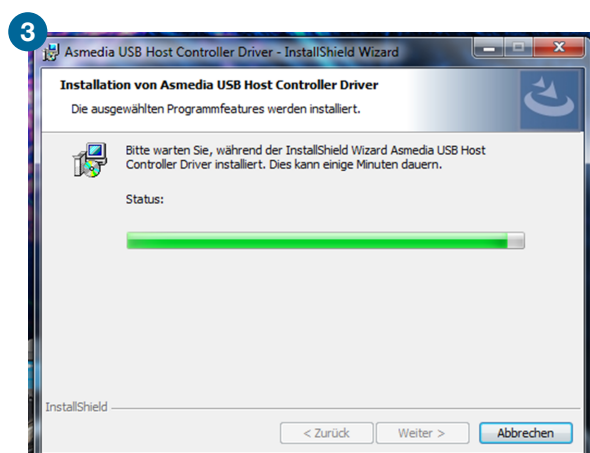**1** The installation begins once you run the *setup.exe* (and accept the dialog with *Yes* if necessary):
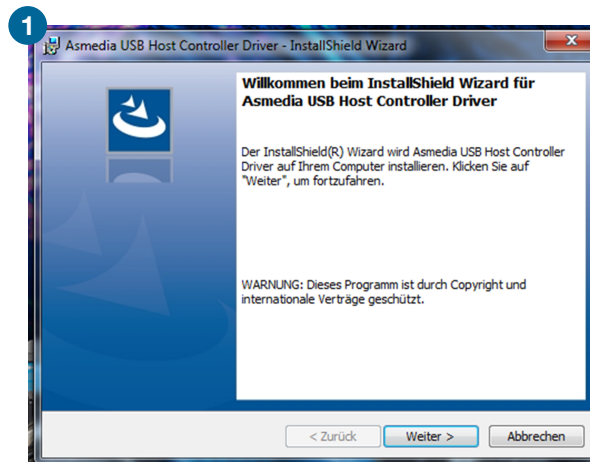
2 Read the agreement and accept to proceed.
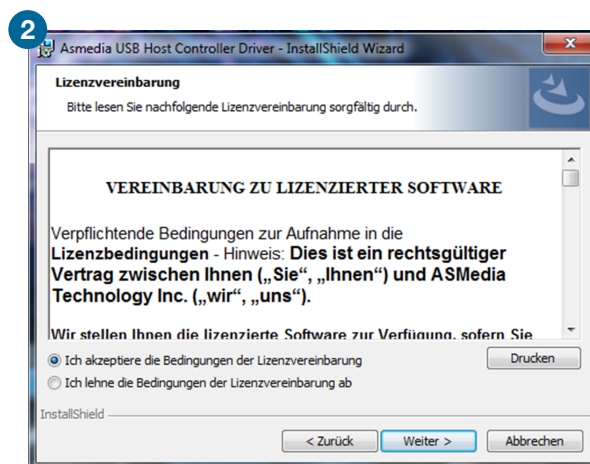
3 The installation will then be completed and the Delock card can be used.

4 You can verify the installation in the Windows device manager. You should see two more entries in the USB controller section:

4 ASMedia USB Root Hub
ASMedia USB3.1 eXtensible Host Controller
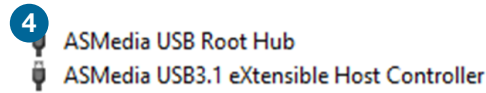
Renesas 30230 Installation

