GERBER INSTRUMENTS
Since 1892

Cryoscope C1 manual

Cryoscope C1A automat

USER MANUAL

Table of contens:

1. Introduction

1.1 Usage

The cryoscope is used to determine the freezing point of raw, pasteurized, Ultra-High Temperature (UHT) or sterilized whole milk, semi-skimmed milk and skimmed milk (skim milk).
It is possible to use the freezing point for the detection of extraneous water inside the milk. (see 5.1.1).

1.2 Short description of the instrument

The Gerber Cryoscope C1A is built tough and has a compact design. Operation works via the large touchscreen. Parameters, such as measurement mode, the amplitude of the stirrer, length of the freezing impulse and measuring unit can be adjusted very easily. Thanks to the understandable menu guide the C1A is easy to calibrate. Measurement data can be printed by an external printer or PC. In the event of malfunctions it is possible to connect the C1A to the Internet and our technicians can therefore access to your device.

1.3 Operating conditions

The cryoscope is keep away from:

- Direct sunlight
- Heat sources near
- Draught
- Vibrations
- Humidity

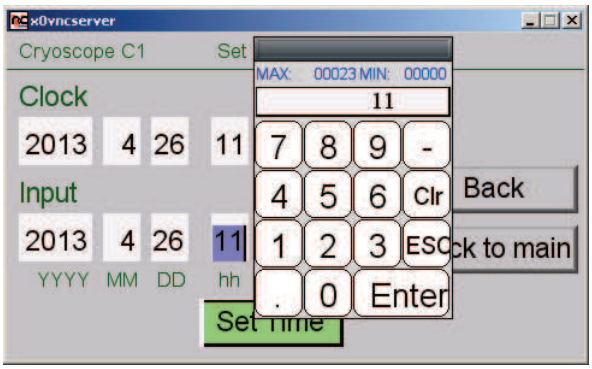
1.4 Informations about the user manual

- This user manual always refers to a volume of 2.0 ml (standard- and control solution, milk samples).
  If the volume sizes are changed (for example 2.5 ml) it is has to be remembered for the calibration.

- Example: Setup
  If the text is highlighted in yellow (Setup) it is a function key.

- 1
  Numbers in a yellow circle indicate information about a button or a text.

- Changing Values



To change existing values (for example date) press on the relevant field. You will see a keypad with which you can enter the new data.
Press Enter to complete.Press Save to confirm.

-  This symbol alerts you to proceed with caution.

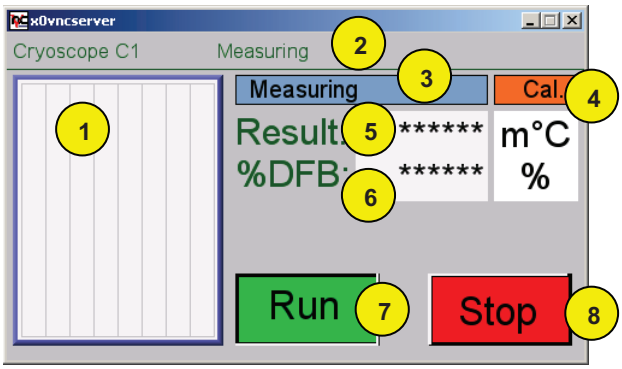
-  This symbol indicates that important information must be observed.

2. Description of the Gerber Cryoscope C1

2.1 Front view of the manual and automatic device

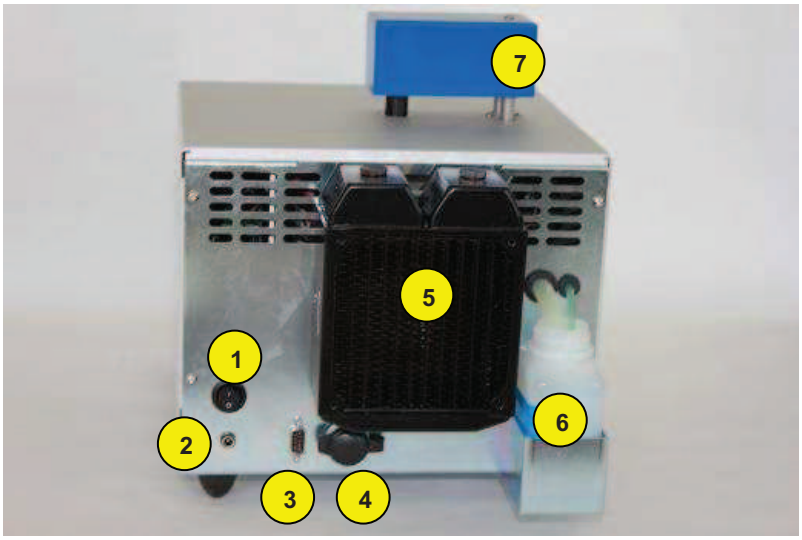
1. Touchscreen
2. Measuring Head
3. Probe
4. Opening of the cooling unit
5. Turntable for 8 samples

2.2 Touchscreen



1. Display (with functions)
2. Operation mode
3. Display operation mode
4. Status of calibration
5. Measuring value of the freezing point
6. Extraneous water content (if activated)
7. Start analyse
8. Stop analyse

2.3. Rear view of the Cryoscope C1

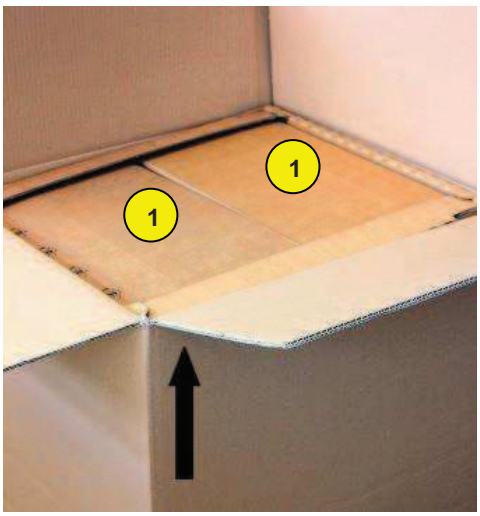


1. Main switch
2. Input external power supply
3. RS 232 output for printer or computer
4. Network connection (needed for support)
5. Cooling unit
6. Fluid transfer tank
7. Measuring Head

3. Unpacking/Device control/Accessories

3.1 Unpacking

Place the packing box on the floor. The arrows on the box should point up. Now, open the packing box.



In the carton there are two small boxes.

1 One box with standard accessories.

1 One box with optional accessories.

- Remove the two boxes from the carton.
- Remove the remaining packing material. Take the cryoscope out from the packaging and place it on a suitable surface (see 4.Initial installation).

3.2 Device control

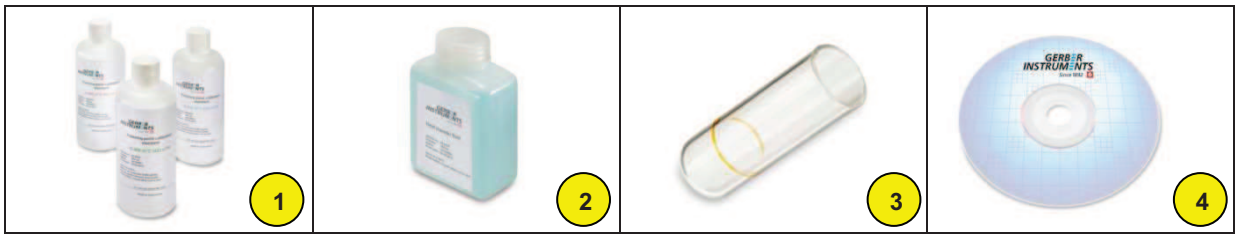
Check the cryoscope according to the following criteria:

- Transport damage
- Moisture on the surface of the housing
- Other irregularities

If one of those criterisas occur, do **not** switch on the instruments.
Please contact your local service partner.

3.3 Accessories

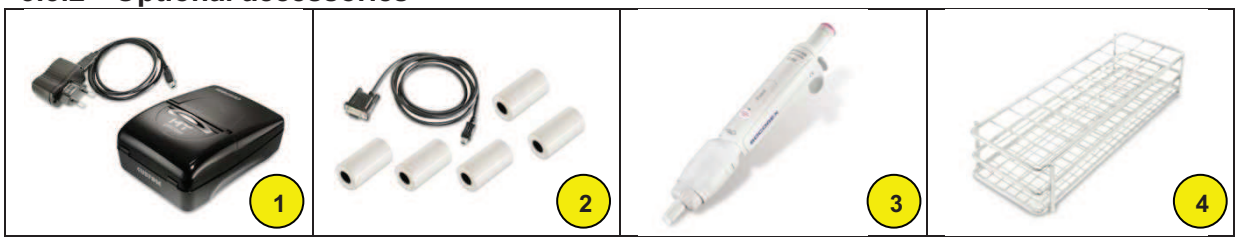
3.3.1 Standard accessories



1. Calibration solution -408 m°C, -600 m°C, -512 m°C (control solution) each 250 ml
2. Heat Transfer liquid 250 ml
3. Test tubes 2 ml (pack a 10 pc.)
4. CD with user manual

Coolant solution Coolant C1, country specific power cable (without image)

