OCULUS | Corvis® ST

INSTRUCTION MANUAL

Tonometer - Pachymeter

OCULUS®

Notes on this instruction manual

Thank you for your purchase and the trust you have placed in this OCULUS product. The Corvis® ST has been manufactured and tested according to strict quality criteria. You have selected a modern and well-engineered product.

To ensure safe operation, it is essential that you use the device correctly. For this reason you should familiarise yourself thoroughly with the contents of this instruction manual before operating the device. In particular, pay attention to the safety instructions.

- This instruction manual describes the measuring procedure of the Corvis® ST.

Due to ongoing development, the diagrams shown may depict minor changes to the actual device delivered.

If you have any queries or would like additional information about your device, do not hesitate to mail us, call us or send us a fax. Our service team will gladly assist.

OCULUS Optikgeräte GmbH

OCULUS is certified according to DIN EN ISO 13485 setting high standards of quality where development, manufacture, quality assurance and service regarding the entire range of products are concerned.

Table of Contents

1 Scope of Delivery

Component	Order number
■ Corvis® ST	72210
■ Eye patch	44560
■ Dust protection cover	6010005001
■ Paper for chin rest	65313
■ Paper roll (3 rolls)	65311
■ Power supply	05150280
■ Instruction Manual	G/72100....en

We reserve the right to change the scope of delivery in line with ongoing technical development.

➔ When checking the delivery, if you discover transport damages, immediately make your claim with the transport company.

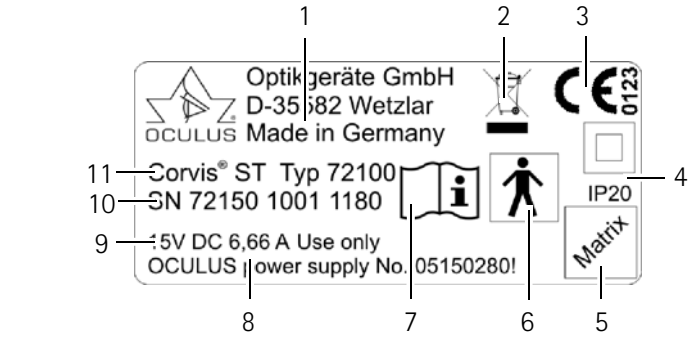
➔ Have the damage confirmed on the bill of lading, so that a proper claim settlement is possible.

➔ Keep the packing material.

Note

We reserve the right to change the scope of delivery in line with ongoing technical development.

2 Type plates



1 *Company logo + address*
2 *Disposal with household waste is prohibited*
3 *CE*
4 *Protection class*
5 *Matrix*
6 *Application part of type BF*
7 *Read the operating instructions*
8 *Power supply number*
9 *Fuse rating*
10 *Serial number*
11 *Device name and number*

Fig. 2-1: Type plate: Gauge head and device interior

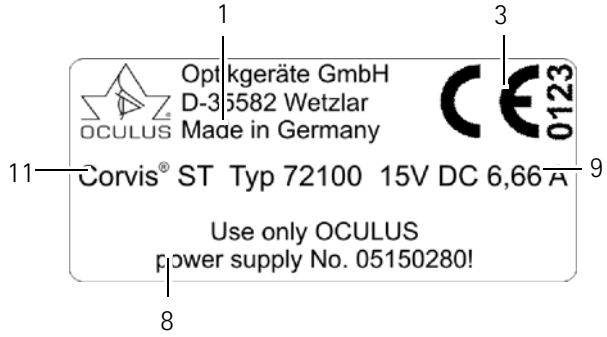


Fig. 2-2: Type plate: Connection (see meaning above)

3 Safety Instructions

3.1 About this Manual

➔ Read the instruction manuals carefully.
➔ Carefully store the instruction manuals near the device.
➔ Observe the legal regulations with regard to accident prevention.

The instruction manuals describe the following versions:

- Control Pad: Version 1.00.648
- Gauge head: Version 1.00.651

The following software versions are used:

- Corvis® ST program: Version 1.00xx
- Patient Data Management: Version 6.07b02

3.1.1 Graphic symbols used

Warning

Describe serious adverse reactions and potential safety hazards, limitations in use imposed by them, and steps that should be taken if they occur.

Note

Instructions for use, and useful or important information.

Identifies important information about the product or its operation, which require special attention.

3.2 Safety Instructions for Use

Attention

Personal or property damage due to false operation

➔ Comply with the following safety instructions.

Personal or property damage due to unsafe equipment modifications

➔ No modifications may be made to this device without the permission of the manufacturer.

Information for the operators

➔ Make sure that the Corvis® ST is used only by persons

- who can guarantee proper handling due to their knowledge, training and practical experience.
- who have been instructed by OCULUS staff or an authorized dealer before the initial operation.

Information for set-up and connection

➔ Do not use the Corvis® ST outdoors or in damp rooms, and do not store the device there.

➔ Keep the Corvis® ST away from water that may drip, splash or spray on it, and make sure that no liquids can enter the Corvis® ST. Do not place any containers holding liquids in the vicinity of the Corvis® ST.

➔ Only operate the Corvis® ST in rooms used for medical purposes if VDE 0107 installation procedures have been observed.

➔ Do not operate the devices included in the delivery in areas where explosions may occur, or in proximity to flammable anesthetics or volatile substances such as alcohol, benzine or similar products.

➔ Do not force any electrical connections. If you are unable to connect a plug, check whether the plug fits the socket.

➔ If you detect any damage to the connection, let our service personnel repair the defect.

Information about operation

➔ Never put a damaged Corvis® ST into operation.

➔ Only operate the Corvis® ST using original accessory parts supplied by us, and only when the device is in technically correct working order.

➔ Before first use: Let OCULUS or an authorized dealer train you in the operation of the Corvis® ST.

➔ Only operate the device if you have understood the instruction manuals

Information for Maintenance

➔ The operating company must ensure that the device undergoes technical measurement testing every 2 years according to MPBtreibV, Appendix 2 Tonometer.

To ensure that it functions correctly and safely we recommend the following:

➔ Have the Corvis® ST checked every two years by our service department or an authorized dealer. If an error occurs which you are unable to correct, label the Corvis® ST as "out of order" and contact our service department or an authorized dealer.

Information for removal and disposal

➔ When you disconnect electrical connections, pull on the respective connectors, not the cord.

➔ Dispose of the device according to legal regulations.

Notes on Electrical Safety

Attention

Personal or property damage due to false auxiliary equipment

Any auxiliary equipment that is to be connected to either analogue or digital interfaces of the Corvis® ST must be verified to fulfill appropriate EN or IC specifications. Furthermore, all configurations must comply with the IEC 60601-1 system norm.

➔ Make sure that only correct auxiliary equipment will be connected.

Personal or property due to an incorrect level of safety

Connection of the Corvis® ST with non-medical electrical equipment (e.g. data processing equipment) to a medical electrical system must not cause patient-relevant safety levels to fall below IEC 60601-1 levels. If making this connection leads to the leakage current threshold being exceeded, protective measures including a circuit breaker must be in place.

➔ Ensure that connections with non-medical devices are made correctly.

➔ Only use the AC adapter stated in the packing list.

➔ If you use a power strip to connect the Corvis® ST: Make sure that the ground wire in the power strip is not interrupted in order to avoid excessive leakage. The power strip must meet the requirements of IEC 60601-1.

Electromagnetic Compatibility (EMC) / Cables

Attention

Personal or property damage caused by electromagnetic interference

Portable and mobile RF communications equipment can affect medical electrical equipment *sect. 25.1, page 94*.

➔ Make sure that portable and mobile RF communications equipment do not cause interference.

4 Indications for Use

The Corvis® ST is intended to measure intraocular pressure of the eye and to photograph the eye and take Scheimpflug images of the anterior segment of the eye to evaluate the thickness of the cornea.

The Corvis® ST is designed for hospitals and eye care professionals. The device may only be used in environments that are intended for eye examinations.

5 Contraindications

None known.

6 Warnings

The Corvis® ST is an automatic non-contact Tonometer with the additional function of our PACHYCAM which is a non-contact pachymeter.

The automatic non-contact tonometer function is the center of application while the additional Pachymetry function give the examiner first hints of any unusual values which were unknown before the examination.

If some unusual corneal thickness values are present, further examinations with devices like our Pentacam® might be necessary.

Furthermore if some unusual intraocular pressure values are preset, further examinations with devices like the Goldman Tonometer might be necessary.

Furthermore if some unusual intraocular pressure values are preset, further examinations with devices like the Goldman Tonometer might be necessary.

7 Transport to installation location

The transport and storage conditions according to IEC 60601-1 with the appropriate packaging are valid for a period of up to 15 weeks, see *"Transport and storage requirements (according to IEC 601 - 1)" on page 92*.

➔ Wait approx. 3-4 hours after transport before operating the Corvis® ST. Extreme temperature changes from cold areas to warm rooms can cause condensation on the optical components.

Note

Equipment damage due to incorrect transport and improper storage

➔ Avoid shocks and vibration.

➔ Avoid contamination, high temperatures and humidity.

➔ Transport the Corvis® ST professionally.

➔ Store the Corvis® ST according to the storage conditions.

➔ Avoid placing near radiators and moisture.

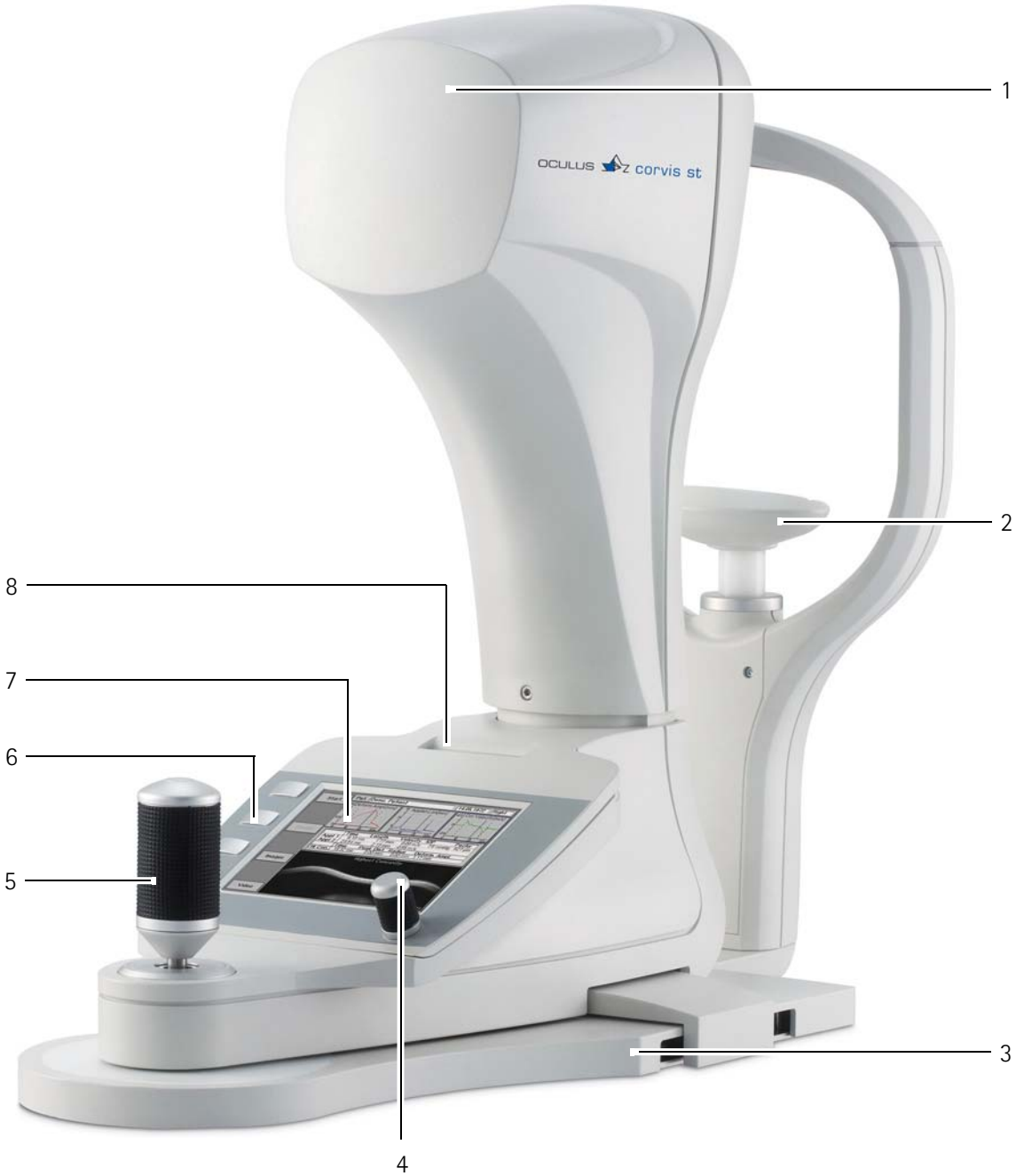
Note

➔ Keep the packing material. You can then ship or transport the unit in the proper manner for any servicing or repairs that may arise. You can thus avoid unnecessary damage and costs.

8 Device Description

8.1 Overview of Device Components

Side - view



1 *Gauge head*
2 *Chin rest*
3 *Xyz-base*
4 *Control knob*
5 *Joystick*
6 *Function keys*
7 *Display*
8 *Printout slot*

Fig. 8-1: Corvis® ST: Side view

Front - view

1	*Forehead rest*	6	*On/Off switch*
2	*Air nozzle / window of the slit lamp*	7	*Control LED*
3	*Lens protection glass*	8	*Mains connection*
4	*LED to illuminate the eye*	9	*USB port*
5	*Marking for the eye height*	10	*Safety stop*

Fig. 8-2: Corvis® ST: Front view and connections

8.2 Mode of Operation of the Corvis® ST

The Corvis® ST is a non-contact tonometer equipped with an optical Pachymetry function.

The Corvis® ST measures intraocular pressure without contact with the eye by applying an air puff to the eye. During the air puff the eye gets illuminated by a 9 mm slit through the apex and a built-in high-speed camera records the movement of the eye with more than 4000 images per second.

The high-speed camera uses a sequence of 140 Scheimpflug images of the cornea which are analyzed by a built-in computer.

Intra ocular pressure is determined by the detection of the applanation moments of the cornea.

Based on the Imbert-Fick principle the intraocular pressure is calculated by dividing the amount of air pressure into the area of applanated surface.

The device increases the air pressure puffed onto the cornea in proportion to time. The shape of the cornea changes from the normal convex surface to a concave surface.

This change is optically detected within 140 Scheimpflug images. The device calculates the time required to applanate (plane shape) the cornea with the air puff.

The slit light illuminates a sectional plane from the front surface of the cornea to the back surface during the air puff. The transparent cells of the cornea scatter the slit light such that the sectional plane appears as if it were self-luminous.

This is captured at an angle of 45° through the pupil by a camera, whereby the image plane of the camera is also tilted 45° to the optical axis of the camera lens, in order to sharply focus the light-scattering cornea plane onto the image plane of the camera (Scheimpflug image).

Due to this arrangement, sharp sectional images of the cornea can be obtained.

The pachymetry principle uses also the sectional images of the cornea.

Corneal thickness and shape are obtained from images when the Cornea is not influenced by the air puff.

Tonometry and Pachymetry are measured at the same measurement process.

9 Start-up

Before you can operate the Corvis® ST for the first time, you must follow the instructions as per *sect. 9.1, page 11*.

If you want to put the Corvis® ST into operation after an in-house transport, follow the instructions as per *sect. 9.3, page 12*.

9.1 Initial Start-up

Before you can operate the Corvis® ST for the first time, you must

- set it up and adjust it
- get trained

Attention

Incorrect measurements / equipment damage due to a lack training

➔ Before first use: Let OCULUS or an authorized dealer train you in the operation of the Corvis® ST.

Incorrect measurements / equipment damage due to incorrect set-up

➔ Before the first use, make sure the installation and connection of the "Corvis® ST" examination area is completed by our service or by a professional authorized by OCULUS.

9.2 Set-up Jobs for Initial Start-Up

➔ Wait approx. 3-4 hours after transport before operating the Corvis® ST. If the Corvis® ST was stored in a cold room or vehicle during the cold time of the year, a significant change in temperature may cause condensation to appear on optical parts of the Corvis® ST.

➔ Check if the transportation safety device is unlocked, *sect. 9.3.2, page 12*.

9.3 Adjustments after an in-house transport

Note

Equipment damage due to incorrect lifting

If the Corvis® ST is lifted by the forehead rest, it can break off.

➔ Grab the Corvis® ST from below to lift it.

9.3.1 Device set-up

➔ Place the Corvis® ST on a level surface.

➔ Place the Corvis® ST so that no direct light can effect the measurement.

➔ Avoid shocks and vibration.

➔ Avoid contamination, high temperatures and humidity.

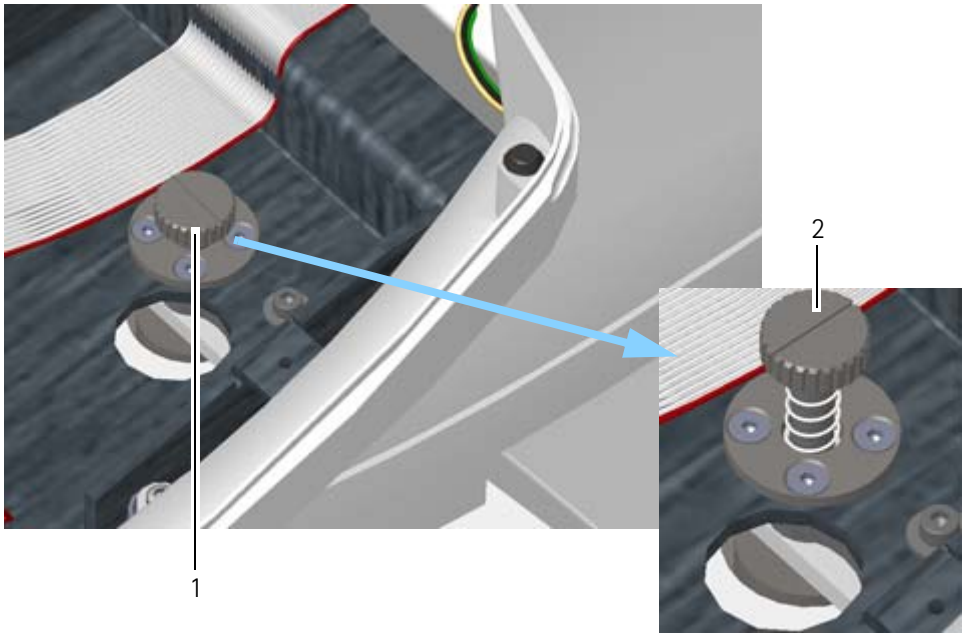
9.3.2 Unlock transport safety device

During transport the Corvis® ST is secured with a transport safety device. This must be unlocked before use.

➔ Open the cover with the display.

Fig. 9-1: Open the cover with the display

➔ Unlock the transport safety device if it is locked (1).



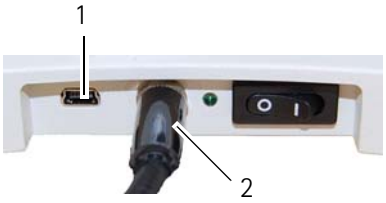
1 "Locked" position *2 "Unlocked" position*

Fig. 9-2: Unlock transport safety device

➔ Press down gently on the transportation safety device and turn it counter-clockwise to the "unlocked" position (2). The spring will push the transport safety device up.

➔ Close the cover with the display, *Fig. 9-1, page 12*.

9.3.3 Device connection



➔ Connect the unit to the power supply with the power cable provided (2).

➔ If desired, connect the device to your PC / laptop using the USB port (1).

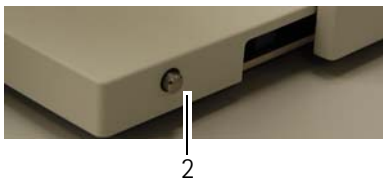
In order for the data from your PC/laptop to be read, you have to have the Corvis® ST program, the "Grabber" software, and the Patient Data Management software installed on it.

9.4 Daily operation

Switching on the Corvis® ST

➔ Make sure that the mains voltage is the same as the voltage specified on the rating plate.

➔ Switch on the Corvis® ST with the On/Off Switch (1).



Setting the safety stop

The safety stop (2) is a lock that prevents the air nozzle from touching the patient's eye.

You can independently determine the position of the stop.

➔ Press down on the safety stop (2) and hold it.

➔ Move the Corvis® ST into the desired position.

➔ Release the safety stop (2).

The safety stop is set. You can only move the Corvis® ST as far as this position. You can move the Corvis® ST towards the rear at any time.

Attention

Risk of contact of the patient's eye with the air nozzle

➔ Before starting a measurement, make sure the safety stop is set correctly. This prevents the air nozzle from touching the patient's eye.

Adjust the break

The brake (1) prevents the Corvis® STL from moving fast and jerkily on the XY-base. This enables you to better control the position of the device.

➔ Turn the brake to the desired position.
To the right: Corvis® ST is hard to move
To the left: Corvis® ST is easier to move

Switching off the Corvis® ST

➔ End the current session.

➔ Switch off the Corvis® ST with the On/Off Switch (1).

10 Using the control pad

You enter and manage patient data with the control panel. In addition, you start the measurements and can view the results with it.

1 *Display*
2 *Control knob*
3 *Joystick*
4 *Joystick button*
5 *Screen-dependent Buttons*

Fig. 10-1: Functions of the Control Pad

Component	Function	Operation
Display (1)	Shows program screens Serves as a touch screen	➔ Lightly press the desired button
Control knob (2)	Changes the corresponding Parameters Enables the selected parameters	➔ Turn the knob to the left or right. The selected parameter is highlighted in blue. ➔ Press the control knob downwards. The selected parameter is enabled or disabled.
Joystick (3)	Sets the height, distance and direction to the left and right	➔ Move the joystick forward, back and sideways, turn it, *"Fine Adjustment" on page 24*.
Joystick button (4)	Starts the measurement manually (if the eye-tracking function is turned off)	➔ Press the button.
Buttons (5)	Enables the adjacent button field, depending on the associated screen	➔ Press the desired button.