If you are using the Delock 89391/89325 with Windows 7 or 8, you will have to install the **Renesas 30230** driver manually.
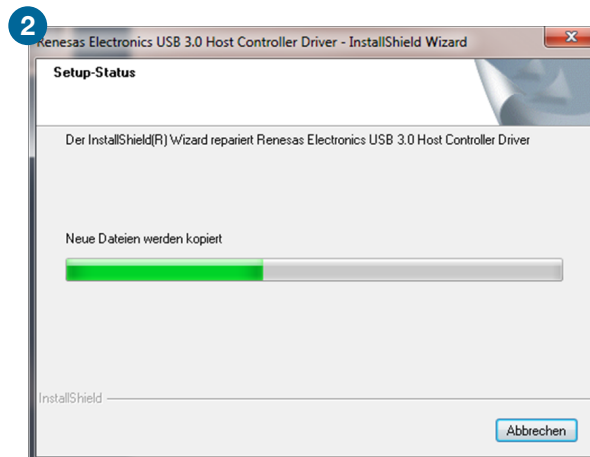Follow these instructions to install it.

- Please insert the installation CD *USB 3.0 to PCIe Host Adapters Drivers V1.1.0* in your CD drive and open the folder *RENESAS USB3 Driver\Driver*
  Open the subfolder *Driver* and run *RENESAS-USB3-Host-Driver-30230-setup.exe*.
- Alternatively, browse for the folder *USB3.0pciboard* on the USB stick that comes with the camera and run the *RENESAS-30230-setup.exe*.
- If your *User Account Control* is enabled, a dialog may ask you to launch the setup. Accept with *Yes*.

1 First, the installation is prepared:

1
Renesas Electronics USB 3.0 Host Controller Driver - InstallShield Wizard

Installation wird vorbereitet...

Renesas Electronics USB 3.0 Host Controller Driver Setup bereitet den InstallShield Wizard vor, der Sie durch den Setup-Vorgang leiten wird. Bitte warten.

Installation wird vorbereitet...

Abbrechen

2 Then the software components are copied:

2
Renesas Electronics USB 3.0 Host Controller Driver - InstallShield Wizard

Setup-Status

Der InstallShield(R) Wizard repariert Renesas Electronics USB 3.0 Host Controller Driver

Neue Dateien werden kopiert

InstallShield

Abbrechen

3 The installation is now completed and the Delock card can be used.
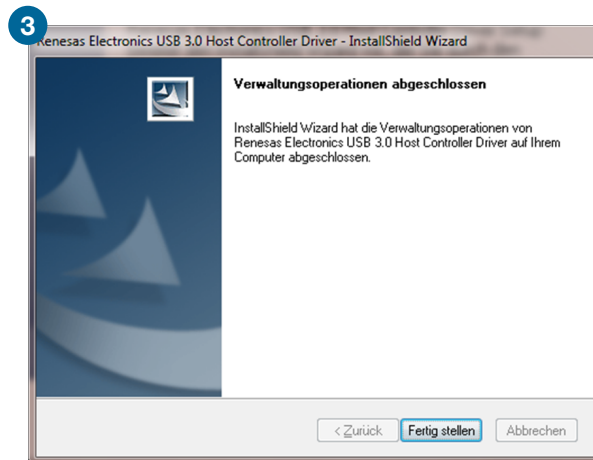
B.2. Cable Mounting

In case you are using an alternative USB cable with fixing screws, make sure you mount the cable properly:

- Plug the USB cable into the camera.
- Attach the fittings to the threads by hand.
- The maximum torque for the screws is 1 Nm.

SCREW THREADS
The screw threads of the camera are very sensitive due to their small size.

C. Lens Mount Configuration

C.1. PCO F-Mount Adapter

PCO's proprietary F-mount adapter for lenses with an automatic diaphragm. It manually sets the lens aperture by **turning the ring on the adapter** (see picture **1**).

F-mount lenses without an automatic diaphragm can be connected to the mount at the camera, but the aperture cannot be changed. An **automatic diaphragm** offers an additional manual control of the lens aperture (see picture **2**).

Matching Lenses with Automatic Diaphragm

Nikon   all Nikkor lenses of type D and type G (not for type E, this one is only electronic).

Zeiss   all ZEISS ZF.2 lenses (Otus, Milvus, Interlock, Distagon, Planar).