3.3.2 Optional accessories



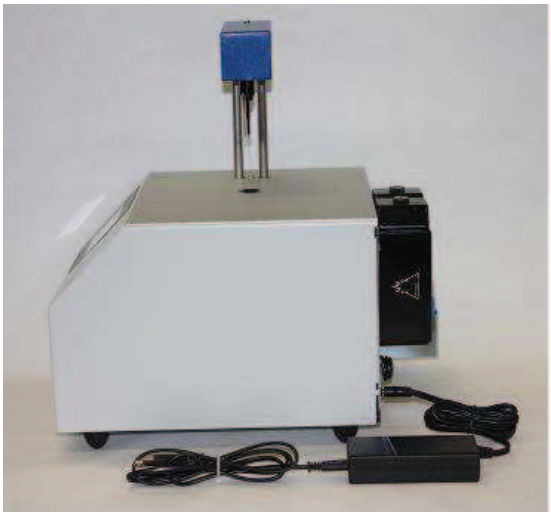
1. Thermo printer with power supply and USB-cable
2. USB-RS232-Adapter, printer paper (pack a 10 rolls)
3. Pipette 2.0 ml or 2.5 ml fixed volume
4. Test tube rack of stainless steel for 30 test tubes

Test tubes 2.5 ml (pack a 10 pc.), pipette tips, USB-Ethernet-Adapter (without image)

4. Initial installation

Place the cryoscope on a solid base. The base should not transmit any vibrations and has to be placed at least 10 cm away from the rear wall and with a 5 cm room to move on the sides. Direct sunlight, other heat sources or drought should be avoided.

4.1. Connect the external power supply



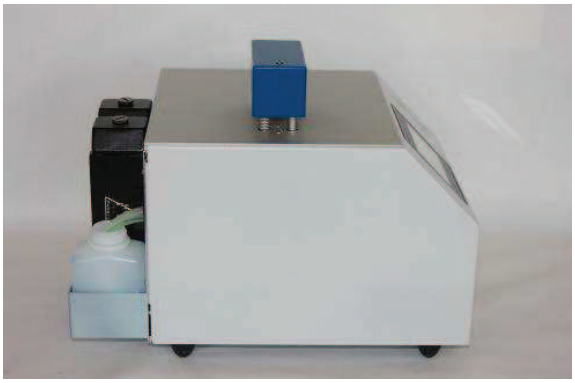
- Connect the external power supply to the socket provided on (see 2.3 rear view Cryoscope C1).
- Connect the country-specific power cord to the power supply.

4.2 Connect printer (optional)

- Connect the printer to the USB-RS232-adapter to the Cryoscope.
- The printer has a battery. If the print quality declines, the charger must be connected (see 2.3 rear view Cryoscope C1).

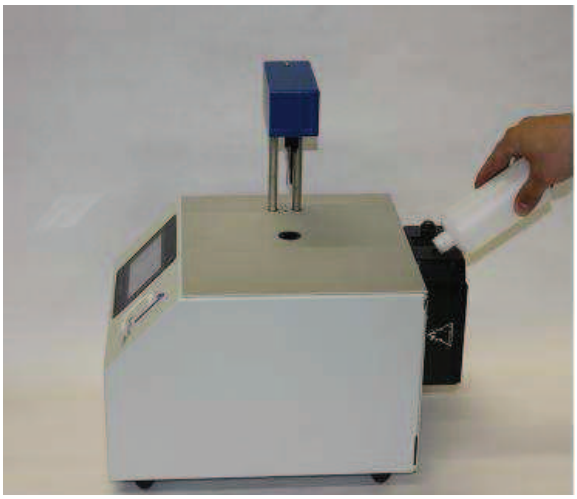
Check beforehand wether the current voltage and frequency match with the technical specifications of the external power supplies.

4.3 Insertion of the Heat Transfer liquid



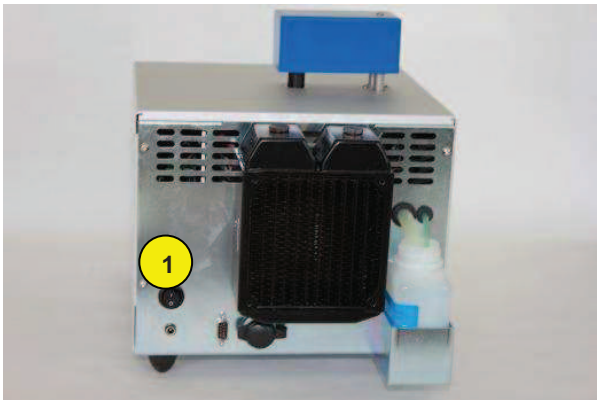
- Insert the bottle containing the Heat Transfer liquid in the provided container.
- Insert both tubes into the open bottle.

4.4 Control of the cooling system

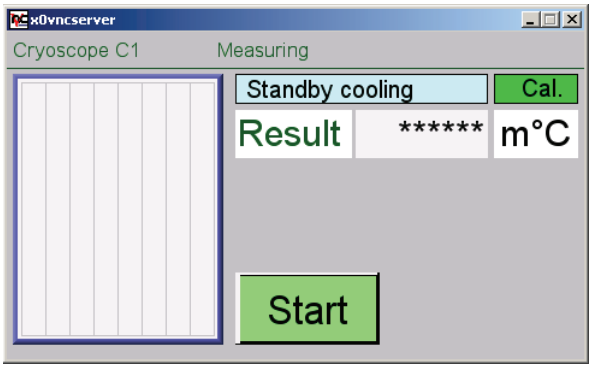


- Open one of the two screws of the cooler and check the coolant level.
- If necessary (no liquid visible), fill up the cooler with the delivered cooling liquid (C1 Coolant) until it reaches the lower edge of the vessel.
- Close the opening.

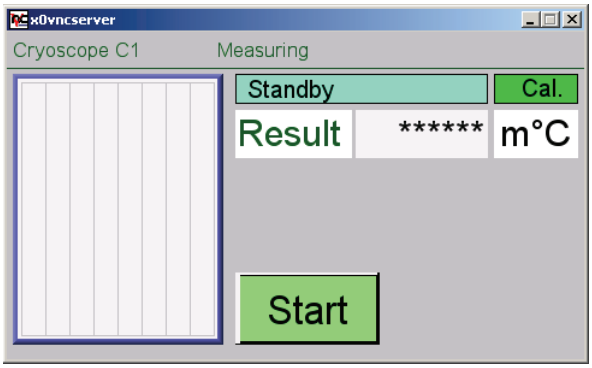
4.5 Switch on the device



1 Turn on the device using the main switch.

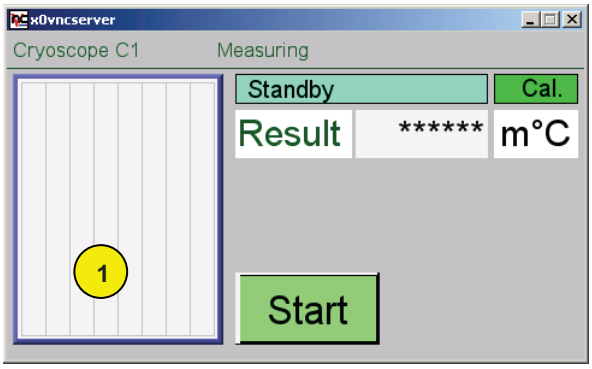


- After a while, the picture below will be displayed.
- The status indicator is light blue during the startup phase (Standby cooling).

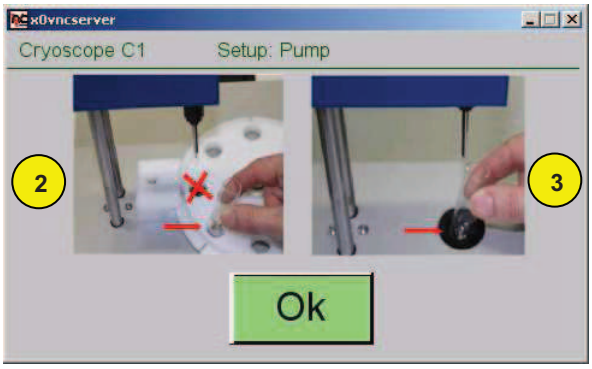


- If the standby temperature of the cooling unit is achieved, the status indicator changes to blue.
- The cryoscope remains in this mode until the Start button is pressed.

4.6 Ventilate cooling circuit



1 Press into *lower half* from the graphic display.



2 **Automat**

- Place an empty sample tube into the next free position in front of the probe and press the Ok button.

3 **Manual device**

- Place an empty sample tube into the opening of the cooling unit and press the Ok button.

- The cooling system will automatically be ventilated.
- Repeat the venting so often until the Heat Transfer liquid run back out of the thick tube in the bottle.
- After finishing with the ventilation the measuring head moves upwards.

Automat

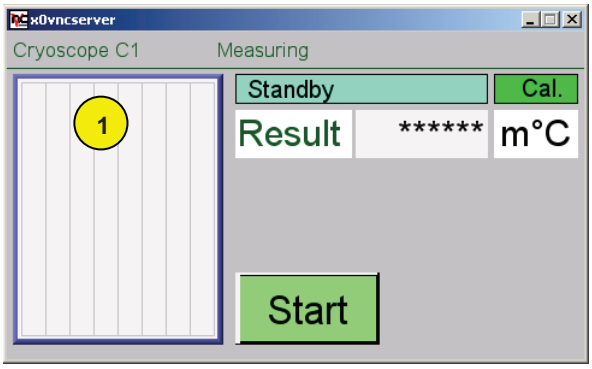
- Press the Start-button, the turntable moves forward one position, remove the sample tube.