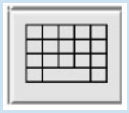
10.1 Display with Touch Screen

In addition to the screen-dependent buttons, you can also use the buttons on the touch screen. The buttons change depending on the function of the display.

➔ Lightly press the corresponding buttons on the touch screen to enable the function.

Buttons on the touch screen

You can use the following buttons in Patient Data Management.

Button	Function
	Change keyboard
	Delete character
	Escape
	Enter
	Return to upper line

11 Using Patient Data Management

When you turn on the Corvis® ST, Patient Data Management is shown first.

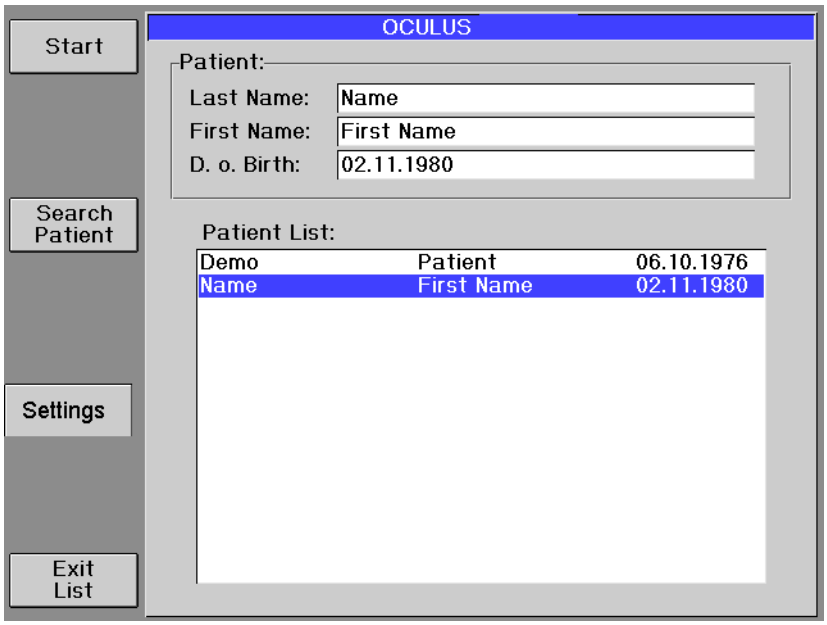


Fig. 11-1: Corvis® ST switch on

Use Patient Data Management to associate examinations with a patient or when you want to save them long-term.

➔ In these cases, it is best to enter the patient's name and date of birth before you conduct the measurement.

11.1 Entering new patients

➔ To input a new patient, press the button [New Patient] in the patient data menu.

The following screen is displayed:

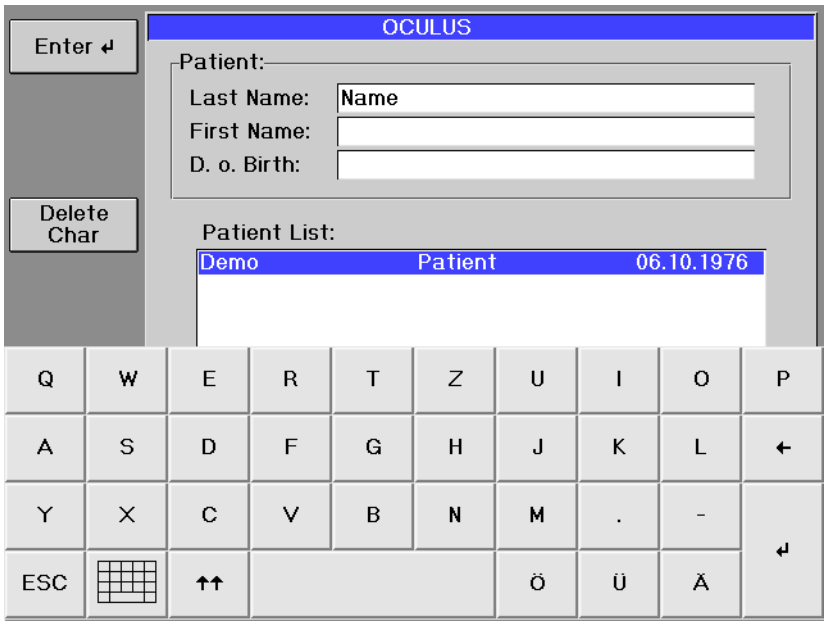


Fig. 11-2: Touch-screen keyboard, enter patient data

➔ Use the touch-screen as described in *(sect. 10.1, page 16)*.

➔ Enter the patient's last name and confirm with [Enter].

➔ Enter the first name. Confirm by pressing [Enter].

In the "D.o.Birth" field, the touch-screen keyboard changes to a numeric keypad:

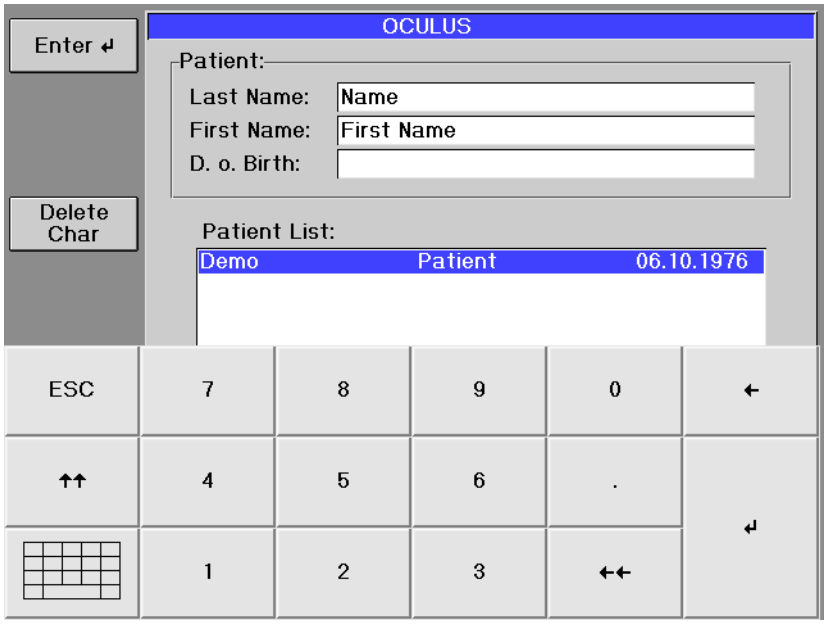


Fig. 11-3: Touch screen keyboard, numeric keypad

➔ Enter the date of birth and confirm with [Enter].

You will be asked if you want to save the new patient data.

➔ Select "Yes".

The patient's name appears in the list.

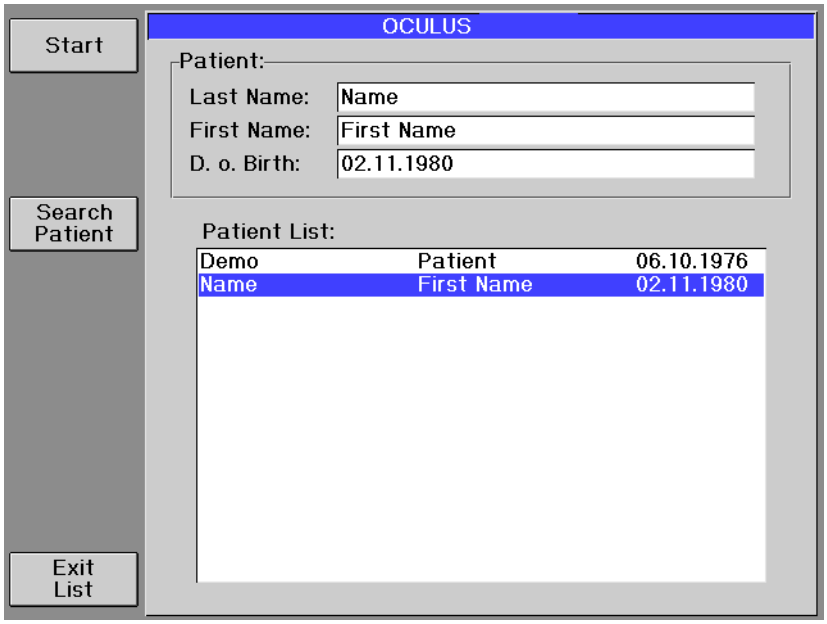


Fig. 11-4: Patient list

➔ Press the [Start] button to switch to measure mode.

11.2 Select an existing patient

Choose a patient whose data is already stored, and whom you wish to examine again.

➔ In the Patient Data Management *(Fig. 11-1, page 17)* menu, press the [Patient List] button.

➔ Turn the control knob to the desired entry in the list.

➔ Press the control knob to select the desired patient.

➔ Press the [New Exam/Back] button to switch to measure mode.

11.3 Delete a Patient or an Examination

If you want to delete a patient or an examination:

➔ Select the patient in question.

➔ Press the [Pat./Exam Delete] button.

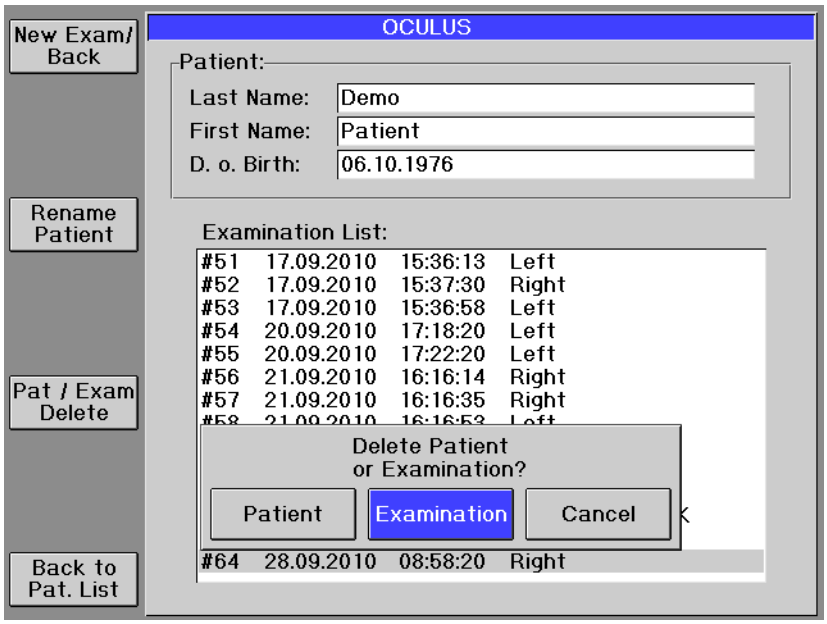


Fig. 11-5: Delete a Patient or an Examination

To delete a patient:

➔ Press the [Patient] button.

The patient will be deleted.

To delete an examination:

➔ Select the examination that is to be deleted.

The line for the selected examination appears highlighted in blue.

➔ Press the [Examination] button.

The examination will be deleted.

12 Perform a Measurement

Attention

Risk of contact of the patient's eye with the air nozzle

➔ Before starting a measurement, make sure the safety stop is set correctly, *"Setting the safety stop" on page 14*. This prevents the air nozzle from touching the patient's eye.

Danger of pinching to hands or body parts

➔ During a measurement: Make sure that the patient does not put either his hand or any other body part between the gauge head and adjusting base.

Note

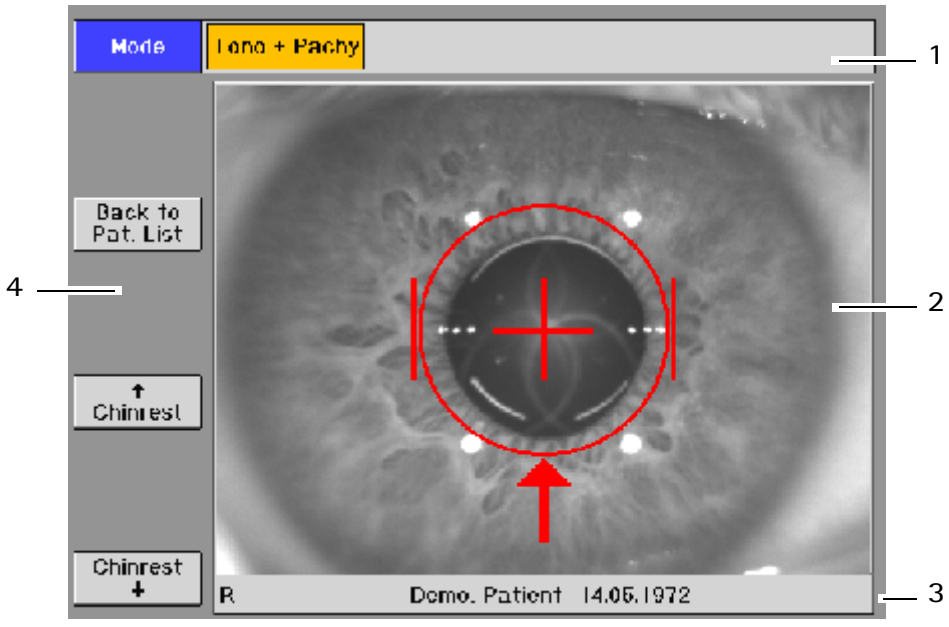
Incorrect measurements from a dirty air nozzle

➔ Before each measurement, check the glass part of the air nozzle from a diagonal angle for dust, dirt, etc.

➔ If necessary, clean the air nozzle *"Clean the air nozzle (2)" on page 79*.

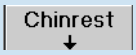
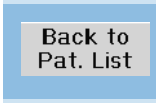
➔ Press the [Start] button to start the measurement process.

During the measurement process, you will work with the following display:



1 Display measuringmode
2 Camera image
3 examinated eye
4 Buttons

Abb. 12-1: Measurement procedure

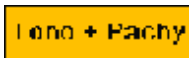
Button	Function
 	Adjust height
	Back to Patient Data Management
	Measure mode, automatically enabled

12.1 Select a measuring mode

Depending on th version you can select d the measuring mode.

➔ Press this button.

Tono + Pachy



➔ Press this button to select the measuring mode „Tono + Pachy".

12.2 Corvis® ST Adjustment

Before you initiate a measurement, you must adjust the Corvis® ST.

12.2.1 Rough Adjustment

➔ Make sure there is new paper on the chin rest.

➔ Ask the patient to place his or her head on the chin and forehead rest.

1 Mark eye height

Fig. 12-2: Position patient according to the markings

The eye height marking (1) between the chin rest and the headrest should be located roughly at the centerline of the patient's eye.

Attention

Risk of contact of the patient's eye with the air nozzle

Fast and/or uncontrolled movements may cause the air nozzle to touch the patient's eye.

➔ When operating the Corvis® ST, move it carefully toward the patient's eye.

➔ If necessary, adjust the height of the chin rest with the buttons ↑ Chinrest and Chinrest ↓.

In addition, you can also adjust the height of the gauge head by turning the joystick:

Turn it clockwise to move the gauge head upwards.

Turn it counter-clockwise to move it downwards, see *"Fine Adjustment" on page 24*.

➔ To prepare the patient prior to the measurement:

Explain to the patient what will happen next to help him/her relax:

"A little air will be blown into your eye. Don't let it scare you. Please be patient and relax for a moment.".

➔ Ask the patient to not blink during the measurement, otherwise the measurement results will be falsified.

➔ Move the adjusting base until the patient's eye is focused on the display.

➔ If necessary: Adjust the height with the buttons ↑ Chinrest and Chinrest ↓.

12.2.2 Fine Adjustment

➔ Use the information on the display and the joystick to make any fine adjustments. Move the joystick in the direction indicated.

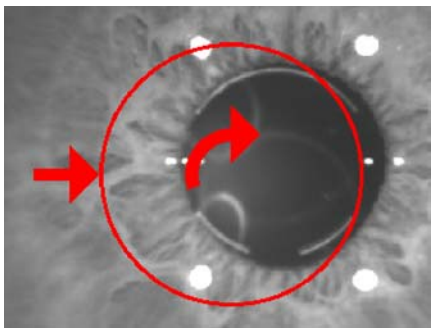


Fig. 12-3: Fine Adjustment

Example ➔ Move the joystick to the right.
➔ Turn the joystick clockwise.

.

Arrow	Camera movement	Joystick movement[a]
→	right	Move the joystick to the right
←	left	Move the joystick to the left
↑	forward	Move the joystick toward the patient
↓	back	Move the joystick away from the patient
↷	up	Rotate the joystick clockwise
↶	down	Rotate the joystick counter-clockwise

a. If you turn the joystick to its limit, the measuring head and the chin rest move in the opposite direction.

When the position has been reached accurately enough, a cross appears in the center of the ring that is bordered by four bars.

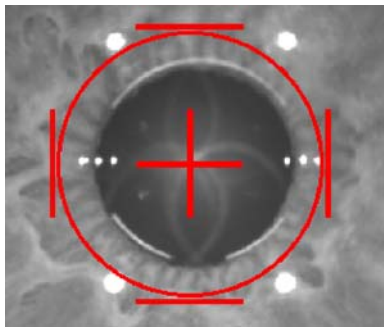


Fig. 12-4: Final position reached

12.3 Start measurement

Depending on the setting the Corvis® ST will automatically begin measuring, alternately you can start the measurement procedure manually.

Automatical measurement

When the position has been reached accurately enough the Corvis® ST will automatically begin measuring *Fig. 12-4, page 25*.

Manual measurement:

➔ To start the measurement manually, press the joystick button *(Fig. 10-1, page 15, Item 4)*.

After the start, the measurement is calculated. You have to wait for this process before you can view the results *(sect. 12.7, page 28)* or can save *(sect. 13, page 36)* them.

12.4 Saving data

Depending on the installation, your data is stored on a USB flash drive or transferred to a PC / laptop.

Note

Loss of data due to interrupted save

If you turn off the Corvis® ST while the progress bar is still displayed, data will be lost.

➔ Do not turn off the power until saving is completed, e.g. when the progress bar is complete.

PC/Laptop: If the Corvis® ST is connected to a PC/laptop, the data is automatically transferred to the Patient Data Management software on the PC, *sect. 14, page 42*.

Prerequisite:

- You must have the Corvis® ST software, the "Grabber" software and Patient Data Management software installed on your PC / laptop.
- The directory paths of the "Grabber" software and Patient Data Management software must be reconciled, *sect. 15.13, page 63*.
- The "Grabber" feature must be enabled in the Patient Data Management options, *sect. 15.12.5, page 60*.

You can now view the examination results, *sect. 12.7, page 28*.

12.5 Re-using data with the USB flash drive (optional)

If your Corvis® ST is not connected to a PC, your data is stored on a USB flash drive that is connected on the inside of the unit.

You can save the data onto a USB flash drive that is inserted in the device. For information on how you can reuse the data see *sect. 15.7, page 47*.

➔ Press the Save to Patient button. The measurement results are saved with the appropriate patient's data.

You can re-use this data on a PC.

Prerequisite: You must have the Corvis® ST program, and Patient Data Management software installed on your PC/laptop.

There are .DAT and .BMP data records on the USB flash drive. You can import this data with the Patient Data Management program.

➔ Open the cover with the display.

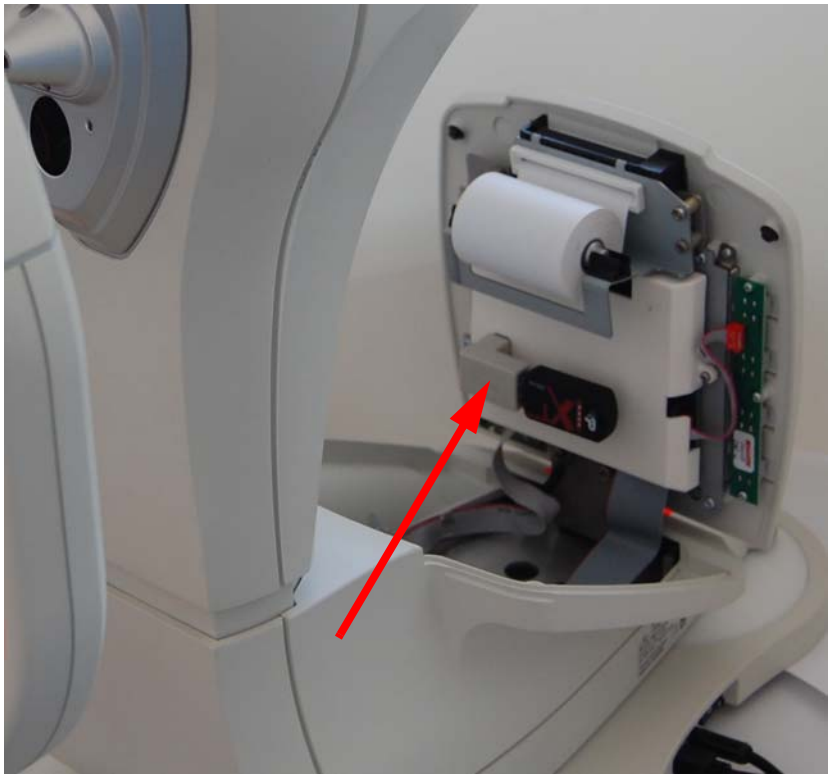


Fig. 12-5: Open the cover with the display

➔ Pull out the USB flash drive.

➔ Plug the USB flash drive into your PC.

Now you can import the data into the Patient Data Management program, *sect. 15.7, page 47*.

12.6 Complete measurement

➔ After each patient remove one of the paper sheets from the chin rest. See also *sect. 18.4, page 82*.

➔ Disinfect the forehead rest after each patient, *sect. 18.2, page 81*.