Sigma   only lenses equipped with a manual diaphragm ring; all other lenses have an aperture control lever which does not spring back if you turn the aperture ring at the adapter.

Tamron   only some lenses provide automatic diaphragm (no particular lens family):

Type 35 mm F-Mount:

- A012, A007, A009, A011, F012, F013, F013

Type APS-C(H) F-Mount

- B001, B005, G005

C.2. Change from F-Mount to C-Mount

Follow these instructions to change the optical input from F-Mount to C-Mount.

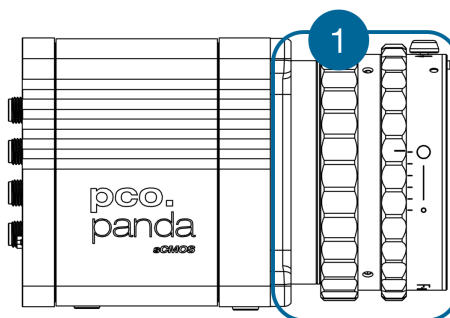**MECHANICAL DAMAGE OF THE C-MOUNT RING**
Tightening the hexagon socket setscrews too tight will permanently damage the C-mount ring.
Use a torque wrench and select a maximum torque of 1 Nm to tighten the hexagon socket setscrews.
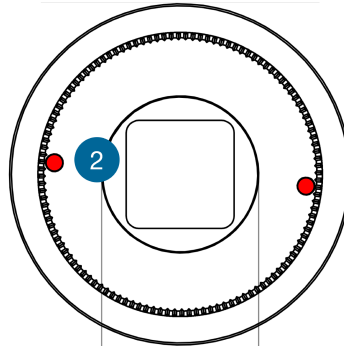
NOTICE

Step 1 : Remove the F-Mount Adapter

Turn the black lock ring (1) counterclockwise to loosen the F-mount adapter and then unscrew it.

Step 2 : Insert the C-Mount Ring

Carefully screw the C-mount ring (2) clockwise. The **two hexagon setscrews** must be loosened until they are visible on the outside.

Step 3 : Adjust the Focal Distance of the Flange

In order to reach the standard support dimension of the C-mount (17.526 mm), screw in the C-mount ring until it stands out 1.8 mm from the lens mount adaption (M45 x 0.5 internal screw thread).
Use a suitable lens with a large aperture for fine adjustment.
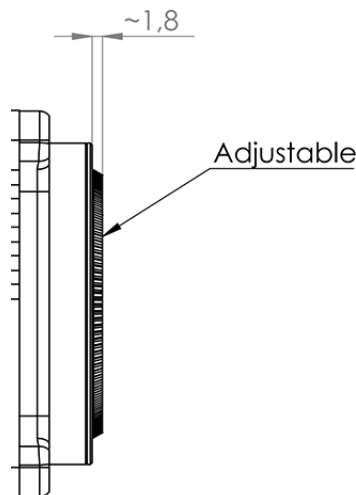
Follow these steps for the fine adjustment:

1 Set the lens focus to *infinity* and look at an object which is far away.

2 Rule of thumb: The distance to the object must be at least 200 times the focal length of the lens. The further away, the better.

3 Then turn the lens mount in until the object is sharp.

4 Look at an object which is positioned at the minimum working distance of your lens (as described in the corresponding datasheet).

5 Set the lens focus to the minimum working distance (the opposite direction of *infinity*).

6 Now adjust the lens mount until this object is sharp.

7 Repeat the above steps until the focus is consistently sharp in both positions.

Step 4 : Fix the C-Mount Ring

Tighten **both hexagon setscrews** (1.5 mm hex key) with a maximum torque of 1 Nm.
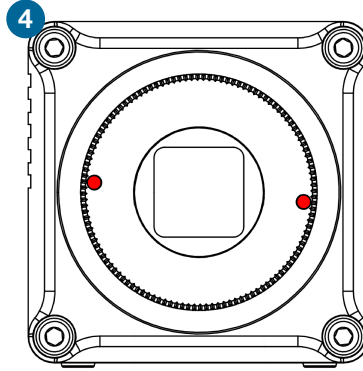
Limitations of C-Mount Lenses

Keep in mind that C-mount lenses can cause shadings at the edges of large-sized sensors. Most C-mount lenses are able to illuminate a maximum image circle of 11 mm (2/3"), 16 mm (1"), or 22 mm (4/3") diameter only.