Manual device

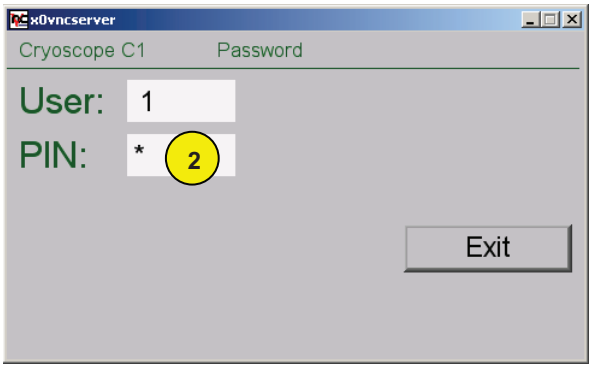
- Remove the sample tube.

At any work with the Cryoscope it must be ensured, that is a test tube under the measuring head. Thus, a contamination of the stirrer/probe avoided with coolant solution.

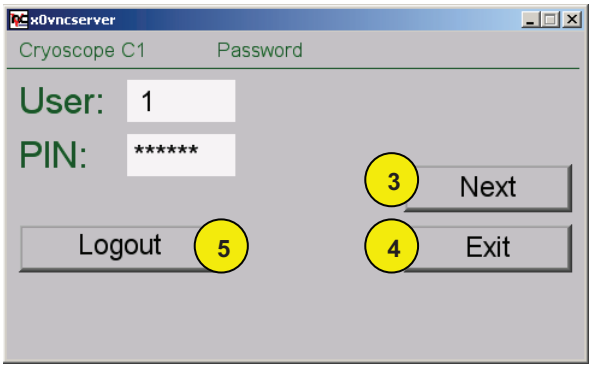
4.7 Password entry



1 Press into *upper half* from the graphic display.



2 Enter the password which was given from your local partner. Confirm with Enter.



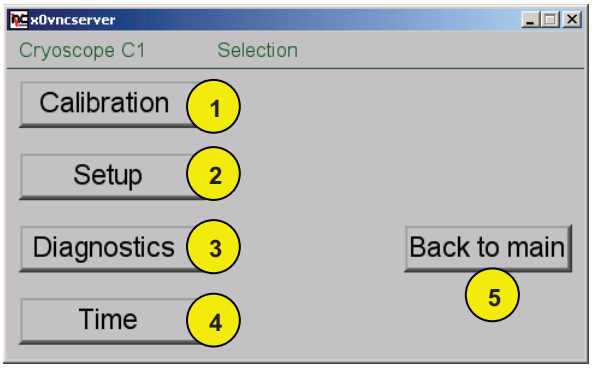
3 With button Next you reach Selection.

4 With button Exit you reach main screen.

5 With button Logout you leave the password-protected area.

5. Control and settings

After entering the password and press the Next button the following menu appears:



1 Calibration (enforcement of calibrations).

2 Setup (verification and modification of attitudes and values).

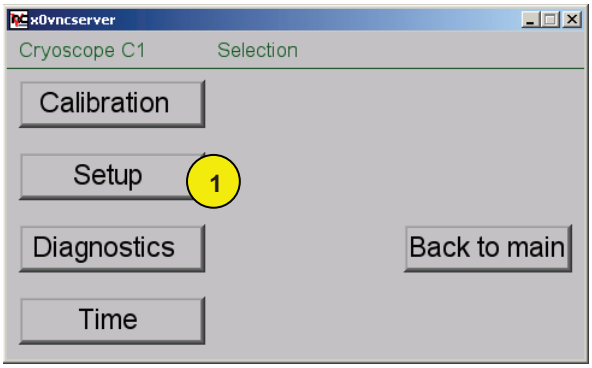
3 Diagnostics (inspection of lift and turntable).

4 Time (review and updating of date and time).

5 Back to main (return to the password request)

5.1 Setup

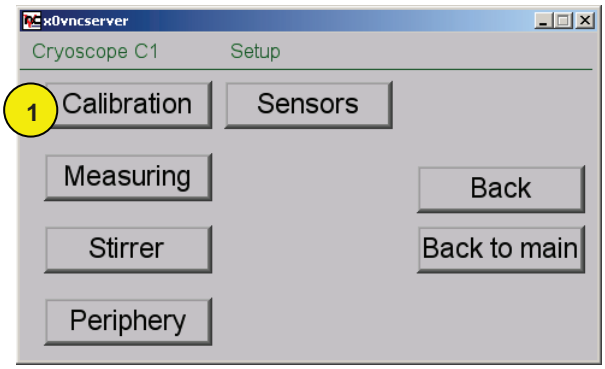
Before starting calibration of the Cryoscope C1 it is possible to check or change the factory settings.



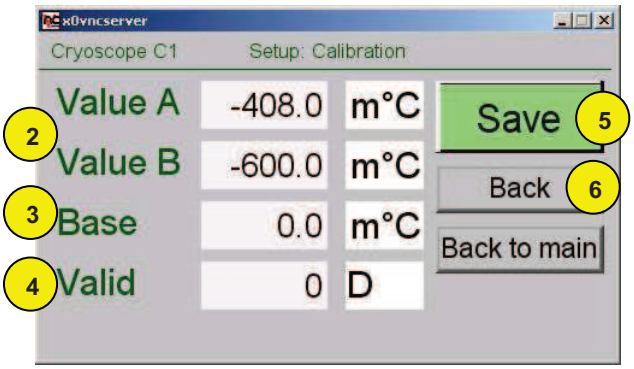
1 Press Setup.

The Cryoscope is delivered with factory settings.
Without compelling reason, there is no need to change them.

5.1.1 Check/change calibration mode



1 Press Calibration.



2 Control of the standard value A (-408.0 m°C).
Control of the standard value B (-600.0 m°C).
(For special measuring the value can be changed)

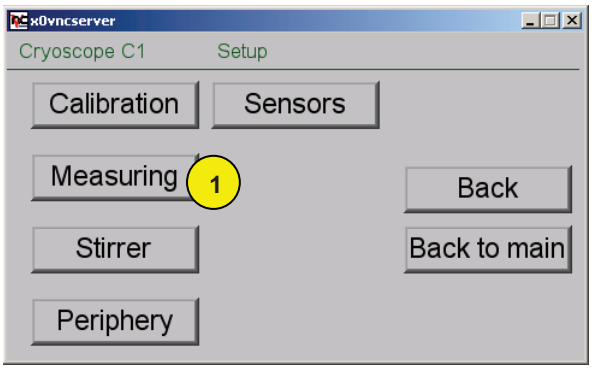
3 If desired, the base point for the calculation of extraneous water may be entered.

4 Enter the validity of the calibration (from 0-30 days selectable).
Factory setting are 0 days. If no change is made, a recalibration is not mentioned (see 2.2 status of calibration).

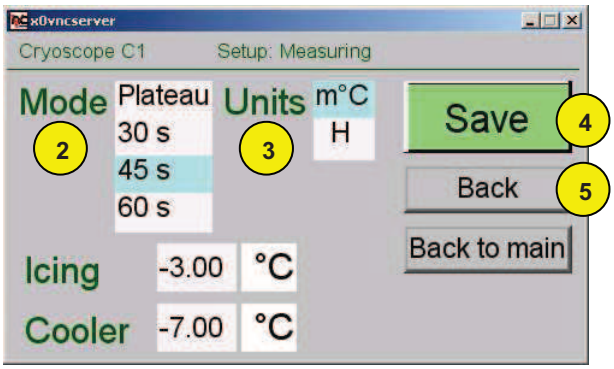
5 If you change data, save them by pressing the Save button.

6 To exit press Back.

5.1.2 Check/change measuring mode



1 Press Measuring.



2 Choose the measuring mode (Plateau, 30, 45 or 60 seconds).

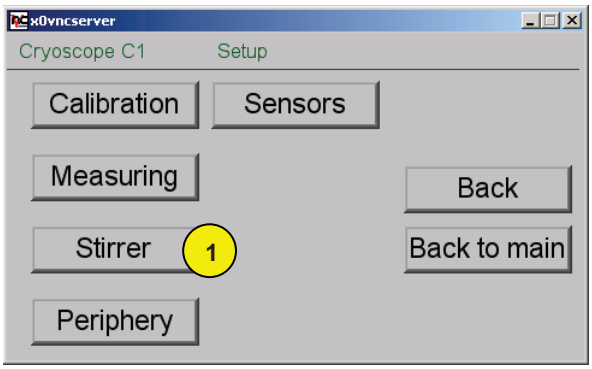
3 Choose measuring units (m° Celsius or m° Hortvet).