Attention

Risk of infection after examining a sick patient

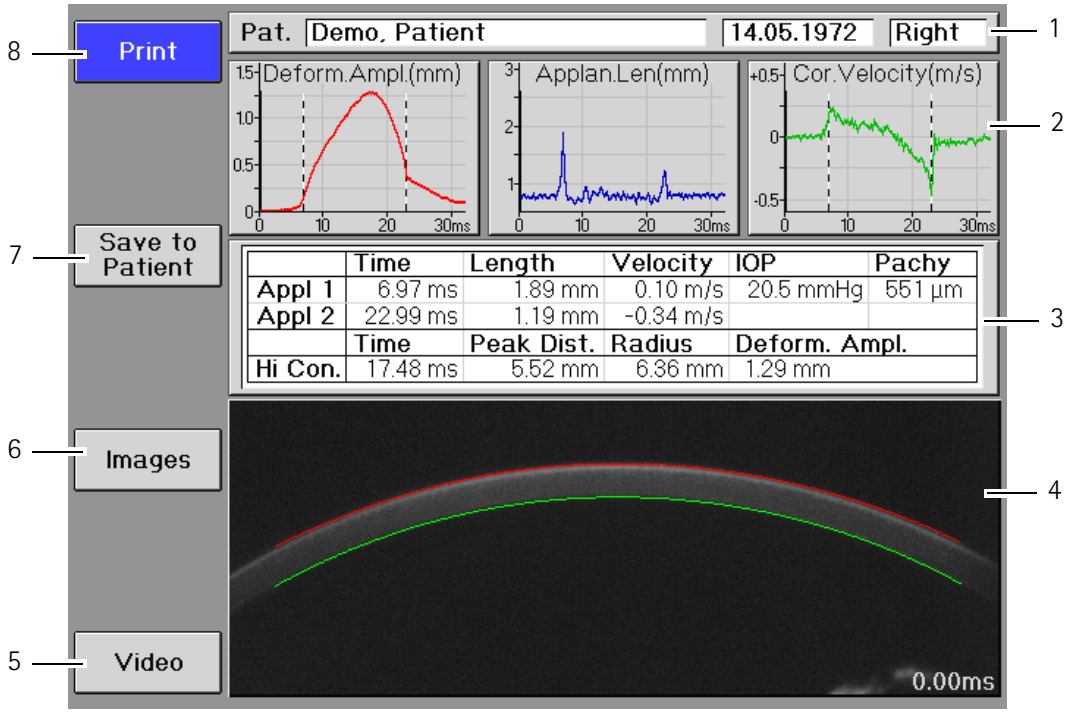
If you perform a measurement on a sick patient, the air nozzle and the front cover can be contaminated.

➔ Clean the air nozzle when you have examined a sick patient, see *"Clean the air nozzle (2)" on page 79*.

➔ Disinfect the front cover *sect. 18.2, page 81*.

12.7 Display Measurement Results

After the examination, when the measurement is complete, the following overview is displayed with the measurement results:



1 *Patient data*
2 *Corneal deformation parameters*
3 *IOP / Pachy values*
4 *Camera image*
5 *[Video] button*
6 *[Images] button*
7 *[Save to Patient] button*
8 *[Print] button*

Fig. 12-6: Overview screen, examination of the right eye

Keyboard layout

Button	Function
Video	You can view the recorded Scheimpflug images as a video. This shows the deformation of the cornea in slow motion.
Images	Switch between views
Save to Patient	Button is displayed after a measurement. Saves the patient's examination data *sect. 13, page 36*
Back to Pat. List	Back to selected patient
Print	Print measurement results

Corneal deformation parameters (2) enlarged view

➔ Click on the curve that you want to see in the enlarged view, for example Deform. Ampl. (mm).

You return to the overview with the [OK] or [Cancel] buttons.

- **Deformation amplitude (mm)**

  Progress of changing the position of the apex during the measurement.

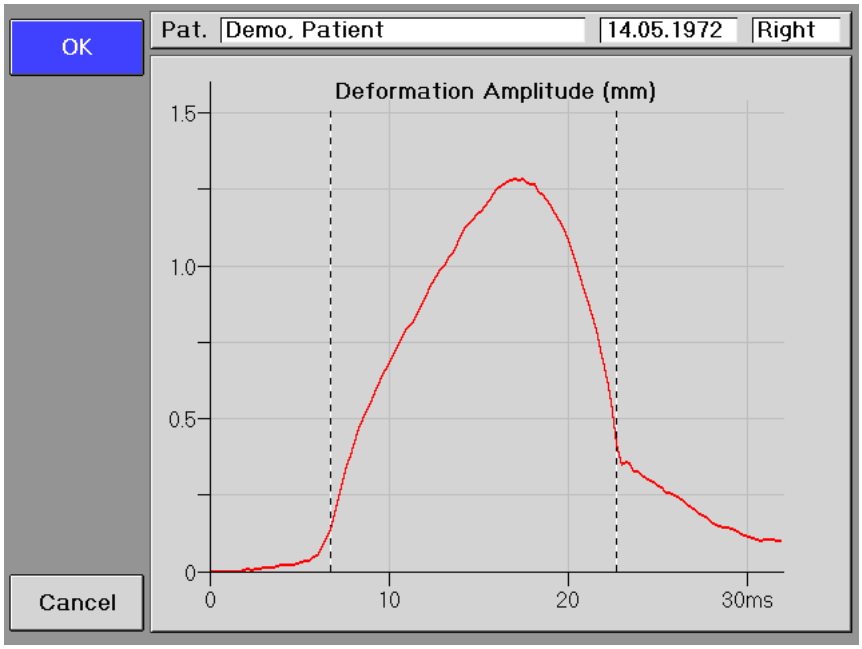


Fig. 12-7: Graph of deformation amplitude

- **Applanation length (mm)**
  Progress of the applanation length (flattened area) during the measurement.

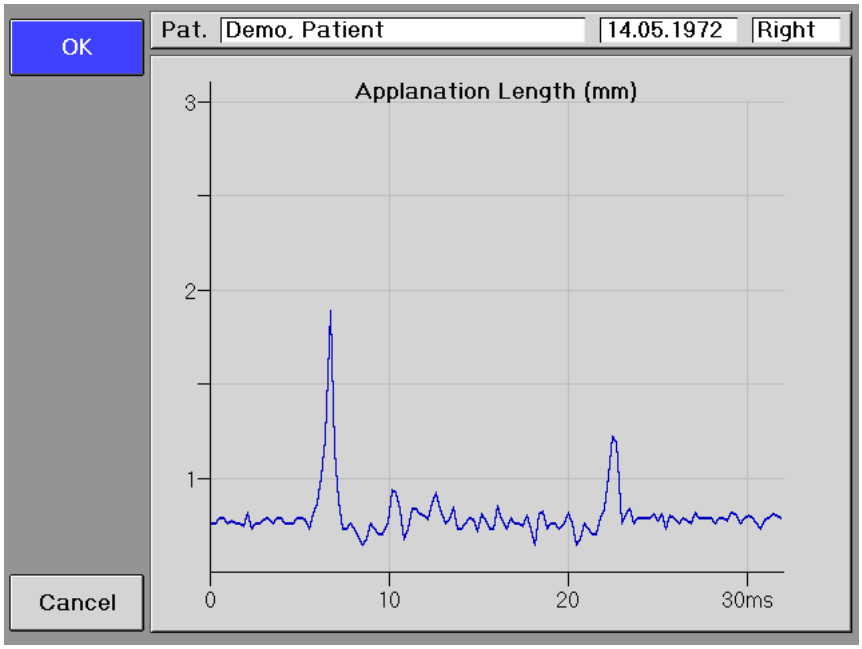


Fig. 12-8: Graph Applanation length

- **Corneal velocity (m/s)**
  Progress of the corneal velocity (from the apex) during the measurement.

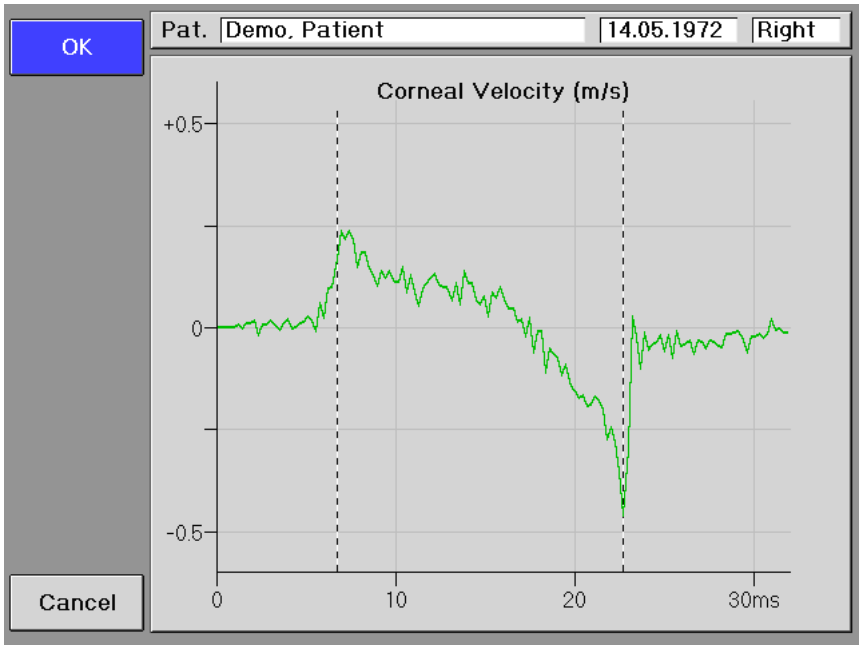


Fig. 12-9: Corneal velocity curve display

Display IOP / Pachy values (3)

	Time	Length	Velocity	IOP	Pachy
Appl 1	6.97 ms	1.89 mm	0.10 m/s	20.5 mmHg	551 µm
Appl 2	22.99 ms	1.19 mm	-0.34 m/s		
	Time	Peak Dist.	Radius	Deform. Ampl.	
Hi Con.	17.48 ms	5.52 mm	6.36 mm	1.29 mm	

Fig. 12-10: IOP / Pachy values

In this table the IOP/Pachy values and corneal deformation values are shown in figures.

Parameter	Designation
Time	The time between the two images is defined by the frame rate of 4330 frames per second.
Length	The length of the applanation is determined by a fixed, straight line in the apex position of the front corneal function. It defines the difference between the straight line and the corneal front. If the deviation of the straight line left and right from the apex is greater than a certain limit, the applanation length is limited. The positions are determined by the Scheimpflug analysis.
Velocity	The velocity is determined by the difference in the position of the apex in 2 images of the video that were made with the high-speed Scheimpflug camera. The positions are identified by the deformation amplitude that was calculated with the Scheimpflug analysis.
IOP	Intra Ocular Pressure
Pachy	Central corneal thickness (apex)
Max. Dist.	If the deformation amplitude reaches its maximum, the maximum distance between the two maximum values is displayed next to the concave area "maximum distance". The positions are calculated using Scheimpflug analysis.
Radius	The value of "radius" describes the radius that an imaginary sphere would need to have to produce the curvature in the cornea. The positions are calculated using Scheimpflug analysis.

Parameter	Designation
Deform. Ampl.	The deformation amplitude is determined by the deformation of the apex before, during and after the air blast. The position of the apex for each image is calculated using the Scheimpflug analysis.

Show individual images (6)

Images

➔ Press this button to display different camera images.

Scheimpflug image

If no video is playing, a Scheimpflug image with different lines will be shown first:

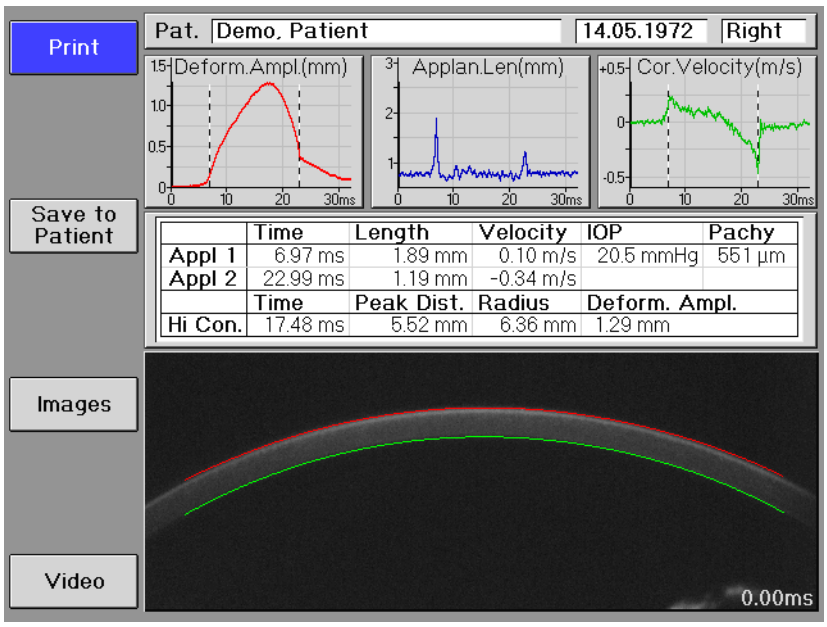
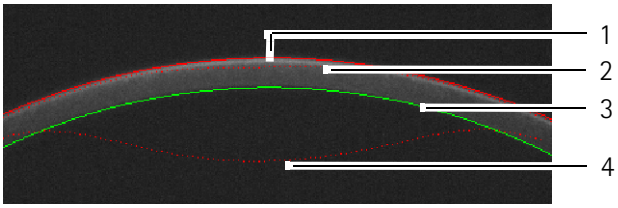


Fig. 12-11: Scheimpflug image

Depending on the setting, lines as shown in this illustration are displayed



1 Front of the cornea
2 Applanation 1 of the cornea
3 Back of the cornea
4 Strongest curvature of the cornea

Fig. 12-12: Importance of the lines on Scheimpflug images

Applanation 1

shows the applanation of the cornea before deformation by the air blast

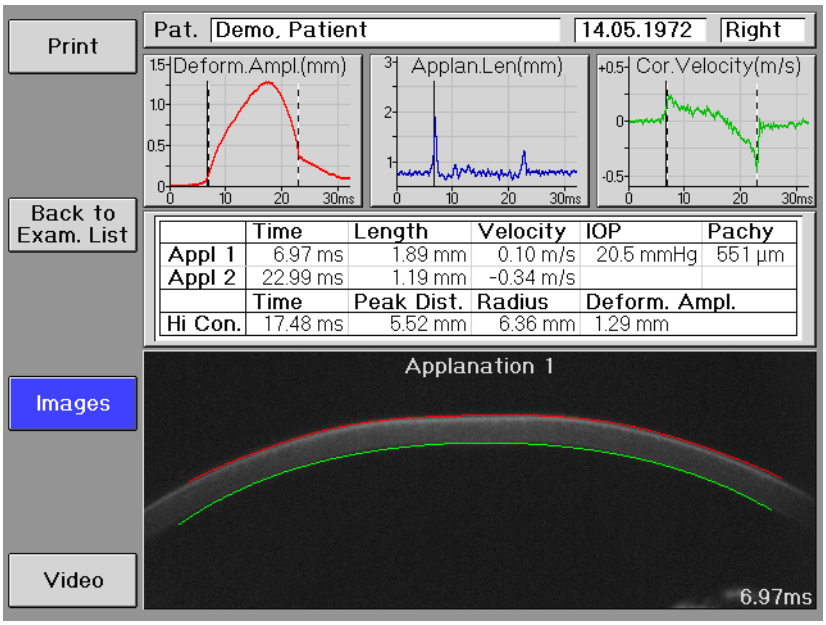


Fig. 12-13: Camera image applanation 1

Applanation 2

shows the applanation of the cornea after deformation by the air blast

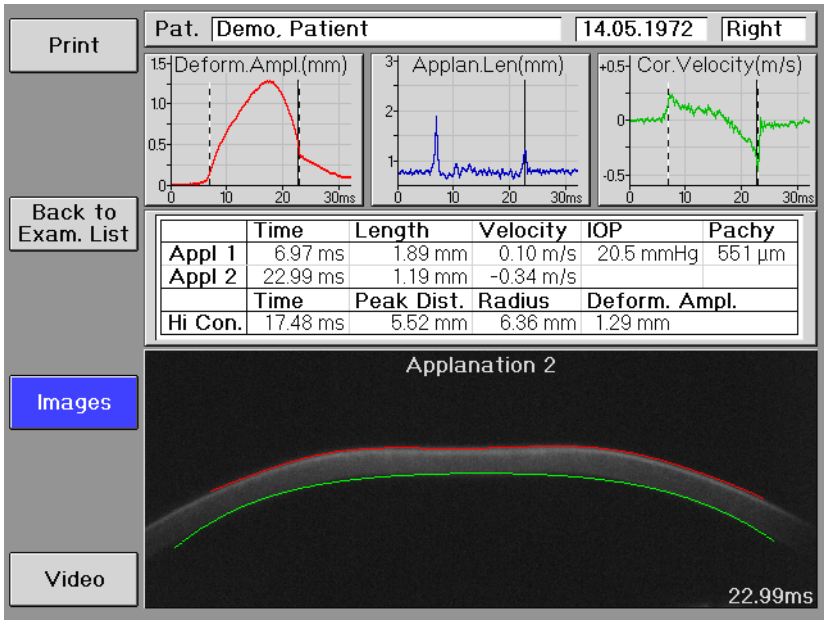


Fig. 12-14: Camera image applanation 2

- **Strongest curvature**

shows the strongest curvature of the cornea from the air blast; in other words, the apex at the greatest distance from its original position

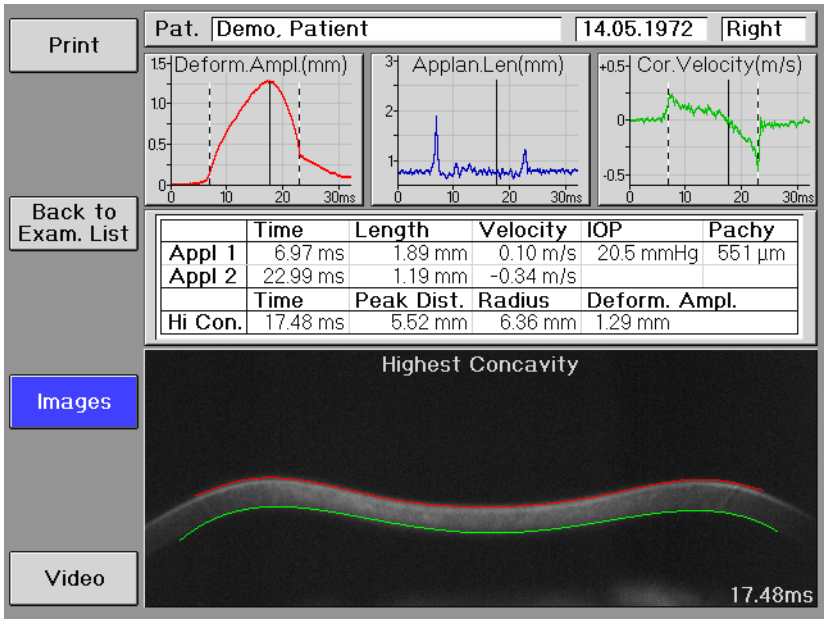


Fig. 12-15: Camera image strongest curvature

View Video (5)

Video

➔ Press this button to display the deformation of the cornea as a video.

➔ Touch the screen to pause the video.

Print teh results of the measurement (5)

➔ Press this button to print measurement results.

Note

The printer uses thermal paper. The readability of the thermal paper is reduced by ageing.

➔ Copy the prints to keep the measurement results safely.

13 Change settings

Here you can adjust the default settings for your individualized measure mode.

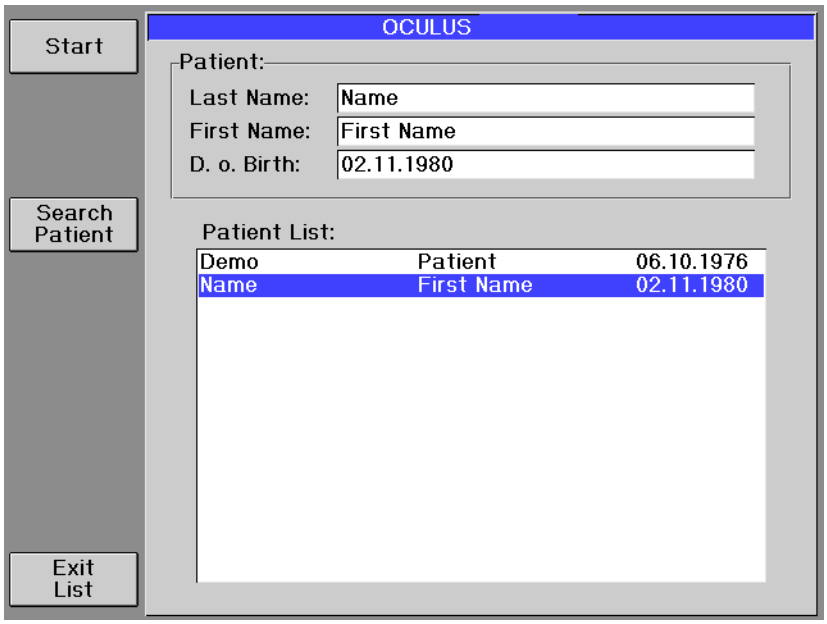
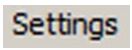
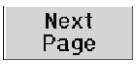


Fig. 13-1: Switch to [Settings] screen



➔ Press this button to display the "Settings 1" screen.

On each screen you can set the values as follows:



➔ Press this button to get to the next settings page.

➔ Press this button to save your settings.

➔ Press this button to cancel the settings.

➔ Turn the knob to the left or right. The selected group is highlighted in blue.

➔ Press the control knob downwards. You can set the parameters in the box.

The selected parameter is highlighted in blue.

If you want to enter a value, such as "Clock" time:
Press the control knob. The parameter is highlighted in blue.

➔ Turn the knob to the desired value.

➔ Press the control knob to confirm the value.

If you want to enable/disable a radio button, such as "start screen":

➔ Press the control knob.