The **pco.panda 26** has a sensor diagonal of 18.1 mm, therefore you have to use the ROI function for a shadeless image while using the C-mount adapter with the two smaller C-mount diameters.

D. Image File Formats

There are several file formats available for saving camera images with **pco.camware**.

B16   The B16 16 bit format is similar to the BMP format. However, 16 bit pixel values are used instead of 8 bit pixel values.

The file format consists either of a Basic Header (6 Long-parameter) or an Extended Header (32 Long-parameter), the latter is optional for additional information. It might follow a variable comment field (ASCII code). Finally, there is the actual data set that is saved linearly (as in the case of BMP files).

With the exception of the first value, all parameters are Long Integers (4 Byte). The first 6 parameters must always exist. The rest of the parameters, as well as the comment field, are optional.

	Parameter	Function
1	pco-	the first 4 byte are the characters pco-
2	file size	file size in byte
3	header length	header size + comment field in byte
4	image width	image width in pixel
5	image height	image height in pixel
6	extended header	-1 (true), extended header follows
7	color mode	0 = monochrome camera, 1 = color camera
8	b/w min	black/white LUT-setting, minimum value
9	b/w max	black/white LUT-setting, maximum value
10	b/w linlog	black/white LUT-setting, 0 = linear, 1 = logarithmic
11	red min	red LUT-setting, minimum value
12	red max	red LUT-setting, maximum value
13	green min	green LUT-setting, minimum value
14	green max	green LUT-setting, maximum value
15	blue min	blue LUT-setting, minimum value
16	blue max	blue LUT-setting, maximum value
17	color linlog	color LUT-setting, 0 = linear, 1 = logarithmic
18-266	internal use	

Comment file in ASCII characters with variable length of 0…XX. The length of the comment field must be documented in the header length field.

	16 bit pixel data
line 1, pixel 1	value of the first pixel
line 1, pixel 2	value of the second pixel
...	...

PCO recommends that all images should first be saved in the B16 or TIFF format. The advantage is to have the B16 or TIFF images available all the time, having the maximum 16 bit information. Note that not all image analysis programs can accommodate 16 bit data. The 8 bit format only saves the information displayed on the monitor screen. The 16 bit information will be lost and cannot be recovered.

pcoraw This 16 bit **PCO** file format is based on the new BigTIFF format, thus allowing for file sizes > 4 GB. A new proprietary **PCO** compression scheme is added if it is necessary.

Standard File Formats

Format	Description
TIFF	Tag Image File Format, version 6.0 and lower. There is a 16 bit monochrome and color image format.
BMP	Windows Bitmap Format, b/w or color 8 bit format-images, which have been saved in BMP format can be loaded later only as 8 bit images, i.e. part of the original information (16 bit) is lost.
FTS	Flexible Image Transport System, Version 3.1. It is a 16 bit image format defined by the NASA/Science Office of Standards and Technology (NOST) has defined this format. Some programs use the FIT extension for this format.
ASCII	16 bit format, some mathematical programs prefer ASCII data.
JPG	JPEG (named after the Joint Photographic Experts Group who created the standard) is a commonly used method of lossy compression for photographic images. The degree of compression can be adjusted, allowing a selectable tradeoff between storage size and image quality.
JP2	JPEG 2000 is a wavelet-based image compression standard and coding system. It was created by the Joint Photographic Experts Group committee in the year 2000 with the intention of superseding their original discrete cosine transform-based JPEG standard (created 1992).
AVI	Audio Video Interleave is a multimedia container format introduced by Microsoft in November 1992 as part of its Video for Windows technology.
MPG	MPEG-1, similar to JPEG, is a standard for lossy compression of video and audio developed by the Moving Picture Experts Group (MPEG).
WMV	Windows Media Video (WMV) is a compressed video format for several proprietary codecs developed by Microsoft. The original video format, known as WMV, was originally designed for Internet streaming applications, as a competitor to RealVideo.