4 If you change data, save them by pressing the Save button.

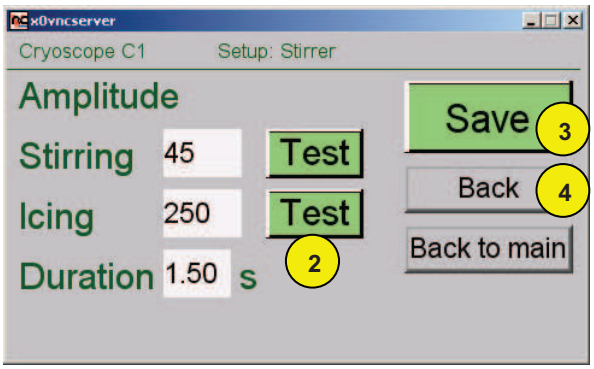
5 Press Back to reach the Setup-Menu.

Please do not change the Icing and Cooler values !
If Mode and Units are going to be changed, the cryoscope has to be recalibrated.

5.1.3 Check/change stirrer



1 Press Stirrer.



- The swinging motion of the stirrer should be about 3-4 mm.
- During Icing the stirrer has to beat strongly against the wall of the glass.
- Duration is the time of Icing. They should be between 0.5 and 2.0 sec.

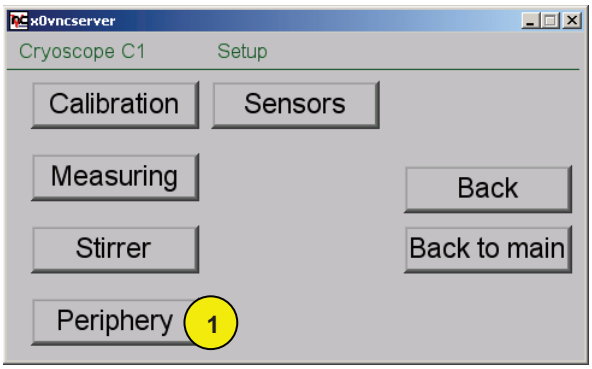
2 Using the test buttons, the values can be checked and changed.

3 Changed values are to be confirmed with Save.

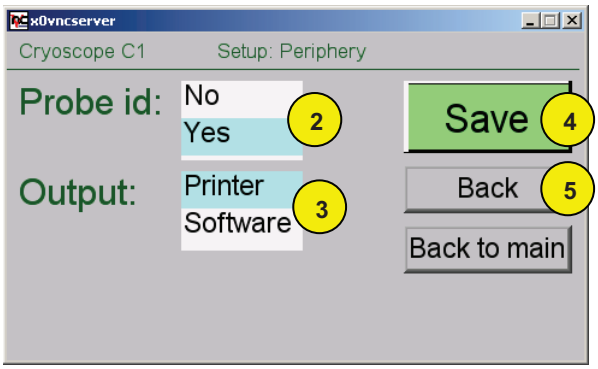
4 To exit press Back.

After each change, the device must be recalibrated.

5.1.4 Select periphery



1 Press Periphery.



2 **Manual device**

➢ If a printer is connected, you have the option to enter a sample identification. Only numbers are allowed and the maximum length are 9 digits.

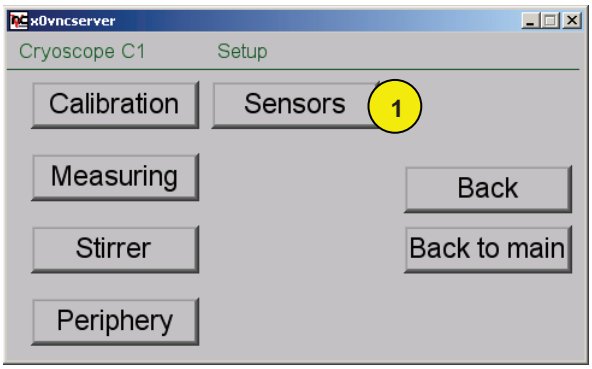
3 **Manual device and automat**

➢ Transfer the data to a Printer or a computer Software. A specially developed software can be ordered at Gerber Instruments.

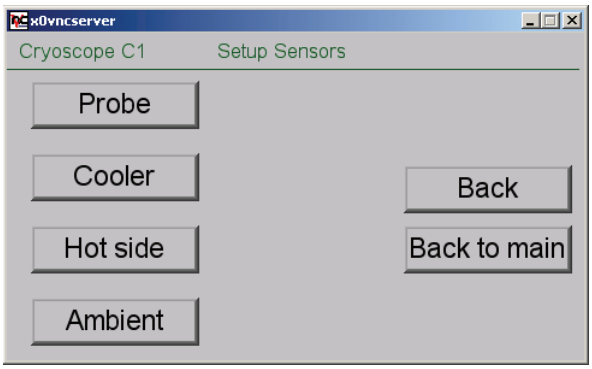
4 All entries are to be confirmed with Save.

5 To exit press Back.

5.1.5 Adapt sensors

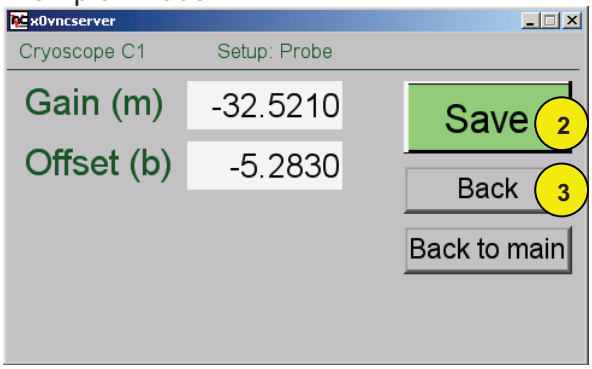


1 Press Sensors.



- Is sensors to be must replaced, new calibration values of the sensors must be entered. (Announcement of the new values at delivery from spare parts).

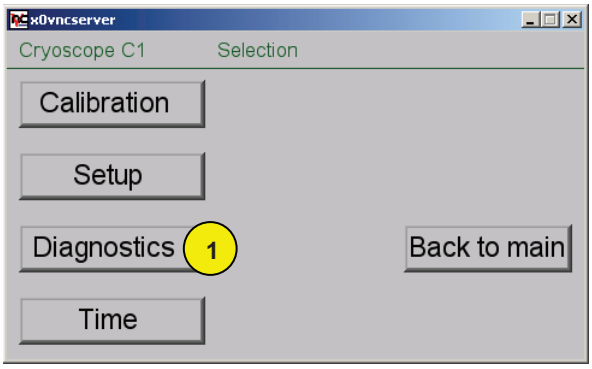
Example: Probe



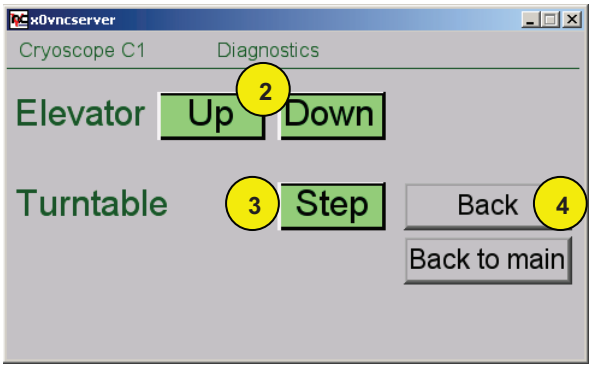
2 All entries are to be confirmed with Save.

3 To exit press Back.

5.2. Diagnostics



1 Press Diagnostics.



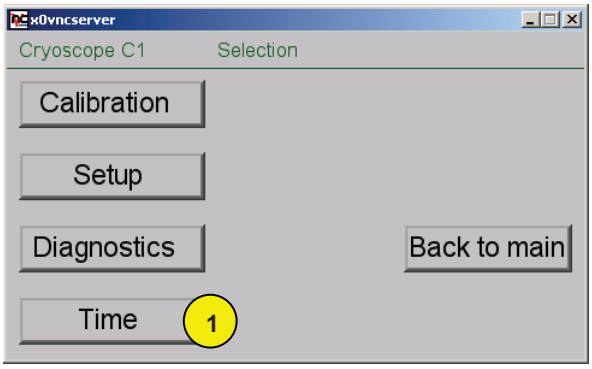
2 **Manual device and automat**
- With the buttons Up/Down you can check the function of the elevator.

3 **Automat**
- With the button Step the turntable move one position clockwise.

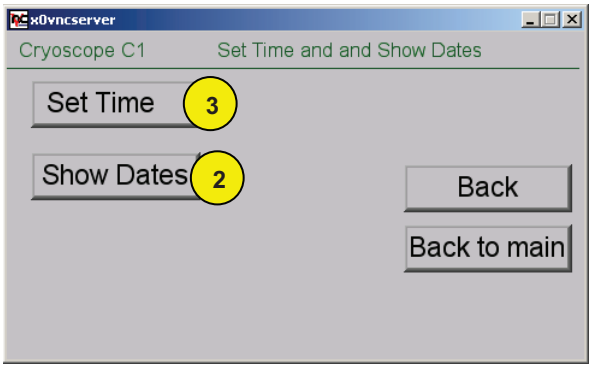
4 To exit press Back.

At any work with the Cryoscope it must be ensured, that is a test tube under the measuring head. Thus, a contamination of the stirrer/probe is avoided with coolant solution.