13.1 Settings 1

You can configure the measurement start and display settings on the "Settings 1" screen.

➔ Press this button to get to the "Settings 1" screen.

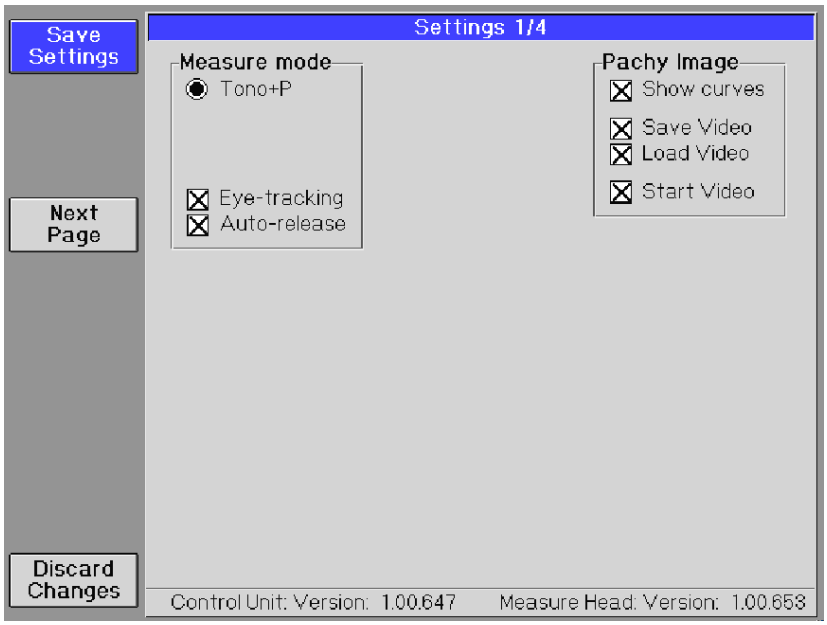
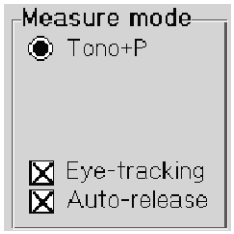


Fig. 13-2: Display: Settings 1



Measure Mode

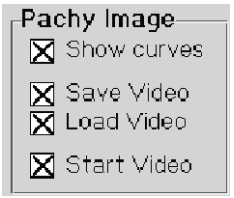
Group Box: Measure Mode

Here you can view the combinations of the measuring functions:
Tono+P: Tonometry + pachymetry.

You can set the "Eye-tracking" and "Auto-Release" functions:

- Auto position: Automatic adjustment of the measuring head in y-direction (height).
- Eye-tracking: Automatic triggering of the measuring process. If this feature is disabled, you must manually trigger each measurement, *"Manual measurement:" on page 25*.

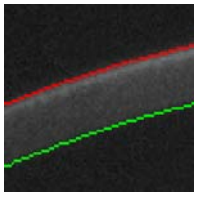
➔ Rotate and press the control knob to enable or disable the functionality "eye-tracking" and "auto-release".



Settings for the pachymetric curves

Group Box: Pachy Image

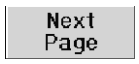
- Enabled checkbox "Show curves": the front and back are shown in red and green colors:



- ➔ Enable the check box "Save Video": The video of the cornea deformation process is stored in the examination data.
- ➔ Enable the "Load Video" checkbox: The video is also loaded when loading an examination.
- ➔ Enable the "Start Video" checkbox: The video will continue to play while an examination is loading.

13.2 Settings 2

You can set various display parameters with the "Settings 2" display.



➔ Press this button on the "Settings 1" screen.

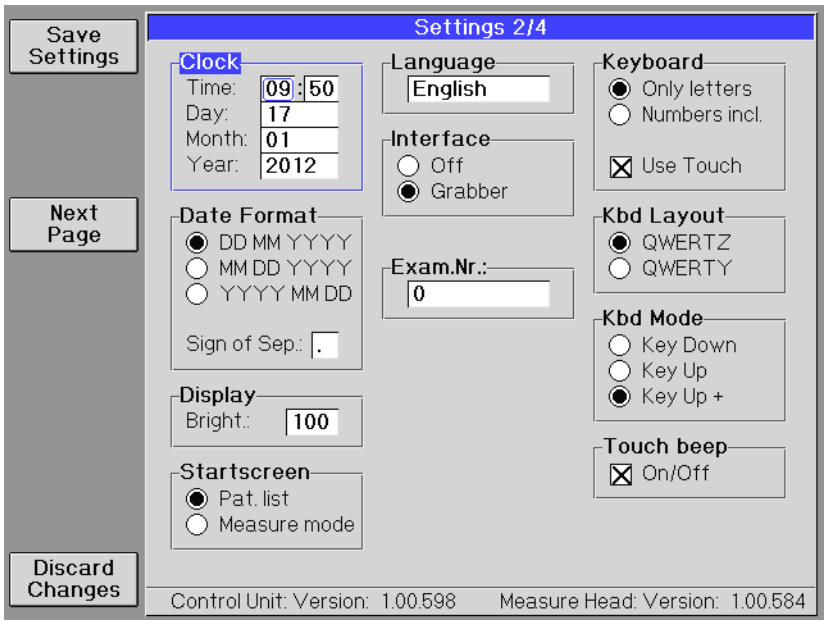
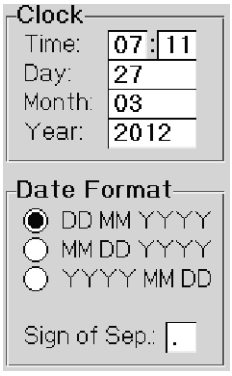


Fig. 13-3: Display: Settings 2



Set date and time

Group box: Time / date format

➔ In these two fields, you set the time and the date by turning and pressing the control knob.

Set the brightness of the display

Group Box: Display

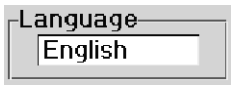
➔ Adjust the brightness of the display here.

Set parameters for the start-up screen

Group Box: Start-up screen

➔ Enable the radio button "Pat.List" to start the Patient Data Management on start-up.

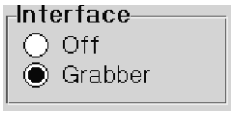
➔ Enable the radio button "Measure Mode" to start a measurement right after start-up.



Language

Group Box: Language

➔ Select the display language.



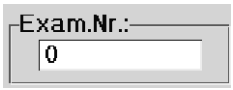
Interface

Group Box: Interface

➔ Select the radio button "Off" to disable the interface.

With the Grabber interface and optional PC software you can export examinations from the Corvis® ST to your PC using a USB cable. You must enable this feature, so that data can be exported.

➔ Select the "Grabber" radio button.



Set print number

Group Box: Print no.

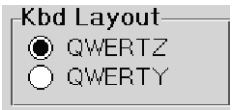
For identification purposes the "print no." appears on each printout and can be reset to zero at any time.

➔ Set the number with which to begin printing.

Set keyboard interface

Group Box: Input

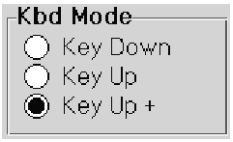
➔ In the "Keyboard" field, select the keyboard interface for the touch screen to, for example, input patient data.
Only letters: The touch-screen keyboard displays letters
Numbers incl.: The touch-screen keyboard shows a series of numbers and letters
Use Touch: Touch screen enabled/disabled



Set the keyboard layout

Group Box: Kbd layout

➔ Select the keyboard layout:
QWERTZ: German keyboard layout
QWERTY: U.S. keyboard layout



Select contact control of the touch screen

Group Box: Kbd Mode

➔ Select the contact control of the touch screen:
"Key Down": Character input through direct contact with the touch screen

"Key Up": Character input by releasing the Touch Screen

"Key Up+": Character input by releasing the Touch Screen In addition, the entered character is also displayed on the display:

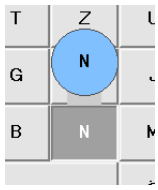


Fig. 13-4: Kbd Mode "Key Up+", Example: The letter N

Confirmation tone (Touch beep) enable and disable

Group Box: Touch beep

➔ Enable/disable the confirmation tone for the touch screen with the radio button "On/Off".

13.3 Settings 3

On the "Settings 3" screen you can individually configure the printouts.

➔ Press this button on the "Settings 2" screen.

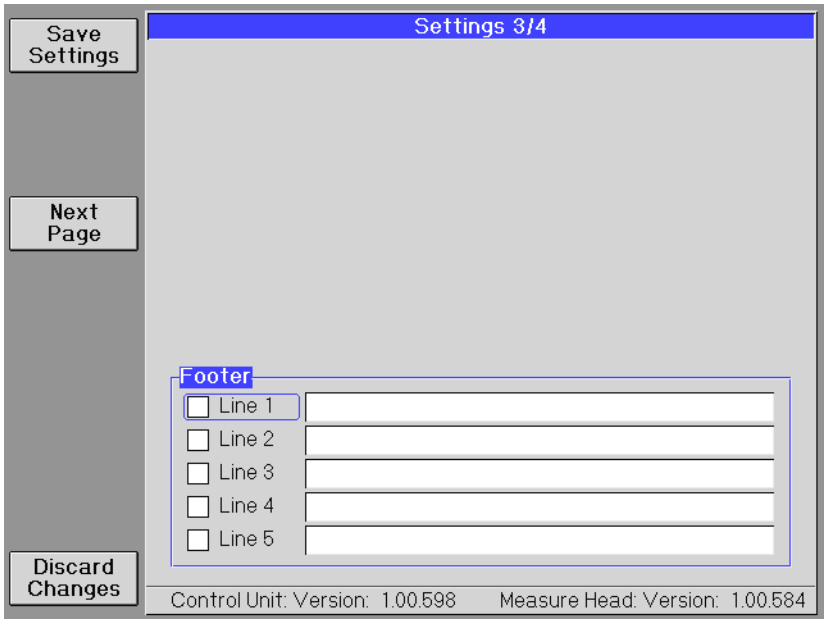


Fig. 13-5: Display: Settings 3

Printout footer

If you want to include your business or office name on the printout:

➔ Enter the appropriate information in the lines provided for that purpose and enable the checkboxes in front of each line.

Note

Settings 4/4 is used only for service purposes. These settings can only be set by the OCULUS service or authorized distributors.

14 Working with the Corvis® ST on a PC

You must have the following programs installed on your PC:

- Corvis® ST program
- Patient Data Management program
- "Grabber" program

If you have connected the Corvis® ST to a PC using a USB cable, data is automatically transmitted with the "Grabber" program. You must configure the appropriate settings on your Corvis® ST device, see *sect. 13.2, page 38*.

How to work with the data is described first for the Patient Data Management program, then for the Corvis® ST program.

Quick Start

To get started quickly, here is a brief overview of the main data processing steps, in order:

- Start Patient Data Management, see *sect. 15.6, page 46*
- Open patient/exam, see *sect. 15.7.2, page 49*
- if necessary, use additional Patient Data Management functions, see *sect. 15.8, page 50*
- Reconcile directory paths, see *sect. 15.6, page 46*
- Work with the Corvis® ST program on the PC, see *sect. 16, page 64*

If necessary, import data from the USB flash drive, see *sect. 12.5, page 27*.

15 Connecting the Corvis® ST with a PC

This chapter offers you information how to connect the Corvis® ST with an external PC and which settings have to be made.

15.1 Installing the Corvis® ST Software

You will find detailed information in the *Software Installation*.

➔ Check the minimum requirements of your PC/laptop, further information in the *Instruction Manual* of the Corvis® ST.

The Corvis® ST software is located on the included CD.

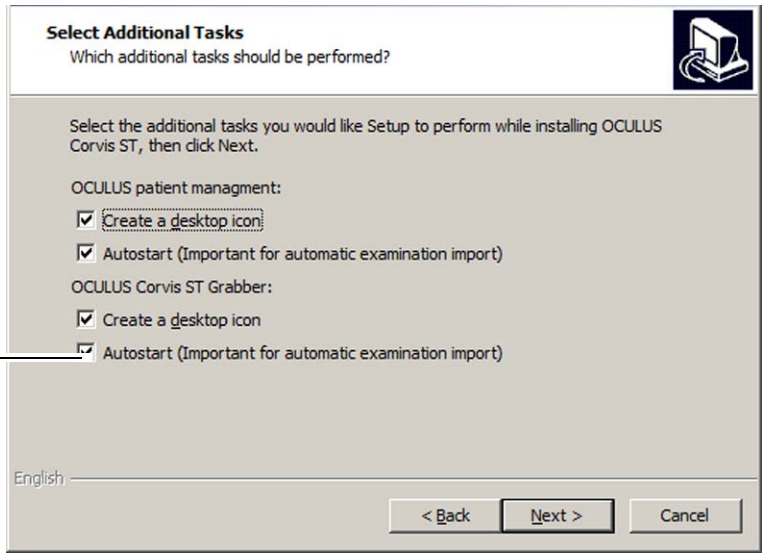
➔ Switch on the Laptop/PC..

➔ Insert the CD.

➔ Open the drive of the device software in Windows Explorer: *C:\CORVIS*

➔ Double click „Setup.exe" to start the installation.

➔ Proceed as requested until the following screen appears::



1 Checkbox [Autostart (Important for automatic examination import)]

Fig. 15-1: "Select Additional Tastks" screen

➔ Activate [Autostart (important for automatic examination import].

➔ Proceed as requested.

15.2 Installing the Driver Softwaren

If applicable you have to install the driver software. Administrator rights are required.

➔ Open the drive of the device software in Windows Explorer: *C:\CORVIS\DRIVER*

➔ Double click "Setup.exe" to start the installation

➔ Proceed as requested.

You will find detailed information in the *Software Installation*.

15.3 Changing the Settings

If applicable you have to change some settings. Administrator rights are required.

➔ Adjust the USB-Root-Hubs.

➔ Change the settings for the power plan.

You will find detailed information in the *Software Installation*.

15.4 Corvis® ST Software: Settings 2

Further information in *sect. 13, page 36*.

➔ Open Corvis® ST program.

➔ Press this button on the "Settings 1" screen.

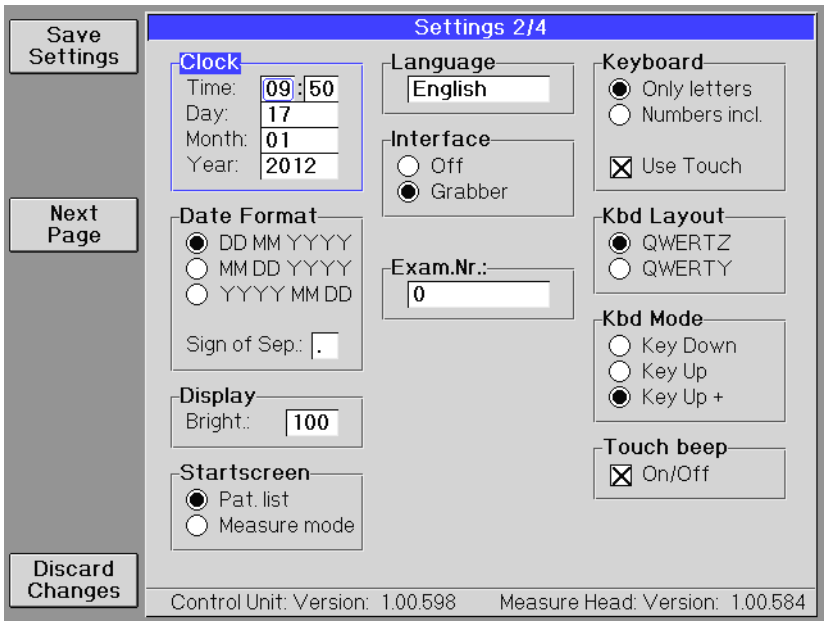
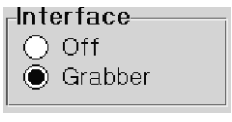


Fig. 15-2: Display: Settings 2



Group field: Interface

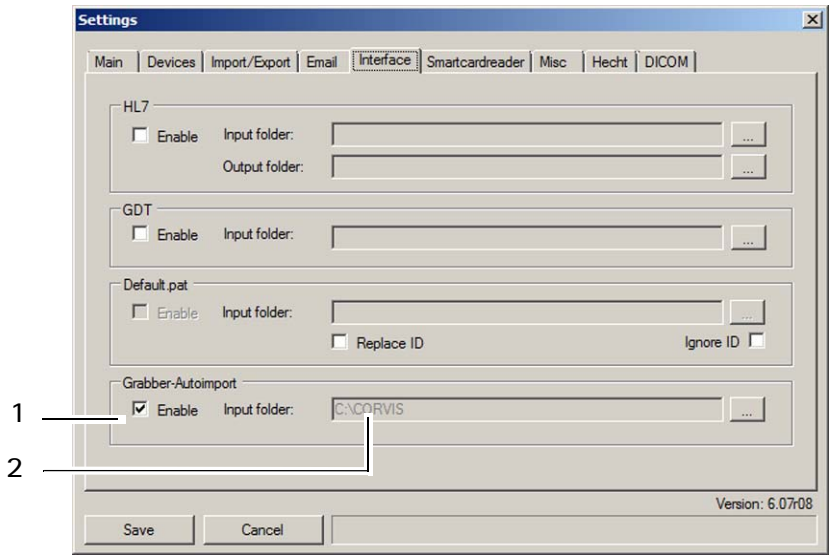
➔ Enable the „Grabber" radio button.

15.5 Settings in the Patient Data Management: "Interface" tab

Further information in *sect. 15.6, page 46*.

➔ Open patent data management.

➔ Select „Settings" > „Interface.



1 [Enable] check box *2 Settings for Grabber import*

Fig. 15-3: "Interface" tab

➔ Enable the Grabber import check box if you wish to transfer the data automatically to your computer via USB cable. For this, align the directory path in the input folder (2) with the directory path in the grabber software, *sect. 15.6, page 46*.

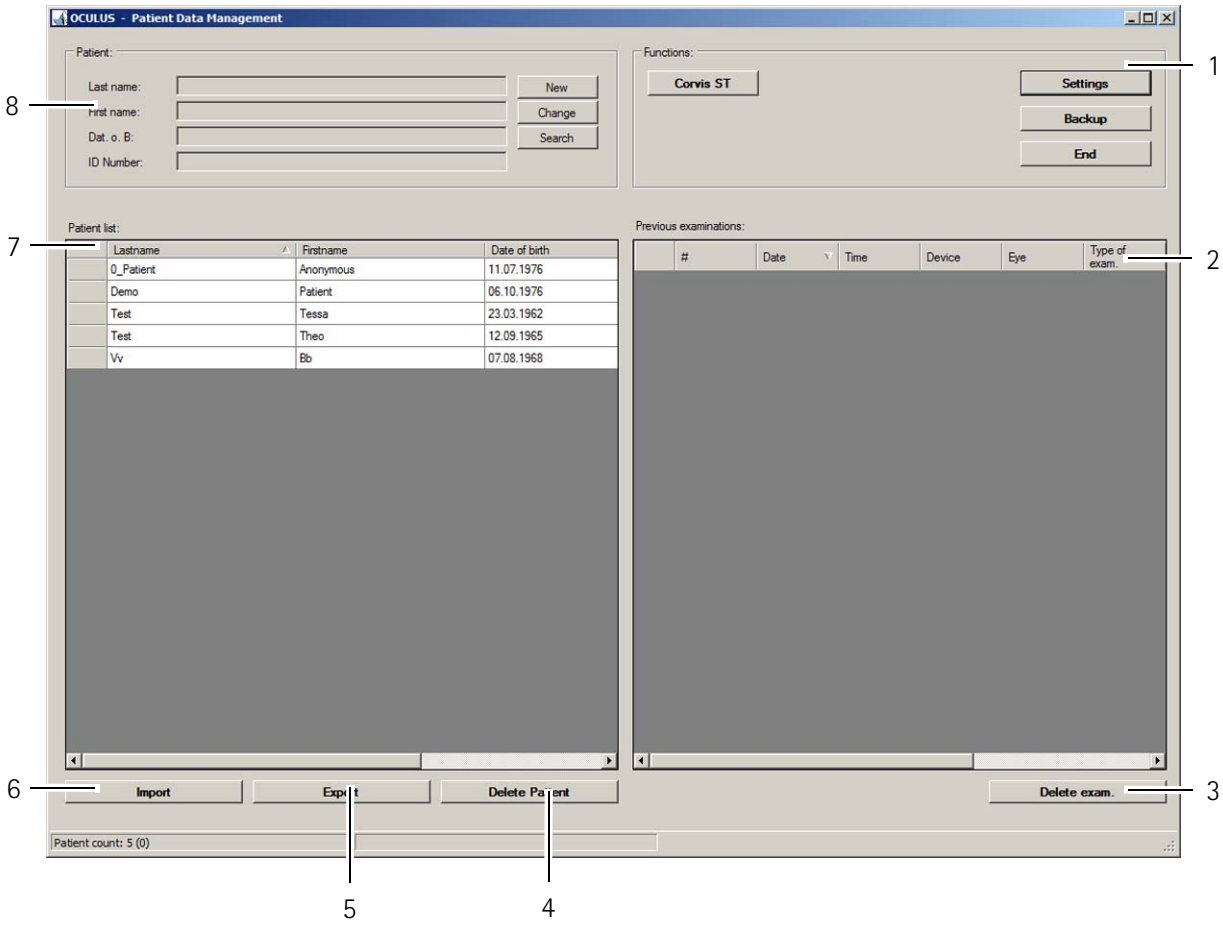
15.6 Start Patient Data Management

You can use the patient data from the Corvis® ST with the Patient Data Management user interface. To do this, you have to transfer the data using a USB cable, or load the data from the USB flash drive.

After you have switched on the PC, it first loads the operating system. Depending on the setting, the Patient Data Management opens automatically.

➔ If necessary, press the Corvis® ST icon: .