E. Customer Service

E.1. Service

The camera is designed to operate with no need of special adjustments or periodic inspections.

E.2. Maintenance

UNPLUG CAMERA BEFORE CLEANING
Risk of injury due to electric shock!

→ Unplug the camera from any power supply before cleaning it.

CLEANING

→ Use a soft, dry cloth to clean the camera.

→ Do not clean the input window unless it is absolutely necessary.

→ Be careful and avoid scratches and damage to the input window surface.

→ Do not use liquid cleaners or sprays.

LENS CLEANING

→ The lens is best cleaned with pressurized air or with liquid cleaners such as pure alcohol or with special optical cleaners that are available at premium photo stores.

→ Use a cotton swab dipped in pure alcohol or optical cleaning liquid and wipe only on the glass surface.

→ Do not get any cleaning liquid on the metallic parts such as the lens thread, because tiny detached particles may scratch the surface.

CLEANING LIQUIDS
Aggressive cleaning liquids can damage your camera.

→ Never use aggressive cleaning liquids such as gasoline, acetone, spirits or nitro cleanser.

→ Every time the input window is cleaned, there is a possibility of surface damage.

PROTECTIVE CAP
Always store the camera with the protective cap or with a lens mounted to avoid dust and dirt on the input window.

E.3. Recycling

To dispose your camera, send it to **PCO** or take it to a local recycling center.

The camera includes electronic devices, which contain materials harmful to the environment. These electronic devices must be recycled.

E.4. Troubleshooting

You can use the **pco.camware** software for troubleshooting, as it has an integrated logging tool. The following instructions are based on the newest version of this software.

To download the newest version, or for detailed information on troubleshooting with other versions and the **pco.logging tool**, please consult our website:

- **pco.camware**
- **pco.logging**

Activate Log Files

Follow these instructions to provide the **PCO** support with information about your individual case in **pco.camware**.

As a first step, open **pco.camware**.

1 You can *Enable Logging* via the *?* (help menu) in the menu bar.
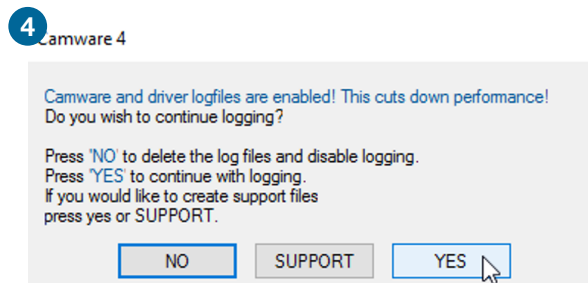Logging can be enabled while the camera is connected.
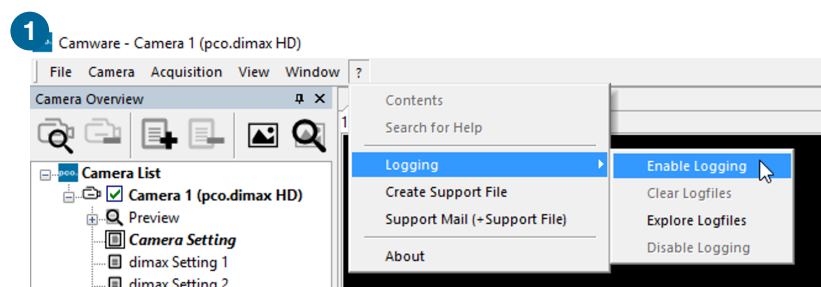
2   *Log files* will be created during the next start of **pco.camware** or when a 'Scan Camera' is
         started.
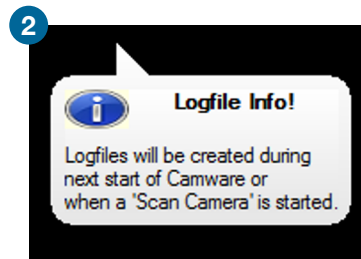
3   Save your image data before starting a rescan.
   Now select *Scan cameras*.
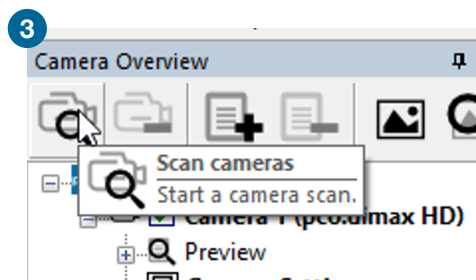
4   **pco.camware** will ask whether you want to *continue logging*.
   Confirm with *YES*.