5.3 Check/change date and time

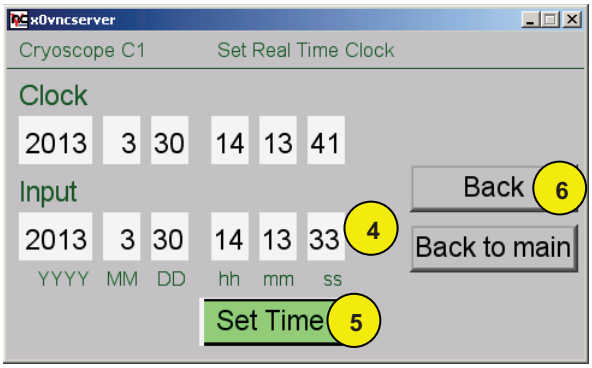


1 Press Time.



2 Show Dates (display the last calibration date).

3 Press Set Time (display/change the current date and time).



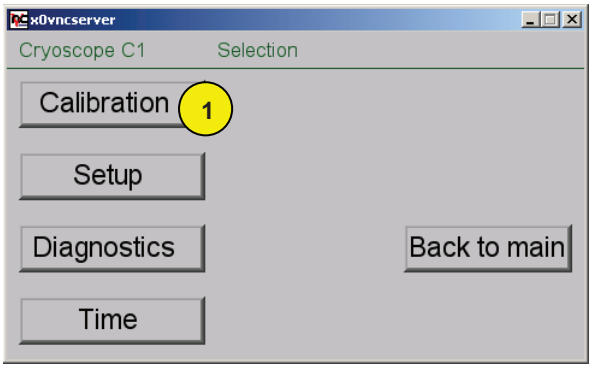
4 If necessary set the date and time into the input field (see 1.4 changing values

5 By pressing the Set Time button the time will be saved.

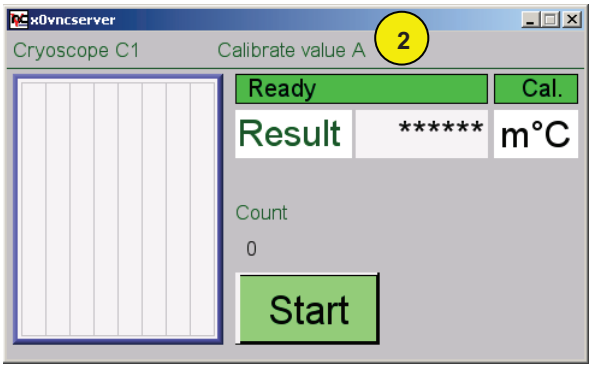
6 To exit press Back.

6. First calibration (routine calibration)

6.1 Calibration with standard A and B



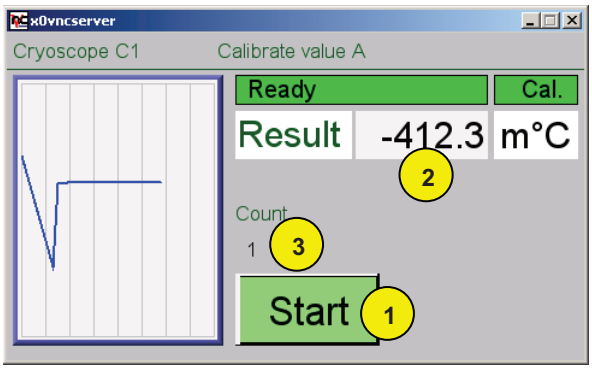
1 Press Calibration to set the cryscope into the calibration mode.



2 Calibration mode (standard A) will be displayed.

➢ If the operation mode not Ready/green press the Start button.

6.1.1 Manual device-standard A

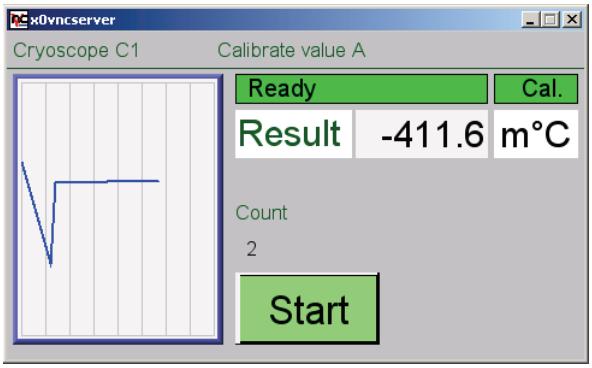


- Add 2 ml of standard A (-408 m°C) into the sample tube and insert it into the opening of the cooling unit.

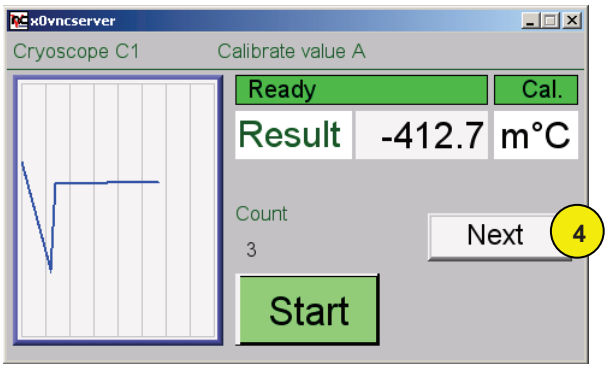
1 Press Start.

2 The first measuring value will be shown.

3 The sample counter will be set to 1.

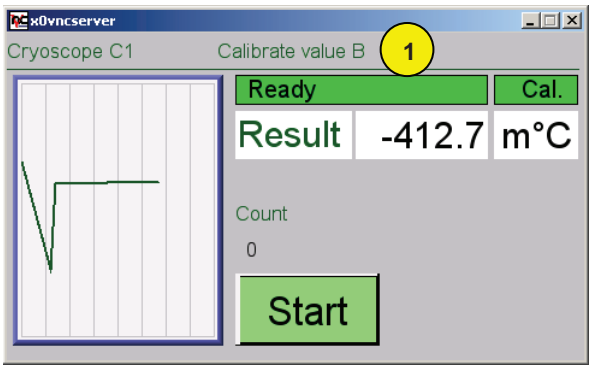


- Again add 2 ml of standard A (-408 m°C) into the sample tube and insert it into the opening of the cooling unit.
- Press Start.
- The second measuring value will be shown.
- The sample counter will be set to 2.



- Again add 2 ml of standard A (-408 m°C) into the sample tube and insert it into the opening of the cooling unit.
- Press Start.
- The third measuring value will be shown.
- The sample counter will be set to 3.

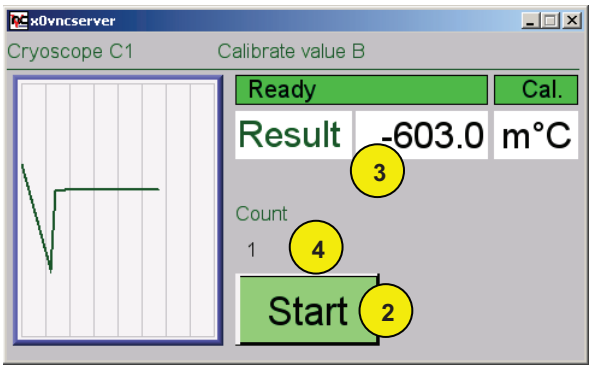
4 Press Next.



1 Calibration mode (standard B) will be displayed.

After each change of solutions (standard or control solution), the stirrer and the temperature sensor have to be cleaned gently with a lint-free laboratory cloth from top to bottom.

6.1.2 Manual device-standard B

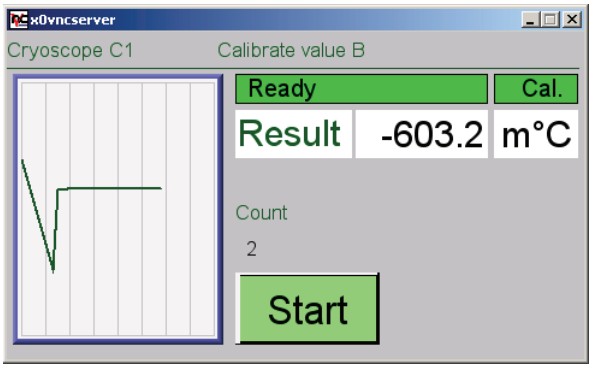


- Add 2 ml of standard B (-600 m°C) into the sample tube and insert it into the opening of the cooling unit.

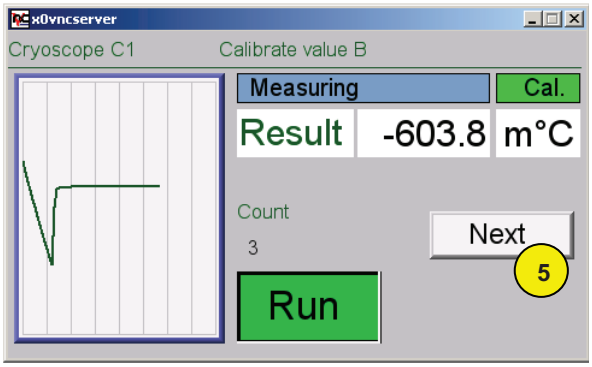
2 Press Start.

