DYNEX

DYNABLOT HEAT

User Manual

WARNING
Carefully read and follow the instructions provided in this document before operating the instrument.

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Area of Application – Intended Use

See table of content

About the User Manual

This user manual includes:

- General information
- Installation of the instrument and software
- Operation of the instrument and software
- Defining and running programs
- Cleaning and maintenance procedures

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Revision Table

Revision	Date	Changes
0	30.3.2016	First official edition
1	18.5.2016	New look of screens, completion according to FW to the date
2	14.6.2016	Setup code menu added
3	18.7.2016	Temp. accuracy (+/- 0,5°C), Reagent position - Caution
4	14.9.2016	Corrections in PC connection capture
5	23.2.2017	Language version, extra wells, pumps training, new errors 205 - 208
6	20.5.2020	Instrument installation - warranty
7	24.1.2022	New chapter 5.4 Non-standard failures
8	19.5.2022	New chapter 1.2, editing of the chapter 2.5.1. and 3.3

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Warning, Cautions and Notes

The following types of notices are used in this publication and highlight important information or warn the user of a potentially dangerous situation:

NOTE
Gives helpful information.

CAUTION
Indicates a possibility of instrument damage or data loss if instructions are not followed.

WARNING
Indicates the possibility of severe personal injury, loss of life or equipment damage if the instructions are not followed.

INSTRUCTION
Actions to be performed.

WARNING
This symbol indicates the possible presence of biologically hazardous material.
Proper laboratory safety precautions must be observed.

ATTENTION
Negative environmental impacts associated with the treatment of waste.
Do not treat electrical and electronic equipment as unsorted municipal waste.
Collect waste electrical and electronic equipment separately.

WARNING
Risk of fire and explosion!
Several disinfection products can be flammable and when improperly handled can lead to explosions. Proper laboratory safety precautions must be observed.

WARNING
Chemical hazardous and biohazardous waste can be associated with the waste material from the process run on DBH.
Treat these substances and disposables, such as trays, system liquid, etc. in accordance with good laboratory practice guidelines.
Inquire about appropriate collecting points and approved methods of disposal in your country, state or region.

Symbols Used

Manufacturer

Date of manufacture

In vitro diagnostics medical device

Catalogue number

Serial number

Indicates the possible presence of biologically hazardous material

Conformité Européenne

Toxic

Hot surface

Use by

Single use

USB

Consult user manual

Warning

Instruction

1 Safety

1.1 Instrument Safety

• The responsible body must ensure that appropriate decontamination is carried out if hazard material is spilt onto or into the equipment. See chapter Instrument Disinfection.

• The responsible body must ensure that the manufacturer or his agent is consulted if there is any doubt about the compatibility of buffers, decontamination or cleaning agents with parts of the equipment or with material contained in it.

• The equipment must not be used in hazardous atmospheres or with hazardous materials for which it is not designed.

• The protection provided by the equipment may be impaired if the equipment is used with accessories not provided or recommended by the manufacturer, with solutions not compatible to the instrument or used in a manner not specified by the manufacturer.

WARNING

If DYNABLOT Heat or the firmware is modified in any way, the performance of the instrument may be negatively affected. The warranty will no longer be valid and the instrument will no longer conform to CE.

WARNING

The instrument complies with the emission and immunity requirements described in ČSN EN 61326-2-6; the electromagnetic environment should be evaluated prior to the operation of the instrument.
It is the operator's responsibility to ensure that a compatible electromagnetic environment for the instrument is maintained, so that the instrument performs as intended.
Do not operate the instrument in close proximity to sources of strong electromagnetic radiation (e.g. unshielded intentional rf sources) as this may interfere with the proper function of the instrument and may also lead to incorrect results.

1.2 Important notices

- In the event of a malfunction or deterioration of the instrument that may compromise its functional capability, the instrument must be discontinued and professional service contacted immediately.
- Failure to observe the operating conditions, especially when there is a risk of interference with other equipment, may affect the functions of the instrument and the results obtained may not be valid.
- Any serious adverse event occurring in connection with the device must be reported to the manufacturer and to the competent authority of the Member State in which the user or patient is established.