5   **Repeat the steps that produce the errors**.
         In case the camera is not recognized and **pco.camware** starts in demo mode, the logging already
         documents possible communication problems.

Create Support File

After having reproduced the steps, create the *support file* and send it to **PCO**. The following steps explain how this is done optimally.
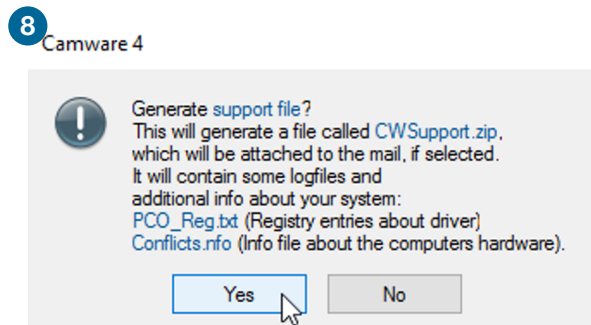
6 Select *Create Support File* via the *?* (help menu) in the menu bar.
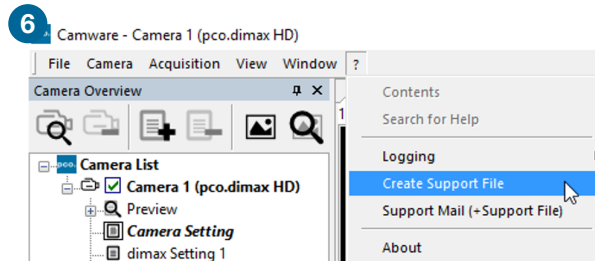
7 **Camware Logfile not found**
If this window appears, *log files* are not found or have not been created yet. In this case, *Scan cameras* again (**3**)
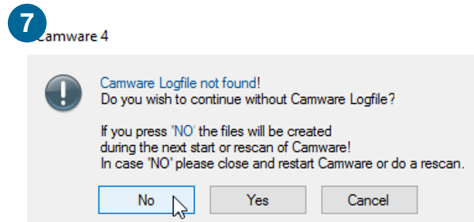
8 Click *Yes* to generate the support file that contains the log files and system information. Send it to **PCO support** (support@pco.de)
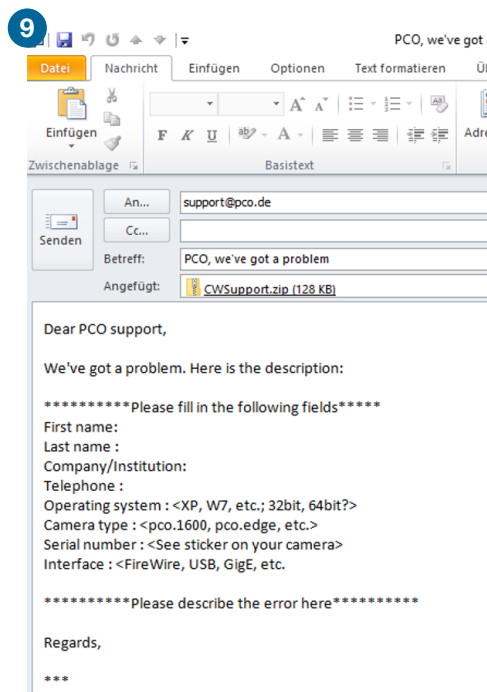
9 **Support Mail**
pco.camware can also create an email with the support file attached (standard email software must be installed on your computer).
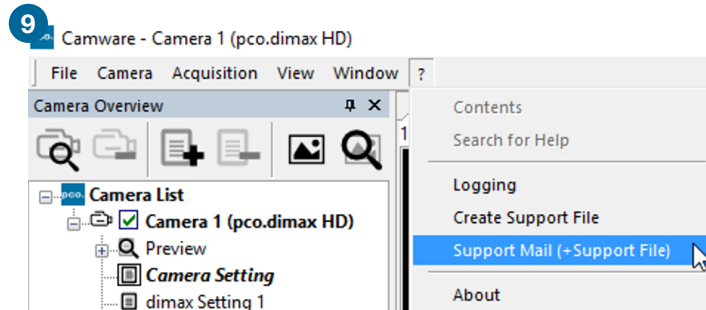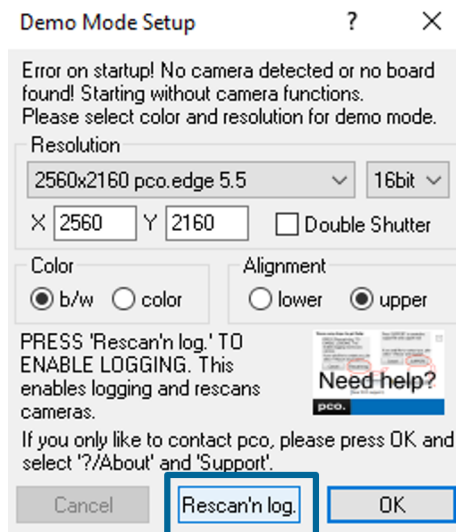