3 The first measuring value will be shown.

4 The sample counter will be set to 1.

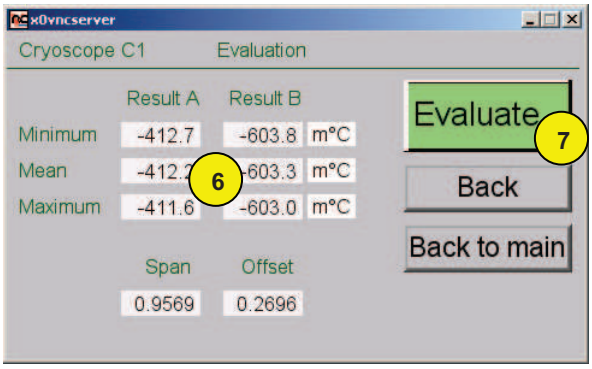


- Again add 2 ml of standard B (-600 m°C) into the sample tube and insert it into the opening of the cooling unit.
- Press Start.
- The second measuring value will be shown.
- The sample counter will be set to 2.



- Again add 2 ml of standard B (-600 m°C) into the sample tube and insert it into the opening of the cooling unit.
- Press Start.
- The third measuring value will be shown.
- The sample counter will be set to 3.

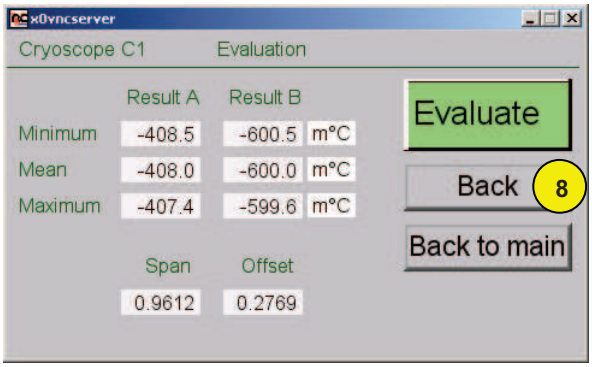
5 Press Next.



6 Display of the statistics.

- From the measurements carried out the highest and lowest values and also the mean values are reported.
- If the deviations from the min/max value for the average correspond with the country specific requirements,

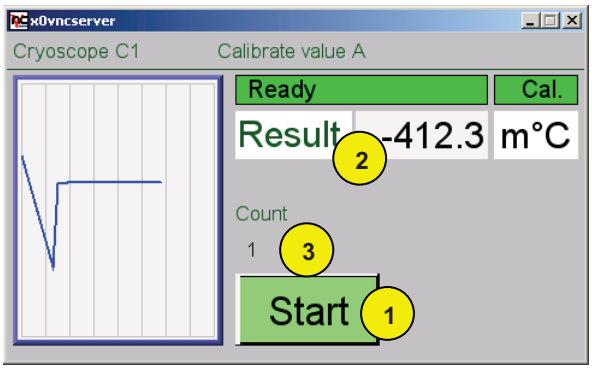
7 confirm with Evaluate.



- The calibration is accepted.

8 To exit press Back.

6.1.3 Automatic device-standard A

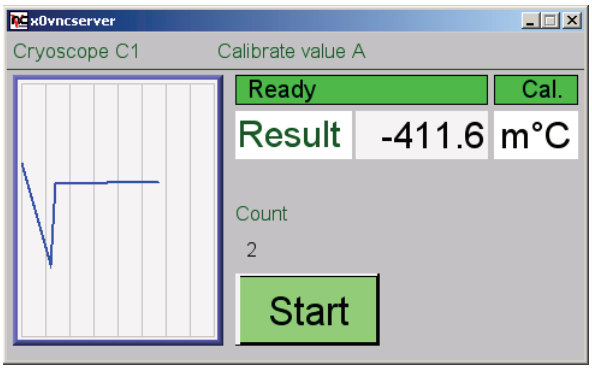


- Fill in into **3** sample tubes 2 ml of standard A (-408 m°C) and insert this into the next free space of the turntable (**not** directly under the probe).

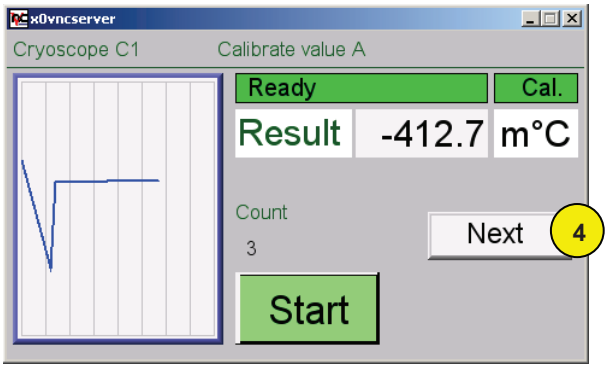
1 Press Start.

2 The first measuring value will be shown.

3 The sample counter will be set to 1.

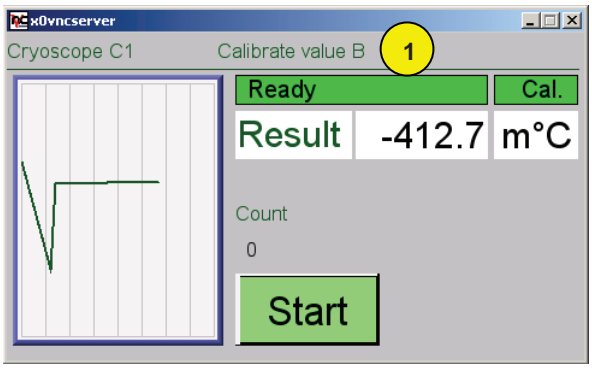


- The second measuring value will be shown.
- The sample counter will be set to 2.



- The third measuring value will be shown.
- The sample counter will be set to 3.
- Remove the sample tubes.

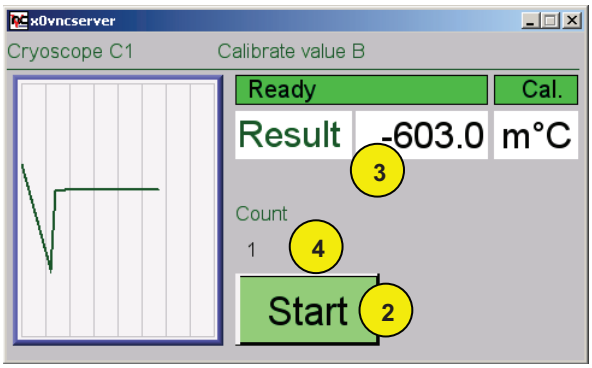
4 Press Next.



1 Calibration mode (standard B) will be displayed.

After change of the solutions (standard or control solution), the stirrer and the temperature sensor have to be cleaned gently with a lint-free laboratory cloth from top to bottom.

6.1.4 Automatic device-standard B

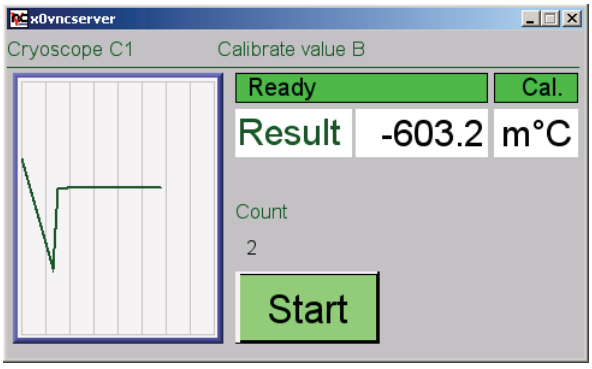


➢ Add **3** sample tubes 2 ml of standard B (-600 m°C) and insert this into the next free space of the turntable (**not** directly under the probe).

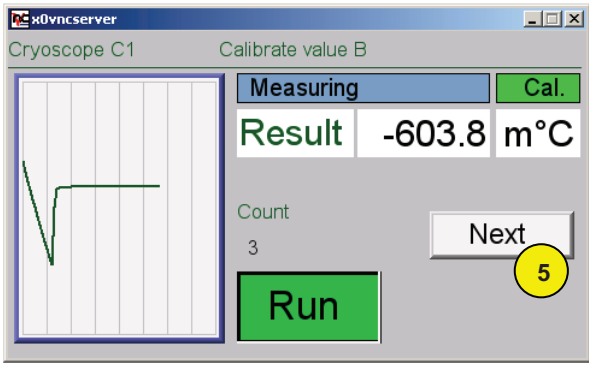
2 Press Start.

3 The first measuring value will be shown.

4 The sample counter will be set to 1.

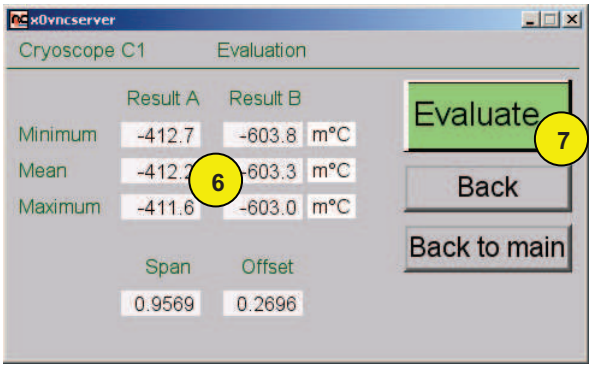


- The second measuring value will be shown.
- The sample counter will be set to 2.