The Patient Data Management user interface is displayed



1 *"Functions" group box*
2 *Previous examinations*
3 *[Delete exam.] button*
4 *[Delete Patient] button*
5 *[Export] button*
6 *[Import] button*
7 *Patient list*
8 *"Patient" group box*

Fig. 15-4: Patient Data Management User Interface

If the Windows desktop is displayed, you have to start the Patient Data Management from there.

To get to the Corvis® ST program, you must first set up a new patient (8) or select an existing patient from the patient list (7).

15.7 Importing patient data

You can import patient data from a USB flash drive, see *sect. 13, page 36*.

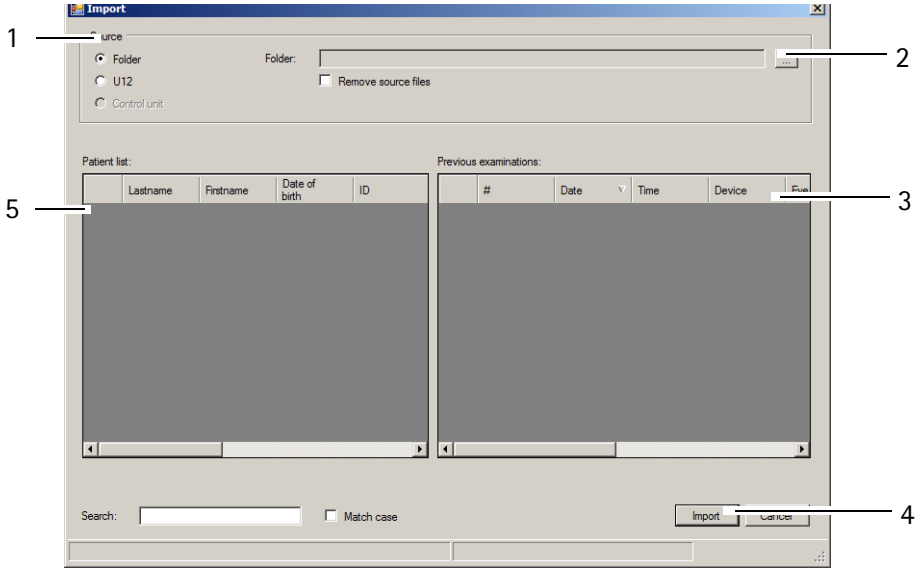
Note

Loss of data due to computer viruses

Computer viruses can cause loss of data.

➔ Run a virus check before importing data from the USB flash drive.

➔ Press the button [Import]. The following dialog is displayed:



1 *Select the source of the data*
2 *[...] button*
3 *Previous examinations*
4 *[Import] button*
5 *Patient list*

Fig. 15-5: "Import" dialog

The options for import and export of data are set as defaults in the "settings" field, see also *sect. 15.12, page 53*.

➔ Depending on the settings you may not have to perform all of the following steps (e.g. selection of the directory).

➔ Select the option (1) which contains the source data ("Folder" or "Single file (U12)").

Recommendation: Import the patient data with the option "Folder".

➔ Press the [...] button. (2)

➔ In the dialog box, select the directory or the file on the USB flash drive where the patient data is located: .DAT and .BMP.

➔ Confirm your selection with [OK] or [Save].

The patients that are located and the associated examinations are displayed in the lower part of the dialog.

➔ To import the data, press the [Import] button (4).

The data will then be available in the Patient Data Management software.

15.7.1 Enter a new patient

Using a USB cable: If the Corvis® ST is connected to your PC/laptop with a USB cable, a new patient and the current measurement are automatically transferred to the PC/laptop and are shown in the list of patients

USB flash drive: If you want to use data on the USB stick, you have to import it *sect. 15.7, page 47*. The patient is entered in the Patient Data Management software accordingly, and is displayed in the list of patients.

Manually enter a new patient

You can also manually enter a new patient.

➔ Press the [New] button to enter a new patient in the Patient Data Management software.

➔ Enter the patient's full last name, first name and date of birth in the patient window.

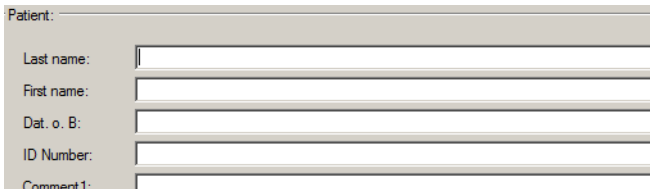


Fig. 15-6: Entering patients

Optionally you can enter an ID number for the patient.

➔ To save the data you entered, click [Save].

The patient you have just entered now appears in the patient list.

15.7.2 Select an existing patient

The patient list on the left-hand side of the screen displays all previously examined patients in alphabetical order.

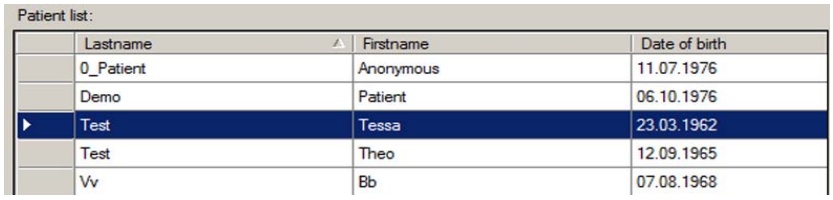


Fig. 15-7: Patient list

➔ Press the [Search] button to quickly find the patient you require in the list.

➔ Enter the patient's name or the first letter of the name in the "Last name" field.

Optionally, you can search through the patient's ID number, first name or date of birth, if it was assigned when you first entered the patient.

➔ Click the appropriate entry in the list to transfer that patient's name to the patient window. This also brings up a list of any previous examinations for that patient in the examination window (bottom right side).

Extended patient search: [Extended] checkbox

➔ Click on the Checkbox [Extended].

The screen displays additional search parameters which, for example, reference previous examinations. Proceed as you did when entering the patient name.

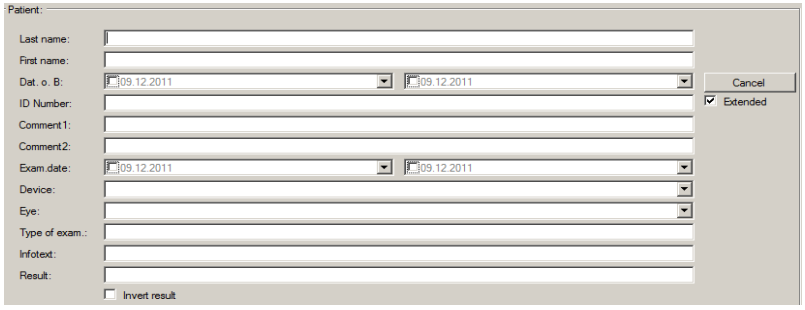


Fig. 15-8: Advanced search

15.8 Use other functions of the Patient Data Management software

When you have completed an examination, you can

- work with the results on your PC, *sect. 14, page 42*
- continue processing the patient data in Patient Data Management

You can do the following to the patient data

- rename, *sect. 15.9, page 50*
- export, *sect. 15.10, page 50*
- save, *sect. 15.11, page 51*

You can also change the Patient Data Management settings, *sect. 15.12, page 53*.

15.9 Rename Patient Data

Patient data can be changed retroactively after it has been added.

➔ Press the [Change] button.

The input boxes for patient data are now enabled, and the cursor jumps to the "Last name" field.

➔ Change the entries in the individual boxes.

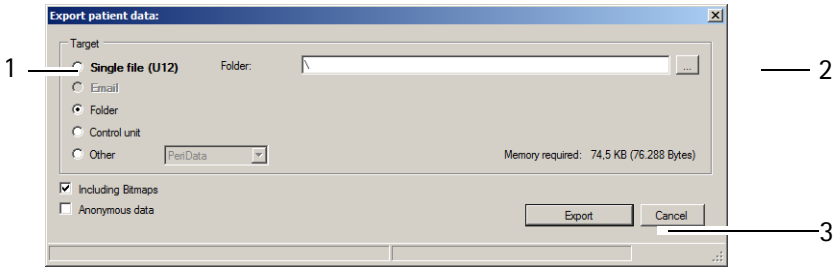
➔ Press the [Save] button.

15.10 Exporting patient data

For example, patient and examination data can be exported for forwarding to another clinic.

➔ Select the patient and also one of the examinations in the respective list.

➔ Press the [Export] button below the patient list. The following dialog is displayed:



1 Select destination
2 [...] button
3 [Cancel] and [Export] buttons

Fig. 15-9: "Export patient data" dialog

The options for import and export of data are set as defaults in the "settings" field, see also *sect. 15.12, page 53*.

Depending on the settings you may not have to perform all of the following steps (e.g. selection of the directory).

➔ Select the "Target" (1) where you would like to export the data.

Recommendation: Export the patient data using the "Individual file (U12)" option.

➔ Press the [...] button. (2)
➔ In the dialog that appears, select the folder or the file to which the patient data should be exported.
➔ Confirm your selection with [OK] or [Save].
➔ To export the data, press the [Export] button (3).

15.11 Data backup

You should carry out a backup of patient and examination data at regular intervals. In case of a loss of data, you can reconstruct the data from a previously created backup with the help of this function. Since data backup takes several minutes depending on the scope of the database and the data to be backed up, a backup should be carried out when the PC and the device will not be needed.

Note

Loss of data due to computer viruses

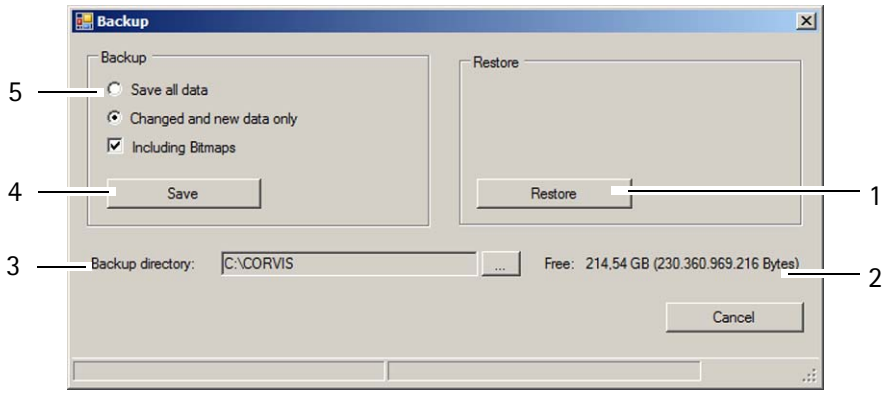
Computer viruses can cause loss of data.

➔ Run a virus check before importing data from the USB flash drive.

The general rules for security backups apply to backup copies created with the help of the Patient Data Management user interface. Storage of backup files should always be done on a separate system (e.g. on a USB flash drive with adequate capacity).

15.11.1 Backup data

➔ Press the [Backup] button on the upper right part in the Patient Data Management user interface. The following dialog is displayed:



1 *[Restore] button*
2 *Display free storage space.*
3 *Backup folder and button [...]*
4 *[Save] button*
5 *Backup data selection*

Fig. 15-10: "Backup" dialog

➔ Select whether all of the data or only changed data should be bakked up.

The Patient Data Management function internally tags all saved data records.

If you selecting the option "Changed and new data only", only the data records that were not saved during a previous backup will be backed up.

➔ Press the [...] button to the right of the "Backup directory" box (3).
➔ In the dialog that appears, select the folder to which the data should be backed up.
➔ Confirm your selection with [OK].
➔ To back up the data, press the [Save] button (4). The previously selected data will then be backed up to the corresponding folder.

15.11.2 Reconstruct data

If a loss of data occurs, the data from a previous backup can be re-imported into the Patient Data Management user interface.

➔ Press the [...] button to the right of the "Backup directory" box (3).

➔ In the dialog that appears, select the folder which contains the bakkup data.

➔ Confirm your selection with [OK].

➔ To import the data, press the [Restore] button (1). All data in the appropriate directory are copied to the Patient Data Management software.

15.11.3 Automatic backup

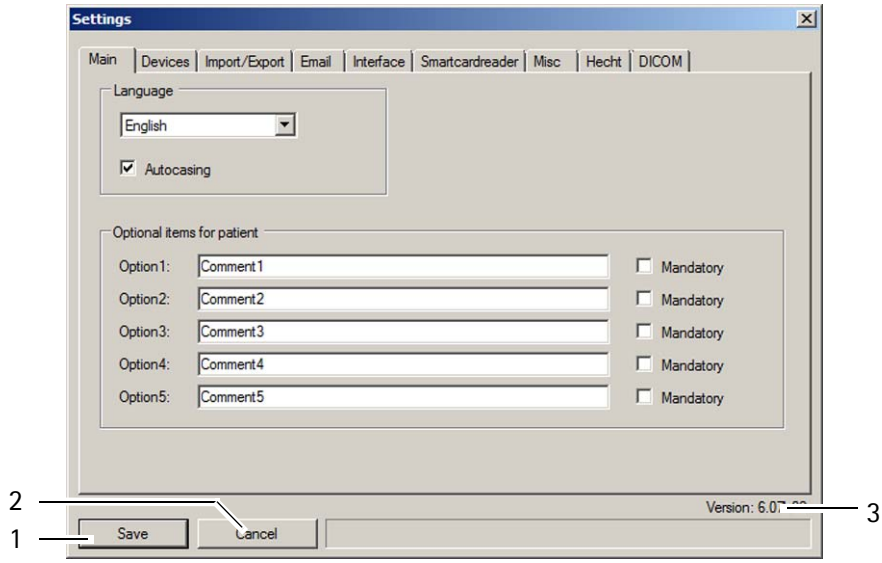
In addition to the manually performed backup, it is also possible to automatically run a backup when exiting the Patient Data Management program. The settings required for this can be made in the "Settings" area, see *sect. 15.12.3, page 57*.

15.12 Change settings

Basic specifications for working with the Patient Data Management user interface can be made in the "Settings" area.

➔ Press the [Settings] button in the upper right portion of the Patient Data Management user interface.

The "Settings" menu page will be displayed. The "Main" tab will appear in the foreground.



1 [Save] button

2 [Cancel] button

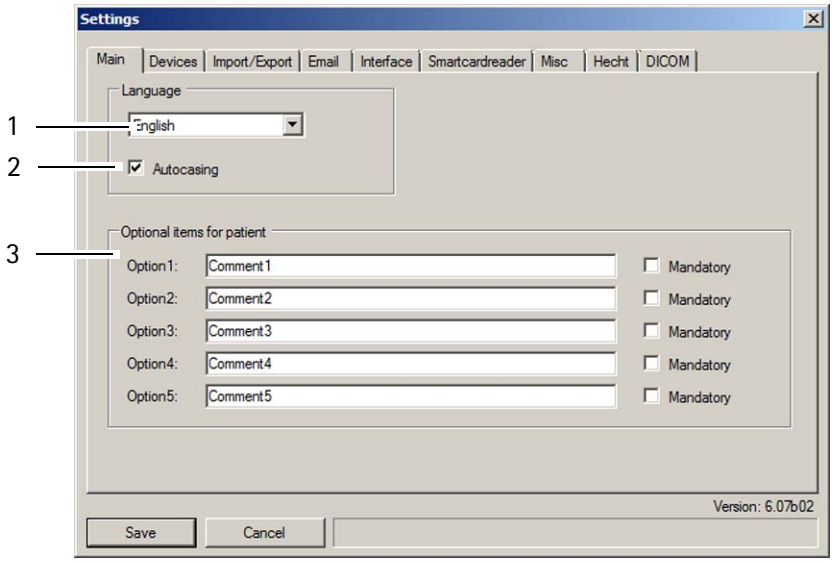
3 Program version of Patient Data Management

Fig. 15-11: "Settings" screen

The following information and buttons are available to you on all tabs:

- The version of the Patient Data Management program is displayed on the lower right (3).
- There are two buttons below and to the left for saving (1) or discarding (2) the changes that have been made. **All** changes are always saved or discarded, and then the screen is closed.

15.12.1 "Main" tab



1 "Language selection" drop-down list
2 Checkbox [automatic upper case /lower case]
3 Optional patient entries

Fig. 15-12: "Settings" screen, "Main" tab

"Language" box

➔ Select the language to be used to display the Patient Data Management user interface from the "Language" drop-down list (1).

➔ Enable the [Autocasing] checkbox (2) as required. If the checkbox is active, the first letter of a patient's first and last name are **always** converted to capital letters.

"Optional items for patient" box

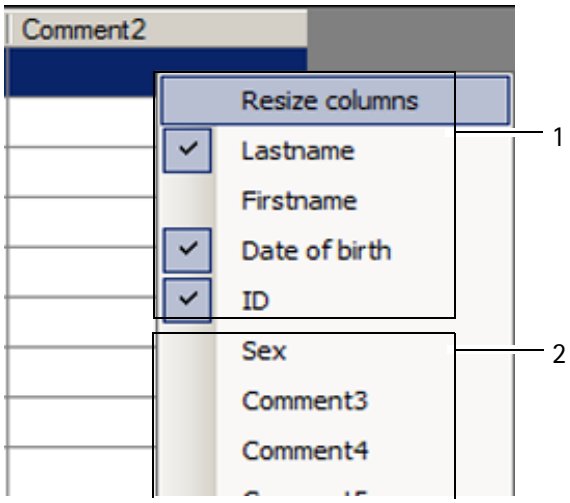
Besides the five standard attributes of first name, last name, date of birth, gender, and ID, up to five additional attributes can be freely defined.

➔ Enter the identifiers for the attributes in the fields Option 1 to 5, for example, "Comments".

To be able to carry out entries for the newly defined attributes, proceed as follows:

➔ Click with the right mouse button on the patient list and open the associated context menu.

➔ Select the desired attribute, e.g. "Comment2" [2].

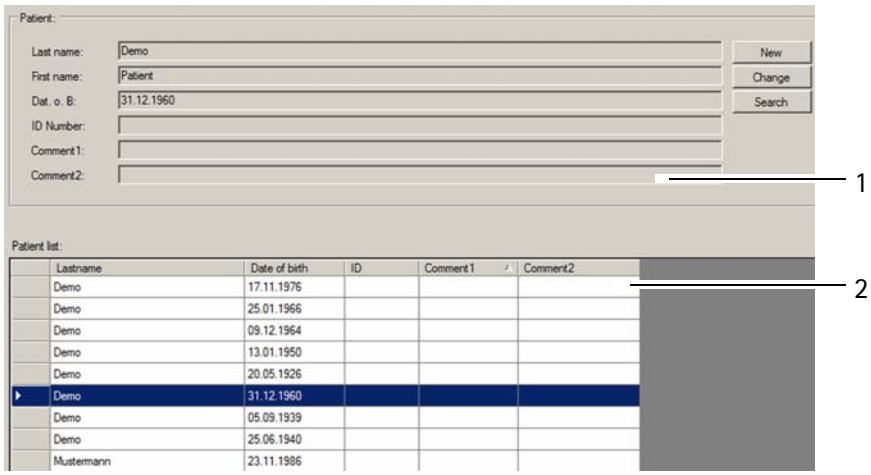


1 Previously enabled attributes

2 New attribute selected

Fig. 15-13: New attribute enabled

The context menu will close, and the attribute "Comment2" will be displayed in the upper section of the entry fields for patient data (1) as well as in the patient list (2).



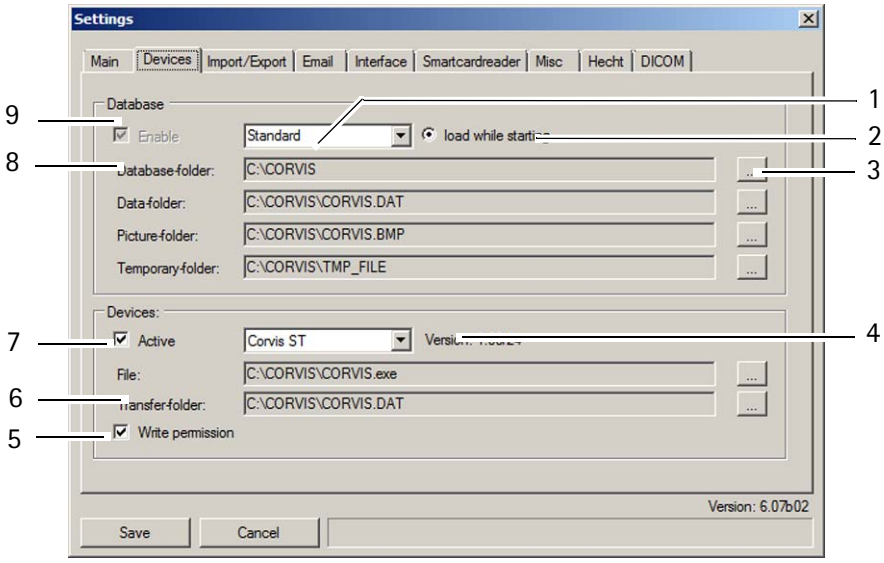
1 Attribute "Comment2" as an input field

2 Attribute "Comment2" in the patient list

Fig. 15-14: Custom attribute "Comment"

The selection of attributes in the context menu is done in the same manner. The currently selected attributes are marked with a check.

15.12.2 "Devices" tab



1 *Drop-down list for selecting a database*
2 *"Load while starting" radio button*
3 *Folder selection*
4 *Drop-down list for selecting a device*
5 *[Write permission] checkbox*
6 *Path for the currently selected device*
7 *Checkbox for activating a device*
8 *Path for the database*
9 *Checkbox for activating a database*

Fig. 15-15: "Devices" tab

"Database" box

Different users can be set up for different databases.

➔ In the drop-down list for selecting a database (1), choose the entry (User) that you would like to edit.

➔ Choose the corresponding path for the database, data, and images using the individual buttons for folder selection (3).

Normally, two different folders are created for data and images during installation, as shown here (8).

- **For data:** Name of the device plus the .DAT identifier
- **For images:** Name of the device plus the .BMP identifier

➔ For each user, enable whether the associated database should be enabled or not (9).