**Please fill out the form with as much relevant information as possible to facilitate support**:

Alternatively, you can visit the **PCO** website and upload the support file via our support ticket.

Demo Mode   If **pco.camware** cannot detect any connected camera, it will start in *demo mode*.
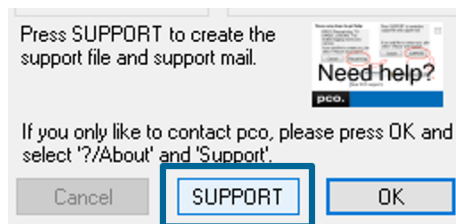It is also possible to *activate log files* in *demo mode*.

Demo mode will ask whether you want to *Rescan'n log*. After pressing this button, **pco.camware** will start a rescan and activate log files.

pco.camware will ask if you want to continue logging. Select *YES*.
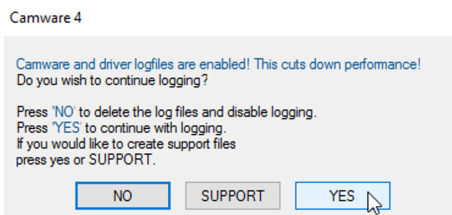
Now select *SUPPORT* to create a support file.

pco.camware can also create an email with the support file attached (standard email software must be installed on your computer).
For this option, see step **9** of **Create Support File** in this chapter.

contact

pco europe
+49 9441 2005 50
info@pco.de
pco.de

pco america
+1 866 678 4566
info@pco-tech.com
pco-tech.com

pco asia
+65 6549 7054
info@pco-imaging.com
pco-imaging.com

pco china
+86 512 67634643
info@pco.cn
pco.cn

for application stories
please visit our website

pco.

An Excelitas Technologies Brand