- The third measuring value will be shown.
- The sample counter will be set to 3.
- Sample tubes take out.

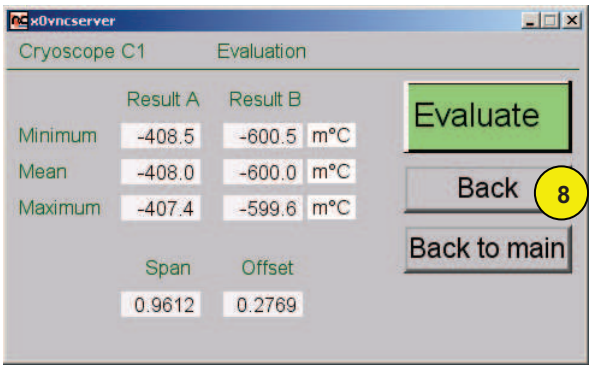
5 Next ***Weiter*** drücken.



6 Display of the statistics.

- From the measurements carried out the highest and lowest values and also the mean values are reported.
- If the deviations from the min/max value for the average correspond with the country specific requirements,

7 confirm with Evaluate.



The calibration is accepted.

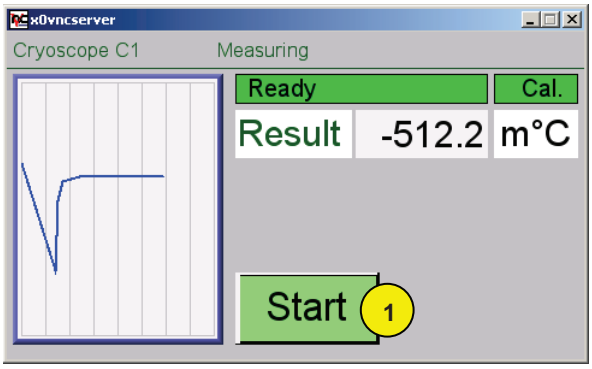
8 To exit press Back.

If the deviations are outside the country-specific tolerance, the entire calibration process has to be repeated.

After change of the solutions (standard or control solution), the stirrer and the temperature sensor have to be cleaned gently with a lint-free laboratory cloth from top to bottom.

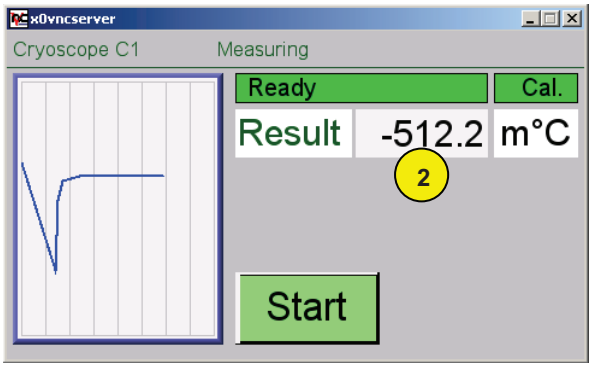
6.2 Verification of the calibration with the control solution

6.2.1 Manual device



- Fill in 2 ml of the control solution (-512 m°C) into the sample tube and insert it into the opening of the cooling unit.

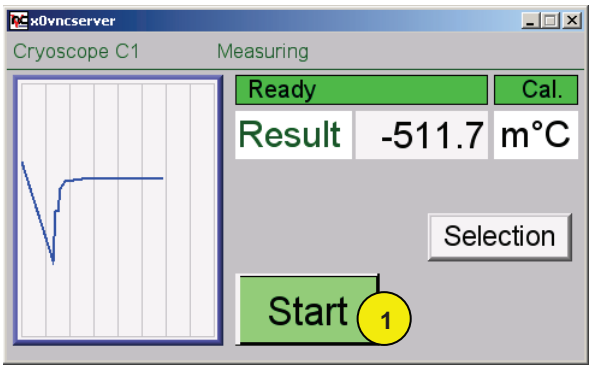
1 Press Start.



2 The first result will be displayed.

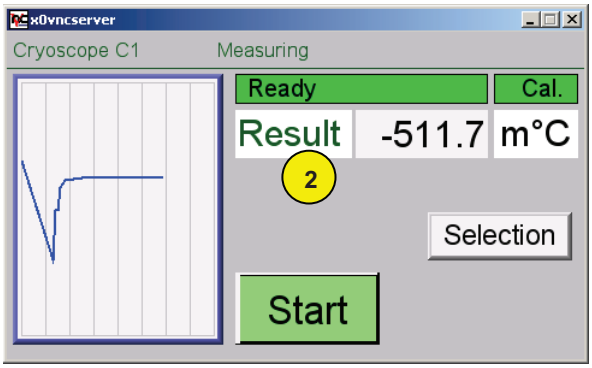
- If no printer is available the results should be written down.
- This measurement shall be repeated at least two times.
- The results now should be compared with the value of the control solution (-512 m°C).
- If the country-specific deviation stays within the tolerance the device is ready for use.
- If the country-specific deviation stays outside the tolerance the error must be wanted.

6.2.2 Automatic device



- Fill in into **3** sample tubes 2 ml of contol solution (-512 m°C) and insert this into the next free space of the turntable (**not** directly under the probe).

1 Press Start.



2 Successively all three results will be displayed.

- If no printer is available the results should be written down.
- The results now should be compared with the value of the control solution (-512 m°C.
- If the country-specific deviation stays within the tolerance the device is ready for use.
- If the country-specific deviation stays outside the tolerance the error must be wanted.

7. Daily work

7.1 General informations

Perform the routine calibrations (see 6.) according to your internal and country-specific regulations. If the ambient temperature of the device changes by more than 5°C or operating parameters are changed, a new calibration is necessary.
Always work with the sample tubes and sample volumes with which you have carried out the calibration (2.0 ml oder 2.5 ml). The sample tubes must comply with the ISO 5764 and always have to be in a clean and dry condition. The sample volume always has to be pipetted exactly.

7.2 Sample preparation

Use representative and homogeneous samples that are not damaged during transport, storage or have been modified.
The examination of the samples should be done immediately after arriving at the laboratory.
If necessary, the samples can also be stored for a short time at a temperature of 0-6 °C.
The test samples and standard solutions at the beginning of the analysis should have the same temperature.
Before pipetting, the milk sample have to be mixed well (multiple swirling without trapping air).

7.3 Performing measurements in routine operation

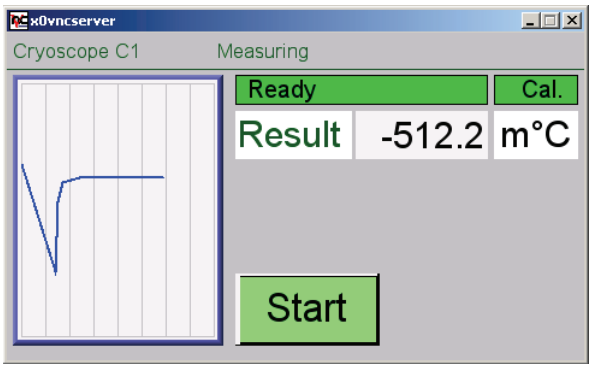
Manual device

- Take a clean sample tube and pipette 2 ml of milk into it.
- Place the sample tube into the opening of the cooling unit.
- Press Start.
- The measuring head moves down and the cooling phase begins.

Automat

- Pipette 2 ml of milk into clean sample tubes.
- Place the sample tubes (max. 7 pc.) into the pitches of the turntable anti clockwise.
- (**not** directly under the probe).
- Press Start. The turntable moves forward one position.
- The measuring head moves down and the cooling phase begins.

- As soon as the milk sample reaches -3 °C, the freezing pulse is triggered and the sample freezes.
- If necessary, you can interrupt the process by pressing the Stop button.



- At the end of each measuring phase, the result is displayed on the screen or on a printer/PC (if available).

After each measurement, the stirrer and the temperature sensor have to be cleaned gently with a lint-free laboratory cloth from top to bottom.

7.4 Advice for optimum repeatability

- For each analysis always use clean and ISO 5764 corresponding sample tubes.
- To clean the glasses we recommend to use hot water as well as a non-ionic detergent. Please rinse the sample tubes with distilled water and dry carefully.
- At the beginning of each inspection every standard solution and milk sample should have the equal temperature.
- Avoid any kind of changes on the samples wich are not examined immediate.
- Always keep the same workflow.
- Always work with the same amount of sample.
- According to need, the stirrer and the temperature sensor have to be cleaned gently with a lint-free laboratory cloth from top to bottom. Careful: Probe and stirring needle must not be bent.
- After a longer measuring break, the first measurement might vary slightly. However, all subsequent samples should be within the required specifications

8. Internet support

Using this kind of support, Gerber Instruments is able to access your cryoscope and help you with problems.