If more than one database is enabled, an additional drop-down list appears on the main page of the Patient Data Management user interface. You can

activate a user (or the assigned database) in this list. The patient list and the associated examinations are updated when the active user is changed.

➔ You can also select the "load while starting" option (2) for exactly one user. The associated database is loaded by default when the Patient Data Management user interface is started, and is selected accordingly.

"Devices" box

Make settings for the connected devices in this box.

➔ In the drop-down list, select the desired device (4).

➔ If the device is in fact connected, then mark the checkbox [Active] (7).

➔ Choose the path to the associated device's application file using the folder selection button.

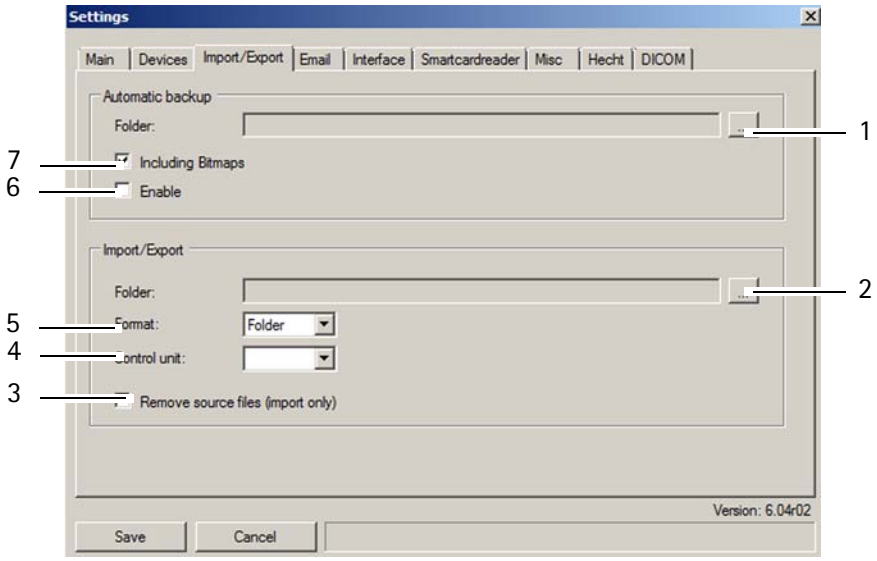
When you save patient and examination data in the database, it is initially placed in the so-called "Transfer folder". This folder is always created locally on the PC.

➔ Choose the transfer folder using the folder selection button. This should correspond with the name of the device and the .DAT extension.

You can also specify settings for devices which are not connected to the PC.

➔ Enable the checkbox [Write permission] for the devices that are in fact connected to the PC.

15.12.3 "Import/Export" tab



1 *Automatic backup folder*
2 *Select import/export folder*
3 *[Remove source files] checkbox*
4 *Interface for manual operating unit*
5 *Standard format for import and export*
6 *[Active] checkbox*
7 *[Including bitmaps] checkbox*

Fig. 15-16: "Import/Export" tab

"Automatic backup" box

In addition to the manually executed backup *(sect. 15.11, page 51)*, there is also the option to perform a backup when the Patient Data Management user interface is closed. The settings required for this can be specified in the group box.

- ➔ Select the folderwhere the data should be saved during an automatic backup using the folder selection button (1) .
- ➔ Select the checkbox [Including Bitmaps] (7) if camera images should also be backed up.
- ➔ If the automatic backup should be executed with the specified settings, enable the [Enable] checkbox (6).

"Import/Export" group box

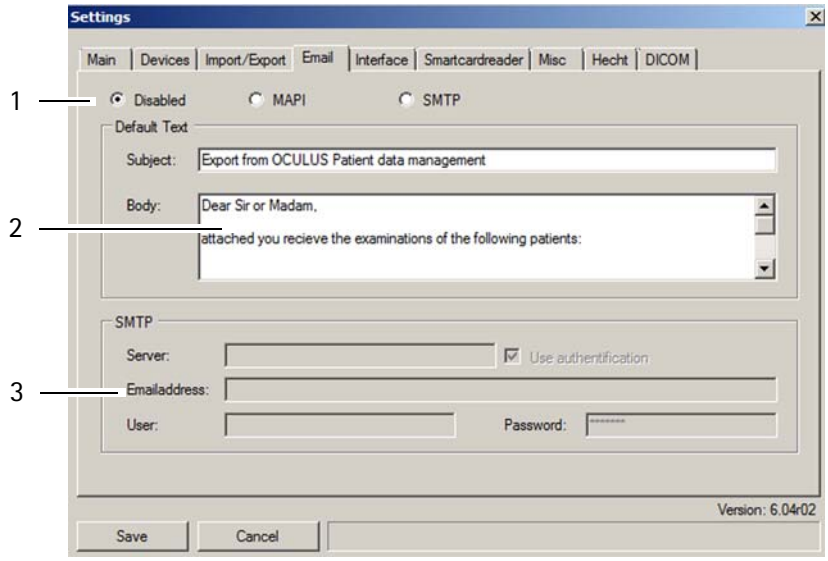
You can enter settings in this box to import and export Patient Data Management data.

Note

The settings specified in this tab for import and export of data can be overwritten. Theseare only default values.

- ➔ Select the folder using the folder selection button (1) which should normally be used as the default for import or export.
- ➔ In the "Format" drop-down list (5), select whether the default import or export should be done for a folder or a single file (U12).
- ➔ Keep the checkbox [Remove source files (import only)] (3) disabled, so that the data import or export does not cause any data loss.

15.12.4 "Email" tab



1 Select e-mail connection
2 Standard text for subject and body text
3 SMTP connection selection

Fig. 15-17: "Email" tab

With the three radio buttons in the upper part of the tab (1), you can determine whether the email connection is active, and if it is, how the transfer of data should take place.

➔ Enable the option "MAPI" if an email program (e.g. Microsoft Outlook) is installed on your PC and if data should be sent using this program.

➔ Enable the option "SMTP" if **no** email program is installed on your PC but you would still like to send the databy email. In this case, additional entries in the "SMTP" box are necessary.

"Default text" group box

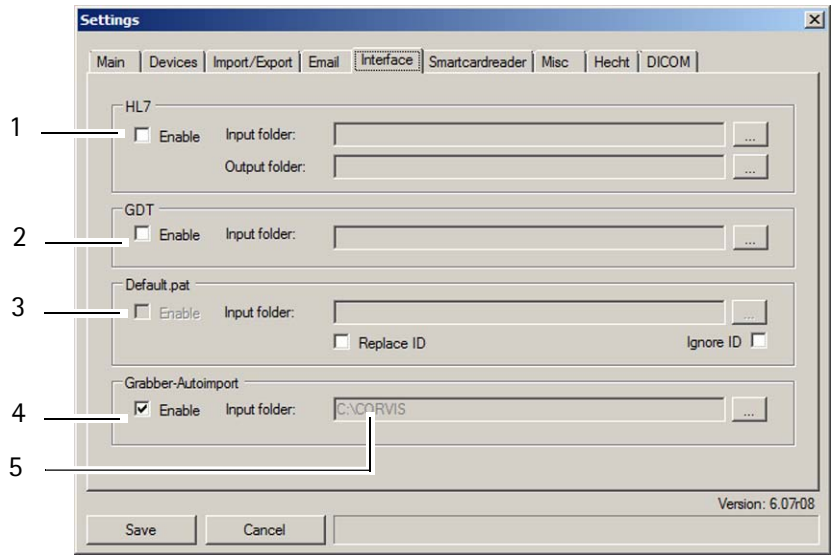
➔ Enter the default text for sending emails in the "Subject" and "Body" (2) boxes. You can adjust this text before email is actually sent (e.g. particular to patients or examinations).

"SMTP" group box

If no email program is installed on the computer, several additional entries must be made here to be able to send emails.

➔ Contact your system administrator if you have questions about the individual entries.

15.12.5 "Interface" tab



1 Settings for HL7
2 Settings for GDT
3 Settings for Default.pat
4 Settings for Grabber Import
5 Inbox for Grabber import.

Fig. 15-18: "Interface" tab

Use this tab to enter the folder for different interface types and to enable or disable them.

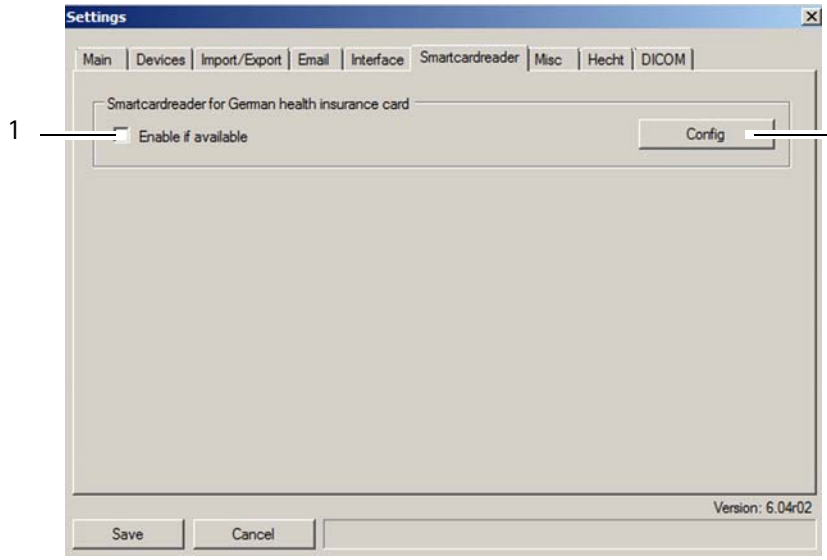
The interface "Default.pat" (3) is used if the Patient Data Management user interface is launched by a third-party program.

➔ Add the interface "Default.pat" to the directory of the other program.

➔ Select the third-party program's folder as the "in" folder.

➔ Check the box corresponding to the Grabber import if you want to automatically import data to your computer using a USB cable. You must reconcile the directory path for the inbox (5) with the directory path for the Grabber software, see *sect. 15.13, page 63*.

15.12.6 "Smartcardreader" tab



1 [Config] button *2 [Active] checkbox*

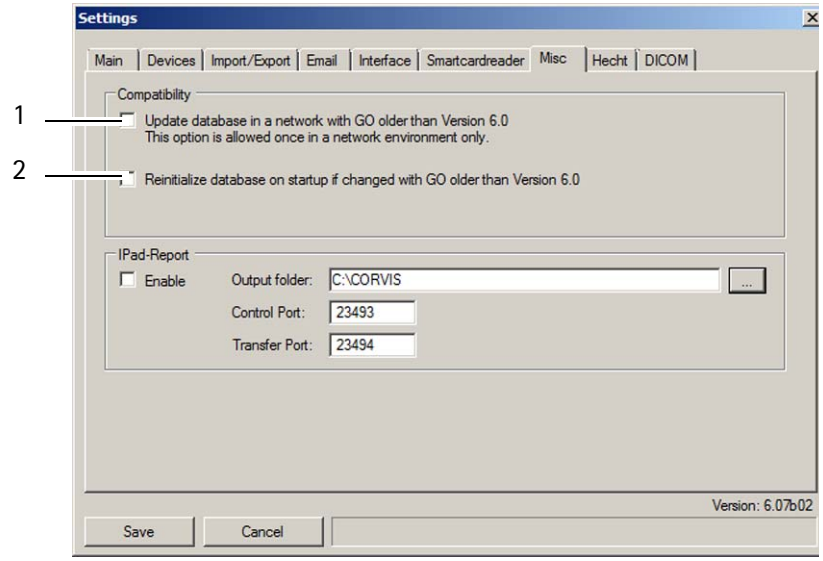
Fig. 15-19: "Smartcardreader" tab

You can configure a smartcard reader on this tab to be able to directly import patient data from the patient's insurance card into the Patient Data Management user interface. First, you have to configure the smartcard reader (usually only once).

➔ Press the [Config] button (2). A page appears for you to select the type of smartcard reader you are using.

➔ Select the [Enable if available] checkbox (1) to activate the smartcard reader.

15.12.7 "Misc" tab



1 *Checkbox to manage the database*

2 *Check box to import a database*

Fig. 15-20: "Misc" tab

The Patient Data Management user interface is available in two different versions: V2.x and V6.x. In principle, implementing both versions on the same network should be avoided. In any case, if it is unavoidable due to the higher technical requirements of the new version V6.x, then the corresponding settings must be set on this tab.

- ➔ Enable the checkbox on this tab (1) on **exactly one PC** that has version V6.x installed.
- ➔ Make sure that this checkbox is **not** enabled on any other PC which has version V6.x of the Patient Data Management user interface installed.
- ➔ Enable Checkbox (2) so that data from the database will be read in again after the next start.

This ensures that the database is automatically updated when a patient is created on a PC with the older Patient Data Management V2.x.

The "IPad Report" field is currently disabled.

15.12.8 "Hecht" and "DICOM" tabs

"Hecht" and "DICOM" tabs are currently disabled.

15.13 Reconcile directory paths

In order for the Corvis® ST examination results to be automatically exported to your PC/laptop with the USB cable, the directory paths in the Grabber software and Patient Data Management software have to be reconciled.

➔ Open the Grabber software.

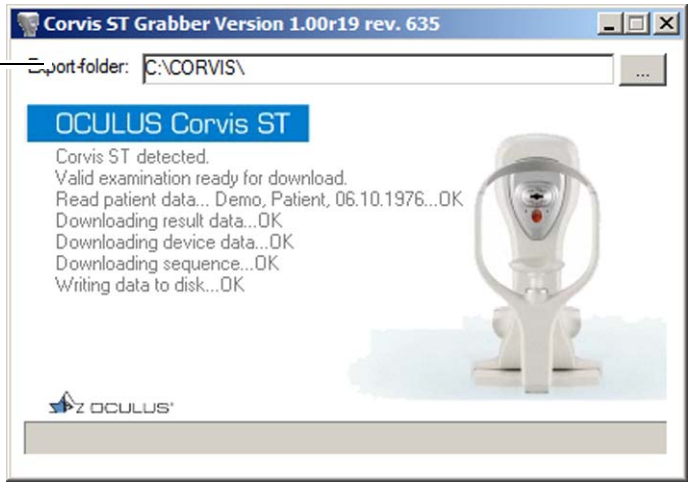


Fig. 15-21: Grabber software

➔ Reconcile the directory path for the export folder (1) with the directory path for the Patient Data Management, see *Fig. 15-18, page 60, item 5*.

16 The Corvis® ST Program on the PC

16.1 Start Corvis® ST program

➔ Double-click the selected exam to start the Corvis® ST program.

or

➔ Double-click the selected patient name to start the Corvis® ST program.

or

➔ After selecting a patient: press the [Corvis ST] button to start the Corvis® ST program.

Fig. 16-1: Start Corvis® ST program

16.2 Working with the Corvis® ST program

If you started the Corvis® ST program by selecting an examination in the Patient Data Management program, the selected examination is loaded in the Corvis® ST program.

If not, you may need to load an examination first, see *"Loading existing examinations" on page 66*.

An overview of the measurement is shown.

1 *Patient and examination data*
2 *Corneal deformation parameters*
3 *IOP / Pachy values*
4 *Camera image*
5 *Video buttons*
6 *Image buttons*
7 *Menu bar*

Fig. 16-2: Overview Screen

The overview is similar to the representation on the Corvis® ST device, see *sect. 12.7, page 28*. The differences and operation of the Corvis® ST program are described below.

16.3 Patient and examination data view (1)

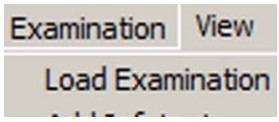
On each screen of the Corvis® ST program the patient and examination data are displayed.

16.4 Working with the Menu Bar (7)

You can access the menu bar from any screen of the Corvis® ST.

Fig. 16-3: Menu bar Corvis® ST Program

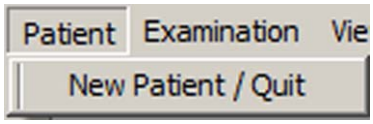
Loading existing examinations



➔ Select the menu item [Examination] and click [Load Exam].
The dialog box "Load Examination" appears.

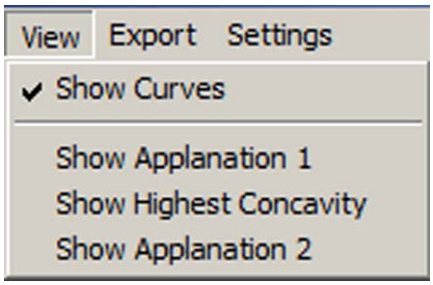
➔ Make a selection by clicking the required examination.

End Corvis® ST program, load new patient/examination



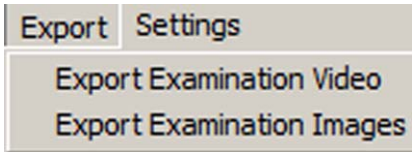
➔ Select the menu item [Patient] and click [New Patient / Quit].
The Corvis® ST program ends and switches to Patient Data Management. There you can download a new patient/examination

Show individual images



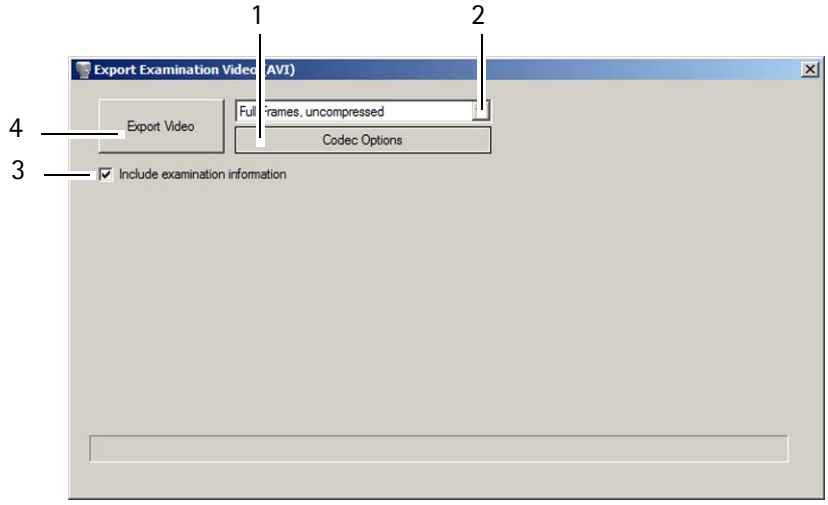
➔ Select the menu item [View] and click on the desired view. For more information see 32.
Alternatively, you can click on the image buttons *(Fig. 16-2, page 65, item 6)*.

Export videos and images



➔ Select the menu item [Export] and then click on the desired item.

Export Examination Video



1 [Codec options] button

2 Drop-down list

3 [Include examination information] checkbox

4 [Export Video] button

Fig. 16-4: Export video

➔ Select a codec method from the drop-down list (2) for encoding and exporting the video.

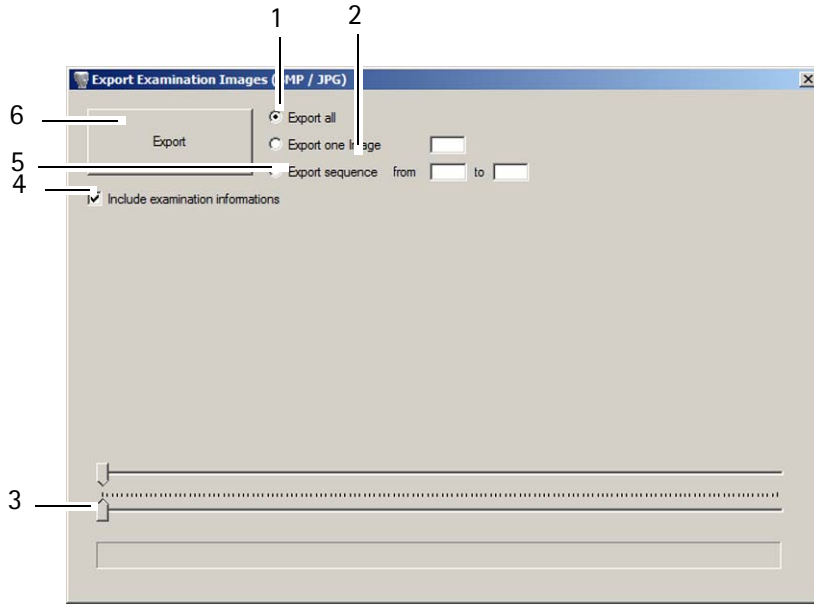
➔ Press the [Codec Options] button (1) to confirm the selected codec mode.

➔ Select the [Include examination information] checkbox (3) if you want to export the examination data.

➔ Press the [Export video] button (4) to start the export.

The video is saved in AVI format.

Export Examination Images



1 *[Export all] radio button*
2 *[Export one Image] radio button*
3 *Slider to display the sequences*
4 *[Include examination information] checkbox*
5 *[Export sequence] radio button*
6 *[Export] button*

Fig. 16-5: Export images

Export All Images

➔ Enable the [Export all] radio button (1) to export all images for one measurement.

➔ Press the [Export] button (6) to start the export.

➔ Specify the destination directory for the export.

The images are automatically numbered and saved in .jpg format.

Export a single image

➔ Enable the [Export one Image] radio button (2) to export a particular image.

➔ Move the top slider (3) to move to a specific image.

The corresponding image number is displayed next to the [Export one page] radio button (2).

➔ Press the [Export] button (4) to start the export.

➔ Specify the destination directory for the export.

The images is saved in .jpg format.

Export an image sequence

➔ Enable the [Export sequence] radio button (5) to export a particular image sequence.

➔ Move the top slider (3) to move to the first image of the sequence.

➔ Move the bottom slider (3) to move to the last image of the sequence.

The corresponding image numbers are shown next to the checkbox [Export sequence] (5).

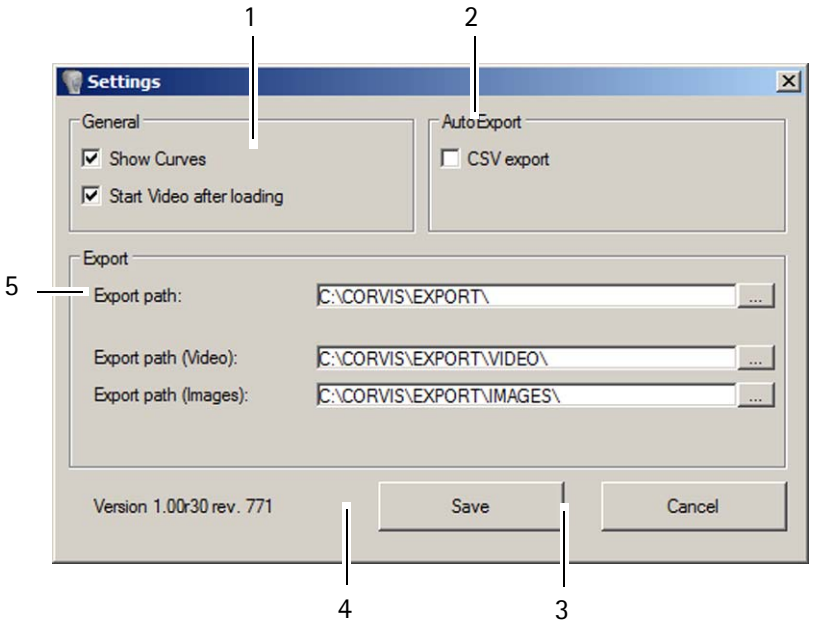
➔ Press the [Export] button (4) to start the export.

➔ Specify the destination directory for the export.
The images are automatically numbered and saved in .jpg format.

Change settings

Settings

➔ Select the menu item [Export] and then click on the desired item.
The following screen appears:



1 "General" group box
2 "Auto Export" group box
3 [Cancel] button
4 [Save] button
5 "Export" group box

Fig. 16-6: Export video

Save settings

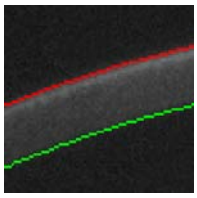
➔ To save the settings, press the [Save] button (4).

Discard settings

➔ To discard the settings, press the [Cancel] button (3).

Change general settings (1)

➔ Enable the check box "Show curves" - the front and back are shown in red and green colors:



➔ Enable the "Start video after loading" checkbox: The video will continue to play while an examination is loading.

Enable Auto Export (2)

➔ Select the "CSV export" checkbox to enable automatic data export. Recommendation: Always set the function to active.

Choose export settings (5)

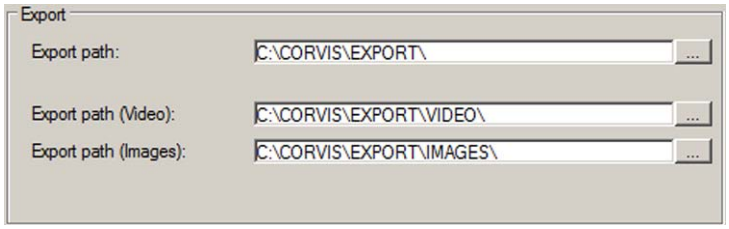


Fig. 16-7: Choose export settings

➔ Press the [...] button next to "Export path".

➔ In the dialog that appears, select the folder or the file to which the patient data should be exported.

➔ Confirm your selection with [OK] or [Save].

➔ Repeat the steps for "Export path (Video)" and "Export path (Images)".

16.5 Show corneal deformation parameter in enlarged view

➔ Click on the curve that you want to enlarge, see *Fig. 16-2, page 65*, *item 2*
For more information see page 29.

16.6 View IOP / Pachy values

In this table, the curve values are shown in figures *Fig. 16-2, page 65*, *item 3*
For more information see page 31.

16.7 View individual images

For more information see *Fig. 16-2, page 65*, *item 4* and page 32.

17 CSV Files

The data of th examinatios can be transferred to an Excel file.
The Corvis® ST program creates automatically files (CSV files) which can be opened with Excel.

17.1 Generate CSV Files

➔ Open the patient data management.

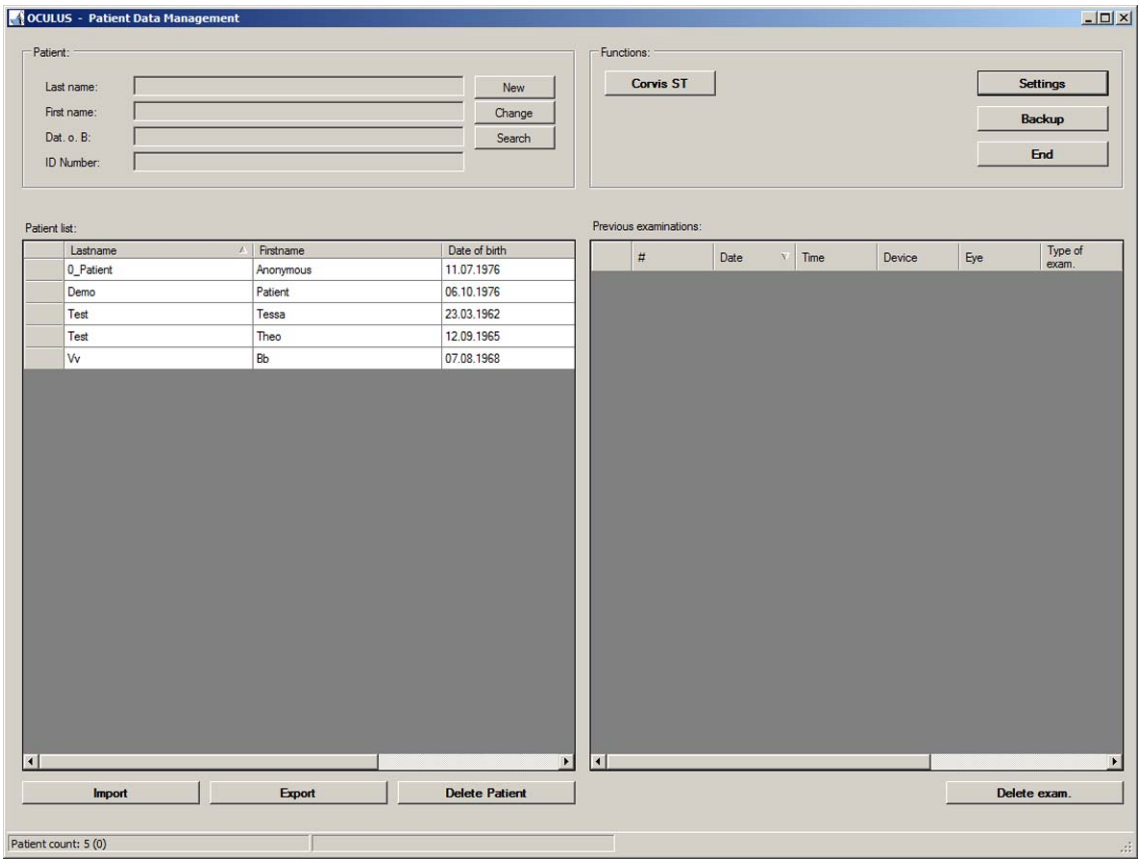


Fig. 17-1: Patient Data Management User Interface

17.1.1 Export Data with Call-All

Call all examinations of all patients (F11)

➔ In the Patient Data Management Menu, click the shortcut "F11".

The following window is displayed.

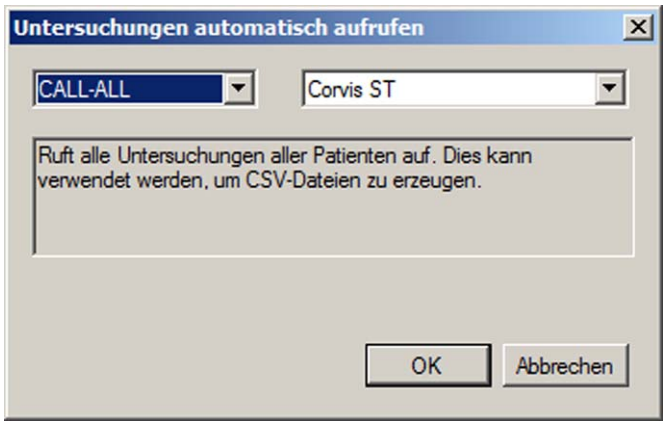


Fig. 17-2: "Automatic Examination Call" window

➔ You cab choose between the following options.

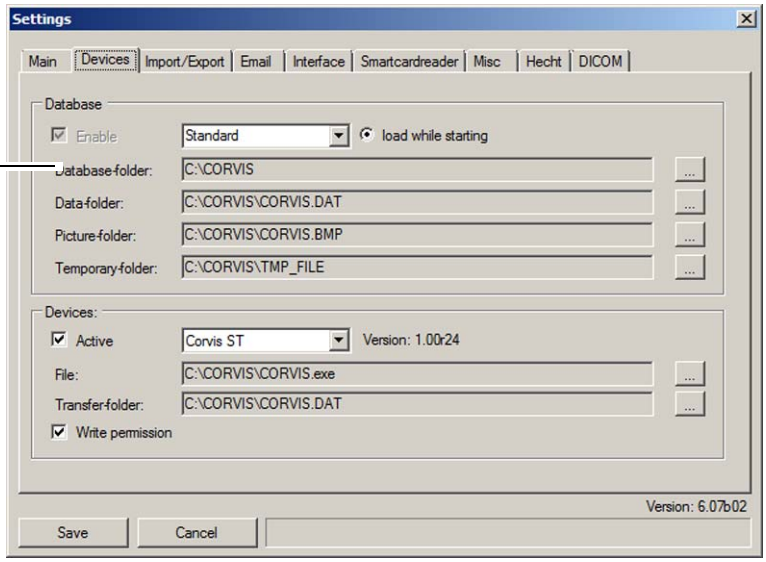
Name	Description
CALL-ALL	■ Calls all examinations of all patients. ■ Can be used to generate CSV-files of all taken examinations. ■ Current data set will be appended to already existing CSV-files
EXPORT_ALL	■ Calls all examinations of all patients ■ Examination results will be exported automatically

➔ Activate the automatic examination call by clicking [OK].

Note

For creating new CSV-files for e.g. study purposes, it is adviceable to rename the existing CSV-files prior starting the CALL-ALL routine.

You can find them in your selected database-folder.



1 Database path *8 P*

Fig. 17-3: Tab "Devices"

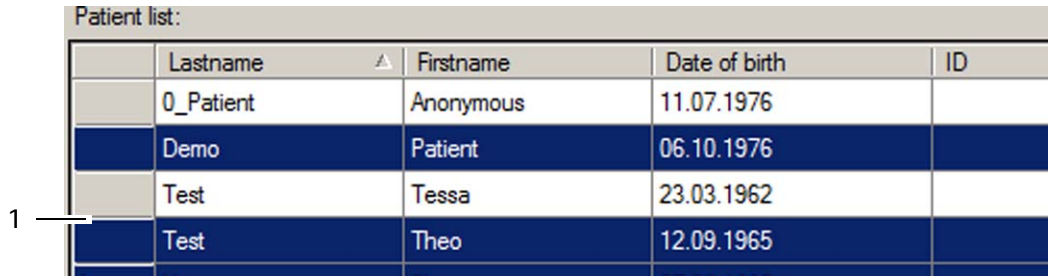
Note

Creating new CSV-files by the CALL-ALL routine can take a long time, depending to the amount of the data.

We recommend to perform this procedure at the end of a day or on a weekend.

Call All with selected patients only (Shift+F11)

Select patients by using the Ctrl-button.

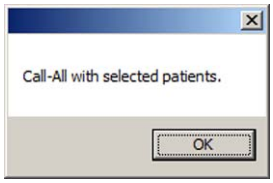


1 List of selected patients

Fig. 17-4: Patient Data Management

➔ Click Shift+F11.

The following window is displayed:



➔ Confirm by clicking [OK].

The following window is displayed.

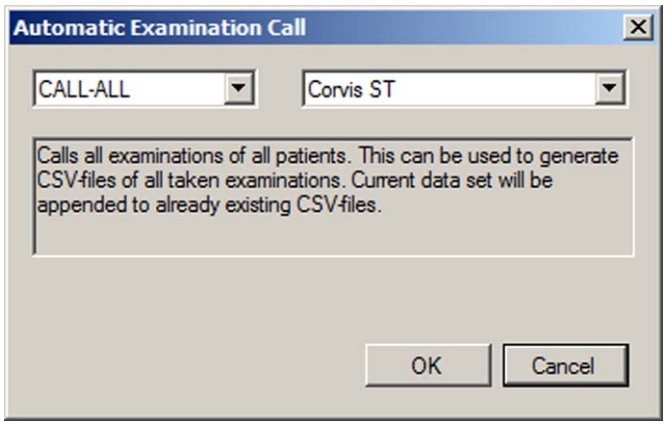


Fig. 17-5: "Automatic Examination Call" window

➔ Activate the automatic examination call by clicking [OK].

All examinations of all patients will be appended to already existing CSV-files.

Note

For creating new CSV-files for e.g. study purposes, it is recommended to rename the existing CSV-files prior starting the CALL-ALL routine.

In this case the selected patients only.

You can find them in your selected database-folder *(Fig. 17-3, page 74)*.

17.2 Content of a CSV file

If you open a CSV file an Excel file with the following parameters will be generated.

Date information

The format for date information corresponds with that which is set in the Corvis® ST program.

Time information

All time information is in the 24 hour format, i.e. HH:MM:SS (H = hours, M = minutes, S = seconds). If an examination took place at 9 o'clock, 47 minutes, and 6 seconds, then the entry in the table displays "09:47:06"..

Definition of the parameters

The following parameters are displayed:

- **LastName:** Patient's last name
- **FirstName:** Patient's first name
- **Pat-ID:** Patient ID, if available.
- **D.o.Birth:** Date of Birth
- **Exam Date:** Examination date
- **Exam Time:** Examination time
- **Exam Eye:** Examined eye
- **Exam Comm:** Comment to an examination
- **IOP [mmHg]:** **i**ntra**o**cular **p**ressure
- **Pachy [µm]:** Corneal thickness (Apex)
- **Def. Amp. Max [mm]:** Maximum corneal deformation amplitude
- **A1 Time [ms]:** Time of the first applanation
- **A1 Length [mm]:** Length of the first applanation
- **A1 Velocity [m/s]:** Velocity of the corneal apex at the first applanation
- **A2 Time [ms]:** Time of the second applanation
- **A2 Length [mm]:** Length of the second applanation
- **A2 Velocity [m/s]:** Velocity of the corneal apex at the second applanation
- **HC Time [ms]:** highest concavity, time of the maximum deformation
- **Peak Dist. [mm]:** Distance between both non-deformed peaks
- **Radius [mm]:** Radius of curvature at maximum deformation, calculated with "parabolic fit"

18 Cleaning, Disinfection and Maintenance

This chapter describes how to clean, disinfect, and maintain the Corvis® ST.

Attention

Electrical Shock Hazard

➔ Unplug the power cord before cleaning the cabinet, disinfecting the device, or performing maintenance.

Note

Equipment damage due to moisture

➔ Make sure that no liquid can get into the Corvis® ST.

➔ Always pay attention to the product descriptions and instruction manuals of any materials or products that you use to care for, clean, and disinfect the unit and/or its accessories.

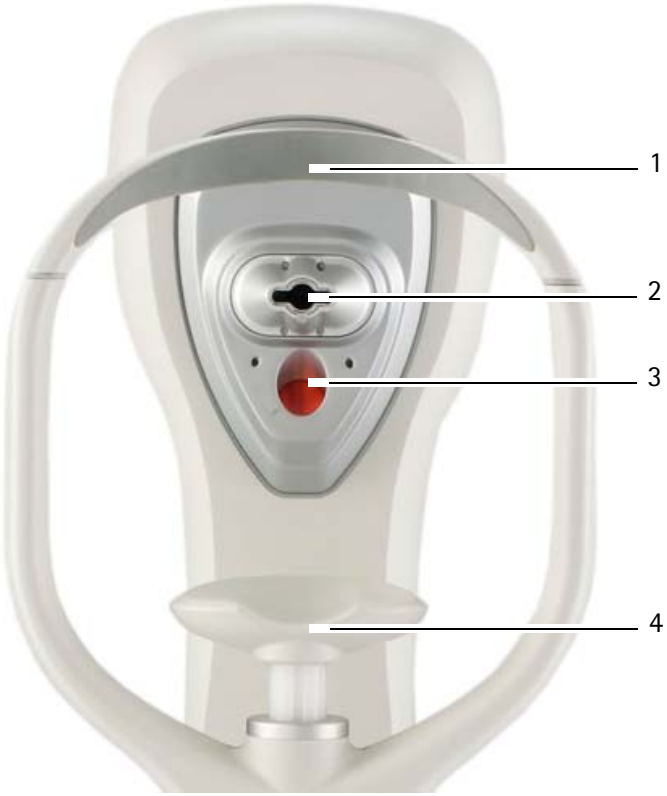
18.1 Cleaning

➔ Do not clean the Corvis® ST with aggressive, chlorinated, abrasive, or harsh cleansers.

Required materials:

- Cleaner for plastic surfaces with anti-static effect
- Cleaner for painted surfaces: Mixture of equal parts of alcohol and distilled water, possibly with a few drops of commercial detergent
- Soft cloth or lens brush
- Methanol or pure alcohol or lens cleaner
- Gauze moistened with rubbing alcohol
- Cotton swab

18.1.1 Clean the front panel



1 Forehead rest
2 Air nozzle
3 Lens protection glass
4 Chin rest

Fig. 18-1: Clean lens protection glass and air nozzle

Clean forehead (1) and chin (4) rests

During the measuring process, sweat, cosmetics, etc. from the patient can get on the forehead and chin rest.

➔ Clean these parts before examining the next patient.

Before and after each measurement wipe off the forehead and chin rest with a clean cloth, for example, with gauze moistened with rubbing alcohol.

Do not wipe more difficult spots repeatedly with a dry cloth. Instead moisten it with rubbing alcohol.

Clean lens protection glass (3)

The openings in the housing for the optics are covered by protective glass covers which must be kept dust and dirt-free.

➔ Clean the lens protection glass with a lint-free cloth moistened with alcohol.

Clean the air nozzle (2)

Attention

Risk of infection after examining a sick patient

If you perform a measurement on a sick patient, the air nozzle can be contaminated.

➔ Moisten a cotton swab with rubbing alcohol.

➔ Clean the nozzle with the cotton swab.

➔ Disinfect the device as needed, see *sect. 18.2, page 81*.

➔ Check the glass part of the air nozzle from a diagonal angle for dust, dirt, etc.

➔ Blow off dust, foreign particles, etc. with a lens blower.

➔ Afterwards, carefully wipe the glass with a cotton swab which you have previously moistened with methanol or pure alcohol.

➔ Clean the protection lens in front of the camera of the air nozzle using a dry, lint-free cloth.

Note

Damage due to improper cleaning

➔ Carefully wipe the air nozzle and do not rub the surface.

➔ Make sure there are no foreign particles on the air nozzle when wiping it. Otherwise, the glass could get scratched.

➔ Check the glass afterwards.

18.1.2 Cleaning the housing

Wipe the forehead rest after each examination, and the housing as required.

- ➔ Turn the Corvis® ST off, *"Switching off the Corvis® ST" on page 14*.
- ➔ Unplug the power cord.
- ➔ When cleaning, use a damp cloth and make sure that no liquid enters the Corvis® ST.
- ➔ Clean the plastic surfaces and painted surfaces with the appropriate cleaning agents.

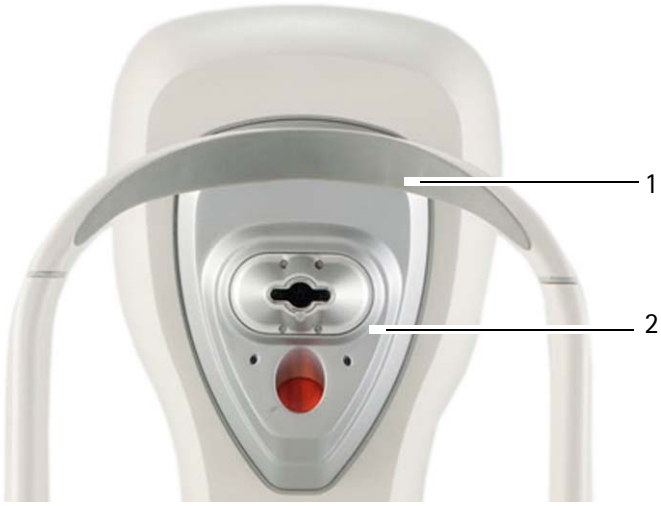
18.2 Disinfection

Required materials:

- Disinfection and Cleaning Kit (included),
  Alternatively: Pursept®-A Xpress disinfectant wipes,
  Merz+Co company
  D-60318 Frankfurt:
  Tel: +49 69 1503 1
  Fax: +49 (69) 596 21-50
  E-mail: merzpr@merz.de

➔ Turn the Corvis® ST off, *"Switching off the Corvis® ST" on page 14*.

➔ Unplug the power cord.



1 Forehead rest *2 Front cover*

Fig. 18-2: Disinfect

➔ Disinfect the forehead rest (1) after each examination.

Attention

Risk of infection after examining a sick patient

If you perform a measurement on a sick patient, the forehead rest and the front cover can be contaminated.

➔ Disinfect the front cover (2) and the housing as required.

Note

Equipment damage due to disinfectant solution

The disinfectant solution may damage the finish if it is sprayed directly on it.