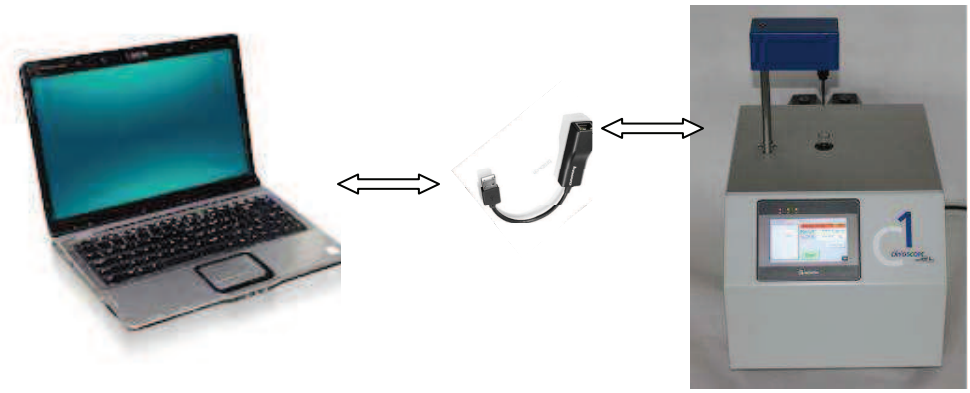
8.1 Requiered pieces for internet support

➢ Computer with internet access	Client
➢ LAN Cable	Client
➢ USB-Ethernet Adapter	Optional
➢ Drivers for USB - Ethernet Adapter	Enclosed
➢ TeamViewer	Homepage Gerber Instruments
➢ VNCViewer	Enclosed

8.2 Installation of the software

- Install the driver for USB - Ethernet adapter on your computer.
- Install the TeamViewer on your computer.
- Install the VNCViewer on your computer.

8.3 Installation of the hardware



- Connect the USB connector of the adapter to your computer.
- Connect the Ethernet port from the adapter with the Cryoscope (cable from the customer).

8.4 Configuration of the USB- Ethernet Adapter

- Open the network connections.
- Open the High Speed USB- Ethernet Adapter connection.
- Open the internet protocol (TCP/IP).
- Insert the following IP adress:

  IP adress: 192.168.1.37
  Subnet mask: 255.255.255.0
  Standardgateway: 192.168.1.1

8.5 Support application

- Call Gerber Instruments (telephone: +41 (0)52 343 37 37) and ask for support.
- Open the TeamViewer.
- Give your ID to Gerber Instruments (left window).
- Give your password to Gerber Instruments.

A connection to the cryoscope will be established.

For questions about your privacy policies, please contact your local IT service before installing the software. Defective or incomplete software installations are not covered by the warranty.

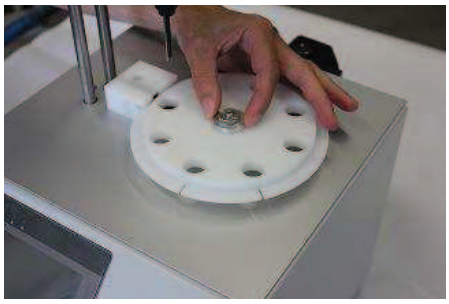
9. Cleaning

If needed, clean the surface of the cryoscope with a lint-free laboratory cloth.
The tooth- and guide rod must **not** be cleaned.

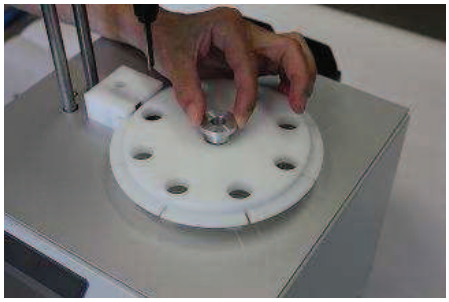
10. Servicing

10.1 Daily servicing

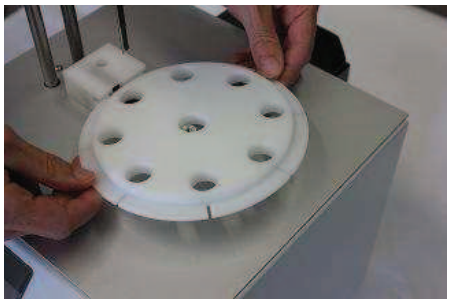
- After change of the solutions (standard or control solution), the stirrer and the temperature sensor have to be cleaned gently with a lint-free laboratory cloth from top to bottom.
- Remove the turntable and clean it (just for automatic).



1. Loosen the knurted nut.



2. Remove the bush.



3. Remove the turntable.

4. Clean the housing area.

10.2 Weekly servicing

- Check the level Heat Transfer liquid, if necessary change the bottle (to avoid dilution, do not refill).

10.3 Monthly servicing

- Check the level cooling liquid, if necessary (no liquid visible), fill up the cooler with the delivered cooling liquid Coolant C1.

10.4 Servicing on the sample throughput

- Replace the stir wire.
- Replace the yoke.
- Replace the clapper.
- Replace the spring.

11. Packaging

The device is delivered in a special packaging. Please keep the original packaging for any return shipping.

12. Disposal

At the end of its life time, the instrument must be disposed or collected in the appropriate ways, according to the regulations in force in the country of use.

For any question please contact our sales office under:

E-mail: info@gerber-instruments.ch
Telephone: +41 (0)52 343 37 37
Fax: +41 (0)52 343 30 70

13. Technical assistance

Adress:
Gerber Instruments AG
Im Langhag 12
CH-8307 Effretikon

14. Warranty

Gerber Instruments warrants that this product will be free from defects in material and workmanship for a period of 2 years from the delivery date respectively starting installation date*****. Providing that the instrument is used solely per the intended use and following the instructions of use specified in the present manual well as the use of only original Gerber spare parts, accessories and consumables. In case of default within the warranty period, Gerber Instruments will proceed, free of charge, to the repair or the replacement of the defect instrument. The instrument will have to be returned within the warranty period. The return of the product to Gerber Instruments is unfree by the customer. The service made under warranty, will not extend the contractual warranty duration, nor open any possibility of claim for a duration extension of this latter. The repairs made because of ordinary wear and tear, will be chargeable following the costs in force at time of execution. Freight costs for replaceable parts pays by the customer.

***Only valid, if the attached installation report and the report registration/warranty has been completed and emailed no later than 3 months from the delivery date to the manufacturer email adress: info@gerber-instruments.ch**

15. Order numbers

15.1 Optional accessories

Description	Article-nb.	Selling unit
Thermo printer with power supply and USB-cable	05.25502	pack=1 pc..
USB-RS232-Adapter	05.25503	pack=1 pc.
Printer paper	05.25505	pack=10 rolls
Printerset (printer incl. power supply, USB-cabel, USB-RS232-Adapter, printer paper 10 rolls)	05.25504	pack=10 pc.
Pipette 2.0 ml fix. volume	6.235043	pack=1 pc.
Pipette 2.5 ml fix. volume	6.258006	pack=1 pc.
Test tube rack of stainless steel for 30 test tubes	05.5030	pack=1 pc.
Test tubes 2.5 ml with ring mark	05.5021	pack=10 pc.
Pipette tips 2 ml	9.411501	pack=500 pc.
Pipette tips 5 ml	9.411449	pack=500 pc
USB - Ethernet Adapter	05.25095	pack=1 pc.

15.2 Consumables

Description	Article-nb.	Selling unit
Standard solution -408 m°C	05.5024	250 ml
Standard solution -600 m°C	05.5026	250 ml
Control solution -512 m°C	05.5025	250 ml
Heat transfer liquid	05.5012	250 ml
Coolant liquid Coolant C1	05.5028	250 ml
Printer paper	05.25505	pack =5 rolls
Sample tubes 2.0 ml with ring mark	05.5020	pack =10 pc.
Sample tubes 2.5 ml with ring mark	05.5021	pack =10 pc.
Pipette tips 2 ml	9.411501	pack=500 pc.
Pipette tips 5 ml	9.411449	pack=500 pc

15.3 Spare parts

Description	Article-nb.	Quantity
Gearwheel	05.25053	1
Pump hose	05.25060	1
Fan	05.25069	1
Cooling pump	05.25059	1
Pump Heat Transfer liquid	05.25067	1
Slip clutch complete	05.25057	1
Lift PCB	05.25044	1
Motor complete	05.25043	1
Coil complete	05.25004	1
Cooling unit complete	05.25242	1
Elevator complete	05.25058	1
Probe complete	05.25012	1
Yoke	05.25002	1
Clapper	05.25003	1
Stir wire manual device	05.25001	1
Stir wire automatic device	05.25113	1
Probe holder for manual device	05.25007	1
Probe holder for automatic device	05.25017	1
Spring for manual device	05.25028M	1
Spring for automatic device	05.25028A	1

16. Technical data

Test time	Approx. 90 seconds (Time mode 30 secounds)
Sample capacity	Single sample for manual version 8 samples for automatic version
Sample volume	2.0 ml or 2.5 ml
Units	m°C or m°H
Resolution	0.1 m°C/ m°H
Range	0 to -1000 m°C/m°H
Repeatability	+/- 2 m°C/m°H (1 S.D.)
Temperature	15 to 35 °C with full sample troughput
Humidity	5 to 80 % relative humidity (non condensing)
Storage	0 to 45 °C
Voltage	110 to 240 VAC (50/60 Hz)
Power	90 W
Dimensions (wxdxh)	28 x 42 x 32 cm (measuring head down)
Net weight	11 kg
Shipping weight	15 kg
Warranty	2 years

17. Notes