➔ Only spray the disinfectant solution onto a cleaning cloth, not directly on the device

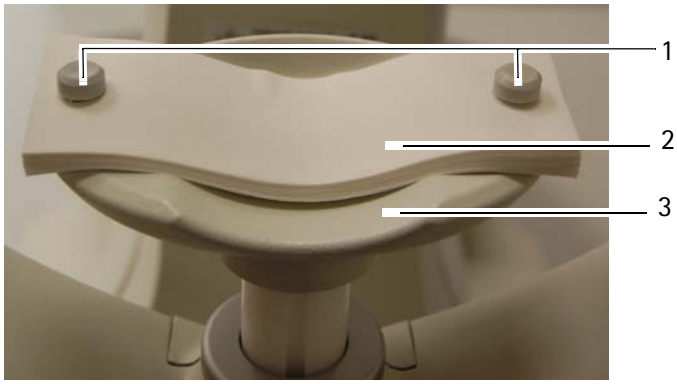
18.3 Maintenance

➔ The operating company must ensure that the device undergoes technical measurement testing every 2 years according to MPBtreibV, Appendix 2 Tonometer.

➔ To ensure that it functions correctly and safely we recommend the following: Have the Corvis® ST checked every two years by our service department or an authorized dealer.

18.4 Attach paper to the chin rest

If you want to attach new chin rest paper, follow these instructions:



1 Pins
2 Chin rest paper
3 Chin rest

Fig. 18-3: Attach chin rest paper

➔ Pull the two pins (1) out of the chin rest.

➔ Put the chin rest paper (2) in such a way that the holes of the paper and the chin rest (3) are aligned.

➔ Insert the two pins (1) in the chin rest.

18.5 Insert new printing paper roll

➔ Open the cover with the display.

Fig. 18-4: Open the cover with the display

The following screen appears:

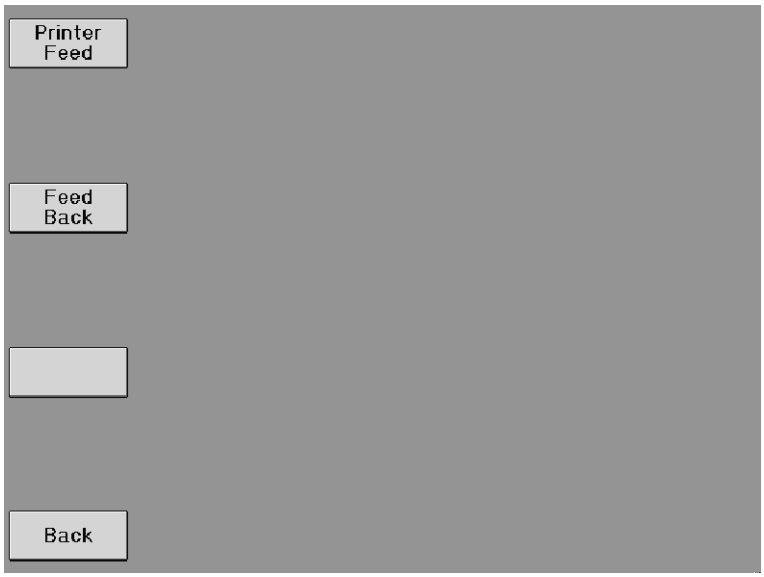
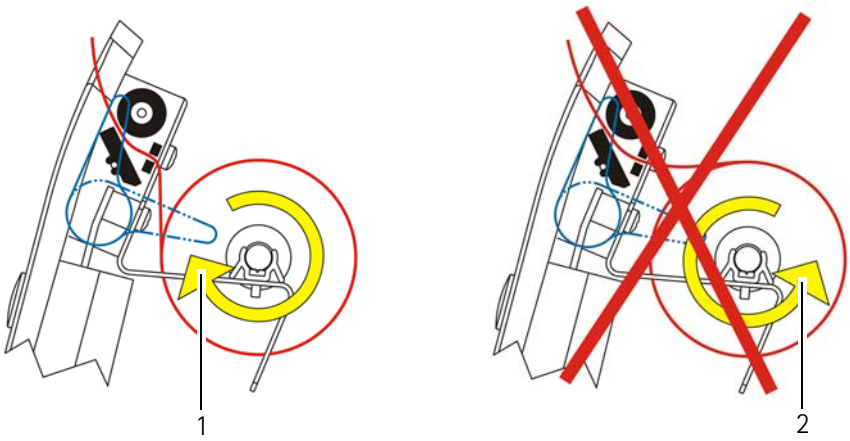


Fig. 18-5: Change printer paper

You can advance and reverse the printer paper by pressing the buttons "Printer Feed" and "Feed Back" accordingly.

➔ Press "Feed Back" to reverse, or roll back the printer paper.

- ➔ Remove the feed roller from the holder and pull the metal pin out.
- ➔ Push the metal pin into a new printer roller and insert the printer roller into the holder.
- ➔ Slide the white paper through the slot from below.
- ➔ Make sure the paper (1) is correctly aligned.



1 Proper paper guide *2 Wrong paper guide*

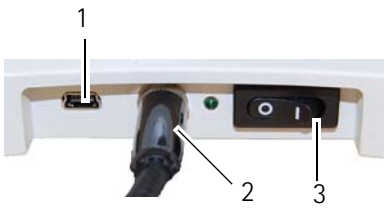
Fig. 18-6: Insert the paper

- ➔ Press the button "Printer Feed" so that the printer paper is pulled through the opening.
- ➔ Close the cover with the display, see *Fig. 18-4, page 83*.

19 Dismantling, transport and storage

Before you transport or store the Corvis® ST you may have to dismantle it properly.

19.1 Removal



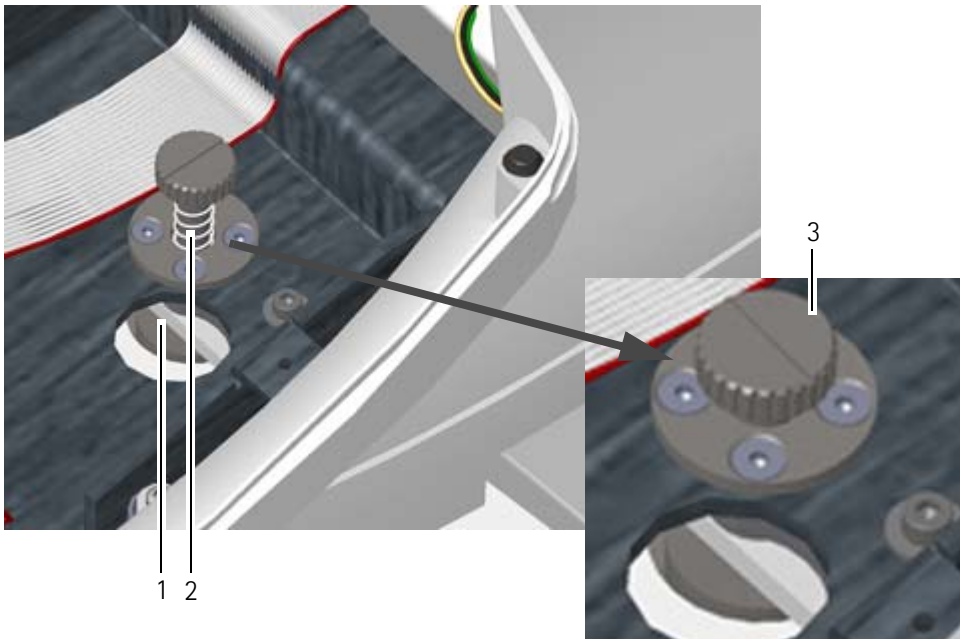
- ➔ Switch off the Corvis® ST with the On/Off Switch (3).
- ➔ Unplug the power cord.
- ➔ Unplug the power cord (2) of the device.
- ➔ If necessary, disconnect the USB cable from the USB port of the PC/ Laptop (1).
- ➔ Open the cover with the display.

Fig. 19-1: Open the cover with the display

- ➔ Move the Corvis® ST over the opening (1) of the transport safety device in the adjusting base.

➔ Lock the transport safety device (2).

Press down gently on the transport safety device and turn it counter-clockwise to the "unlocked" position (3). The transport safety device must be engaged.



1 Opening of the transport safety device
2 Spring
3 "Locked" position

Fig. 19-2: Transport safety device

➔ Close the cover with the display, see *Fig. 19-1, page 85*.

19.2 Transport and Storage

The transport and storage conditions according to IEC 60601-1 with the appropriate packaging are valid for a period of up to 15 weeks, see 92.

Note

Equipment damage due to incorrect lifting

If the Corvis® ST is lifted by the forehead rest, it can break off.

➔ Grab the Corvis® ST from below to lift it.

Equipment damage due to incorrect transport and improper storage

➔ Avoid bumps, shocks and contamination.

➔ Avoid high temperatures and humidity.

➔ Transport the Corvis® ST professionally.

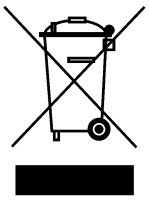
➔ Store the Corvis® ST according to the storage conditions, see *sect. 24, page 92*.

➔ Avoid placing near radiators and moisture.

➔ Check the Corvis® ST for damage every time it has been transported.

➔ Wait approx. 3-4 hours after transport before operating the Corvis® ST. Extreme temperature changes from cold areas to warm rooms can cause condensation on the optical components.

20 Disposal of Used Devices



In accordance with Directive 2002/96/EC of the European Parliament and the Council of 27 January 2003, and in accordance with German law governing the circulation, return and environmentally friendly disposal of used electrical and electronic devices, such appliances must be recycled and may not be discarded as household waste.

21 Troubleshooting

Attention

Persons or equipment damage due to incorrect troubleshooting

- ➔ Do not plug in or unplug any cables while the Corvis® ST is switched on.
- ➔ If an error occurs which you are unable to correct by following the instructions below, label the device as "out of order" and contact our service department or an authorized dealer.

Fault	Possible Cause	Help
No function when the On/Off switch is pressed	Corvis® ST not connected to the power supply.	➔ Plug power cord into the outlet or into the connector on the Corvis® ST.
	Power failure or power outlet is not active.	➔ Inform the in-house electrician.
		➔ Check that the connector is plugged in properly.

22 Terms of Warranty and Servicing

Any software included in the delivery was tested by us and complies with technical standards. Note the following warranty provisions:

- Prior to and while operating the device it is important that you observe the instruction manual and safety instructions.
- The Corvis® ST carries a warranty to which you are entitled in accordance with the legal provisions.
- If any unauthorized persons interfere with the Corvis® ST, all warranty entitlements shall be void. Any inappropriate modifications or repairs can cause grave danger to the user and patient.
- Any entitlement to a warranty shall also be void if unauthorized persons interfere with the PC hardware and supplied software.
- Make transport damage claims to the shipping company during or immediately after delivery. Have the damage confirmed on the bill of lading, so that a proper claim settlement is possible.
- In general, the general terms and conditions of business and delivery apply as per the date of purchase.

22.1 Liability for proper function or damages

OCULUS will only accept responsibility for the safety, reliability and serviceability of the Corvis® ST if the unit is used in compliance with the following terms:

- Use the device in accordance with these instructions and the accompanying user manual.
- There are no user-serviceable parts either on or inside the Corvis® ST. OCULUS shall not assume any liability if assembly, extensions, adjustments, changes or repairs are carried out by unauthorized personnel; if the Corvis® ST is maintained improperly; or if it is handled incorrectly.
- If the work described above is carried out by persons authorized to do so, they must be required to supply a certification detailing the nature and scope of repairs, and, if applicable, to specify modifications to the rated data and area of work. The certificate must bear a date, a signature, specify who carried out the work, and contain company information.
- On request, and for this purpose, OCULUS will supply authorized persons with spare parts lists and additional descriptions.
- Make sure that only original OCULUS parts are used for service and maintenance.

22.2 Address of the manufacturer and service department

Our service department or authorized representatives will furnish you with additional information. Address of the manufacturer and service department:

Germany:

OCULUS Optikgeräte GmbH
Münchholzhäuser Straße 29
35582 Wetzlar, Germany
Tel.: 06412005-0
Fax: 06412005-255
E-mail: sales@oculus.de
www.oculus.de

USA:

OCULUS, Inc.
17721 59th Avenue NE
Arlington
WA 98223-1337
Tel. +1 425-670-9977
Fax +1 425-670-0742
e-mail: sales@oculususa.com

http://www.oculususa.com

23 Declaration of conformity

OCULUS

OCULUS Optikgeräte GmbH
Münchholzhäuser Str.29
D-35582 Wetzlar

Tel: ++49 641 / 20 05 – 0
Fax: ++49 641 / 20 05 - 255

KONFORMITÄTSERKLÄRUNG / DECLARATION DE CONFORMITE / DECLARATION OF CONFORMITY / DICLARATIONE DE CONFORMITA / DECLARATION DE CONFORMITA

Wir / Nous / We / Noi / Nosotros — **OCULUS Optikgeräte GmbH**

Erklären in alleiniger Verantwortung, dass das Medizinprodukt
déclarons sous notre propre responabilité que le dispositif médical
declare on our own responsibility that the medical device
dichiariamo sotto propria responsabilitá che il dispositivo medico
declaramos en sola responsabilidad que el producto medicina

Name / nom / name / nome / nombre — **Corvis® ST**

Typ / type ou modél / type or model / tipo o modello / Tipo y modelo — **72100, 72200, 72210**

allen Anforderungen der Richtlinie 93/42/EWG entspricht.
remplit toutes les exigences de la 93/42/EEC qui le concernait.
meets all the provisions of the Directive 93/42/EEC which apply to him.
addempie a tutte le exigenze della Direttiva 93/42/EEC che lo riguardano.
reuna todos los requisitos de la Directiva 93/42/EEC

Einstufung: (Richtlinie 93/42/EWG, Anhang IX)
Classification: (MDD 93/42/EEC, annex IX)
Classification: (MDD 93/42/EEC, annex IX)
Classificatione: (MDD 93/42/EEC, annex IX)
Clasificatión: (MDD 93/42/EEC, annex IX)
IIa

Konformitätsbewertung nach: Richtlinie 93/42/EWG Anhang II.3
Conformity according: MDD 93/42/EEC, annex II.3
Conformité en: MDD 93/42/EEC, annex II.3
Conformita a: MDD 93/42/EEC, annex II.3
Conformidad para : MDD 93/42/EEC, annex II.3

Angewandte harmonisierte Normen:
Normes harmonisées appliquées:
Applied harmonized standards:
Norme armonizzate applicate
Norma armonizaciónada

DIN EN 60601-1
DIN EN 60601-1-2
DIN EN ISO 15004-1
DIN EN ISO 15004-2
DIN EN 14971

Benannte Stelle:
Notified body:

TÜV Product Service
CE0123

Ort, Datum /
lieu, date / place, date / luogo, data / lugar, fecha

Wetzlar, 28.02.2013

Name und Funktion /
nom et fonction / name and function /
nome e funzione / nombre y function

Geschäftsführer / Managing Director
OCULUS Optikgeräte GmbH

Dipl.-Ing. Rainer Kirchhübel

24 Technical Data

Measure Mode

IOP + pachymetry

Tonometer

Measuring range	6 to 60 mmHg
Working distance	11 mm (0.4 in)

Scheimpflug camera

Frame Rate	4330 frames/s
Measuring range	8.5 mm (0.3 in) horizontal coverage
Pachymeter measuring range	300 to 1200µm
Measuring points	576 per image
Display resolution	576 x 200 pixels
Light source	blue LED (470 nm, UV-free)

Classification according to IEC 60601 - 1

Type of protection against electrical shock	Protection class 2
Level of protection against electrical shock	Type BF
Protection level of the housing against intrusion of foreign objects and liquids	IP20

Operating conditions

Temperature	+10 °C to +40 °C
Humidity	30 % to 70 %
Air pressure	700 hPa to 1060 hPa

Transport and storage requirements (according to IEC 601 - 1)

Ambient temperature	-10 °C to +70 °C
Relative humidity, including condensation	10% to 70%
Air pressure	500 hPa to 1060 hPa

Electrical Specifications

Power input	49.5 VA
Voltage	External 110/220 VAC
Frequency	50/60 Hz
Fuses	Built-in overcurrent shutdown

Other information

Dimensions (W x D x H)	270 x 520 x 495-520 mm (10.7 x 20.5 x 19.5-20.5 in
Weight	approx. 14 kg (30.8 lbs)
Printer	Thermal printer
Display	TFT - LCD approx. 150 mm
CE marking	CE 0123
Contraindications	none noted
Lifecycle expectancy	up to 10 years

25 Appendix

25.1 Electromagnetic compatibility

Medical Electrical Equipment needs special precautions regarding EMC, and must be installed and operated according to the accompanying information contained in the EMC documentation.

No special measures need to be observed for OCULUS devices and systems.

Portable and mobile HF sets can interfere with electrically operated medical devices.

25.2 Lines and Power Supplies

To stay within the limits allowed for interference and immunity, the following types of cables must be used:

Order number	Description	
05200320	Cable with plug, EU standard	2.5m
05200210 (110 volts)	Cable with plug, US standard	2.5m
027210101000	Power Supply Corvis AFM120PS15	Input 90-264 VAC Output 15 V / 6.66 A

The use of accessories and cables that are not specified or offered by OCULUS can cause interference and reduce the resistance to interference of the Corvis® ST.

Avoid proximity to accessories that are listed in the following EMC tables.

25.3 Guidelines and Manufacturer's Declaration Electromagnetic immunity

Electromagnetic radiation, IEC 60601-1-2, 6.8.3.201, Table 201		
The Corvis® ST from OCULUS is intended for use in the electromagnetic environment specified below. The user of the Corvis® ST should ensure that it is used in such an environment.		
Emissions measurements	**Coincides with**	**Electromagnetic environment – Guidelines**
HF emissions according to CISPR 11	Group 1	The device only uses high-frequency energy for its internal functions. Therefore, its HF emissions are very low and it is unlikely to cause interference with any electronic equipment.
HF emissions according to CISPR 11	Class B	The device is intended for use in all establishments, including domestic establishments and those that are directly connected to a public supply network which supplies buildings used for residential purposes.
Harmonic frequency according to IEC 61000-3-2	Class A	
Voltage fluctuations / flicker according to IEC 61000-3-3	fulfilled	

Electromagnetic immunity, IEC 60601-1-2, 6.8.3.201, Table 202			
Immunity tests	**IEC 60601-Test level**	**Conformity level**	**Electromagnetic environment - Guidelines**
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV contact discharge ±8 kV air discharge	±6 kV ±8 kV	Floors should be wood, concrete or ceramic tile. If the floor is covered with synthetic material, the relative humidity must be at least 30%.
Electrical fast transient / burst according to IEC 61000-4-4	± 2 kV for power lines ± 1 kV for Input and Output Cables	±1 kV ---------- ±1 kV	The quality of the supply voltage should be that of a typical commercial or hospital environment.
Peak currents (surges) according to IEC 6100-4-5	± 1 kV differential mode voltage ±2 kV common-mode voltage	±1 kV ±2 kV	The quality of the supply voltage should be that of a typical commercial or hospital environment.
Voltage drops, short interruptions and fluctuations of the supply voltage according to IEC 61000-4-11	< 5% U_τ (> 95% drop in U_τ) for ½ cycles 40 % U_τ (60% drop in U_τ) for 5 cycles 70% U_τ (30% drop in U_τ) for 25 cycles <5% U_τ (> 95% drop in U_τ) for 5 s	< 5% U_τ (> 95% drop in U_τ) for ½ cycles 40 % U_τ (60% drop in U_τ) for 5 cycles 70% U_τ (30% drop in U_τ) for 25 cycles <5% U_τ (> 95% drop in U_τ) for 5 s	The quality of the supply voltage should be that of a typical commercial or hospital environment. If the user continues to operate the Corvis® ST during power interruptions, it is recommended that the Corvis® ST be powered from an uninterrupted power supply or battery.
Magnetic field at supply frequency (50/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields at mains frequency should be those of a typical commercial or hospital environment.
Note: U_τ is the mains voltage prior to application of the test level			

Electromagnetic immunity, IEC 60601-1-2, 6.8.3.201, Table 204

Immunity tests	IEC 60601 test level	Conformity level	Electromagnetic environment – Guidelines
Conducted HF disturbances according to IEC 61000-4-6	3 V_{eff} 150 kHz to 80 MHz	V_{eff} = 3 V E = 3 V / m	Portable and mobile RF communications equipment, including the cables, should not be used closer to the device than the recommended separation distance, which is calculated with the applicable equation for the transmission frequency. Recommended separation distance: $d=\{ 3.5/V_1 \}\sqrt{P}$ $d=\{ 3.5/E_1 \}\sqrt{P}$ for 80 MHz to 800 MHz $d=\{ 7/E_1 \}\sqrt{P}$ for 800 MHz to 2.5 GHz where P is the rated power of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level. Interference is possible in the vicinity of equipment marked with the following symbol: 
Radiated HF disturbances according to IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz,		

Note 1:	At 80 Hz and 800 MHz, the higher frequency range is valid.
Note 2:	These guidelines may not be applicable in all cases. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Field strengths from fixed transmitters, such as base stations for mobile telephones and land mobile radios, amateur radio, AM and FM radio and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment in regard to fixed RF transmitters, a study of the location should be considered. If the measured field strength in the location at which the Corvis® ST is used exceeds the compliance level above, the Corvis® ST should be observed to demonstrate the proper functions. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Corvis® ST.

At frequencies over the range of 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile Electromagnetic radiation, IEC 60601-1-2, 6.8.3.201, Table 206

The Corvis® ST is designed to operate in an electromagnetic environment in which HF disturbances are controlled. The user of the Corvis® ST can help to prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device - depending on the specified output power of the communication device, as shown below.

	Separation distance in m depending on the transmitter frequency		
Power of transmitter W	150 kHz to 80 MHz, d= 1.2 √P	80 MHz to 800 MHz, d= 1.2 √P	800 MHz to 2.5 GHz d= 2.3 √P
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.80	3.80	7.3
100	12	12	23

For transmitters rated at a maximum rated output as listed above, the recommended separation distance d in meters (m) can be determined using the equation, which is in the associated column, where P is the maximum rated output of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the higher frequency range is valid.

Note 2: These guidelines may not be applicable in all cases. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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