2 General

2.1 Introduction

DYNABLOT Heat is a test processing instrument which uses strip methods. It automatizes the process from sample incubation to colour development. It allows using heated reagents methods.
The instrument is intended for "IVD - In Vitro Diagnostics" only!

Any test methods (assays) must be validated by the user in combination with the system in accordance with proper laboratory praxis and local laws before using DYNABLOT Heat to conduct IVD.

The instrument can only be operated by trained personnel.

The manual is intended for the following instrument variants: D-0905, D0905-E, D0905-01, D0905-02, D0905-03.

IMPORTANT
If the operating directions given in this USER MANUAL are not correctly followed, the instrument may be damaged or the procedure may not be correctly performed and the safety of the operator cannot be guaranteed.

Any *in vitro* procedure for diagnostic purposes, performed on the instrument, must be validated.

2.2 Area of Application

DYNABLOT Heat is a laboratory instrument which automatizes carrying out tests using strip methods.
All systems must be validated in accordance with European directive on IVD 98/79/ES or another relevant regulation. The waste may be hazardous or toxic.

2.3 User profile

2.3.1 Professional User – Administrator level

The administrator is a person who has suitable technical training and corresponding skills and experiences. If the product is used as intended, the person is able to recognize and avoid dangers.
The administrator has extensive skills and is able to instruct the end user or the routine user in assay protocols within the bounds of the intended use.
Computer application skills and good English skills are required.

2.3.2 End User or Routine User

The end user or routine user is a person who has suitable technical training and corresponding skills and experiences. If the product is used as intended, the person is able to recognize and avoid dangers.
Computer application skills and good language skills for the respective national language at the installation site and English are required.

2.3.3 Service Technician

The service technician is a person who has suitable technical training and corresponding skills and experiences. If the product needs to be serviced or maintained, the person is able to recognize and avoid dangers.
Computer application skills and good English skills are required.

2.4 Validation

DYNABLOT Heat has been validated for representative applications

INSTRUCTION
When custom made protocols and/or reagents are used, the user must validate the test set-up.

NOTE
If DYNABLOT Heat software or firmware are modified in any way the instrument loses its guarantee and will no longer be IVD compliant for Europe.

NOTE

The operating authority must use only CE-labelled test kits for clinical diagnostic applications.
The operating authority must assure that the combination of a particular CE-labelled test kit used with the DYNABLOT Heat has been validated according to IVD directive for Europe or by other relevant national or local regulations.

2.5 Instrument Specifications

Tray holder	
Maximal number of strips per one protocol run	30 (3 x 10 wells trays in separated heating blocks)
Heating principle	Dry bath
Temperature range	35°C – 65°C
Temperature accuracy	max. +/- 0.5 °C
Temperature variation	max. +/- 0.5°C
Evaporation rate	max. 25% within 30 min at 55°C
Incubation mixing	by rocking
Rocking angle	Adjustable, max. +/- 8 °
Rocking speed	Adjustable, 0 – 40 RPM
Reagents dispensing	
Number of reagent pumps	8
Dispensing precision	< 10 %
Number of positions for heated reagents	2
Volume of the heated bottles	Max. 250 ml
Magnetic stirrers' velocity	Adjustable, max. 200 RPM
Aspiration	
Aspiration principle	Vacuum waste bottle, level checking
Waste bottle volume	4 l
User interface	
Display	Graphic, colour, with touch screen
Protocols	
Positions in instrument memory	50
Protocol creation and saving	PC software Blot Editor, via USB
Others	
Power supply	100 – 240 V AC / max. (4,7 – 1,9) A
Frequency	47 – 63 Hz
Fuse	T 5A 250V
Power during normal operation	Max 200 VA
Instrument dimensions	60 x 44 x 48 cm
Instrument weight	28 kg
Maintenance	
Tubing cleaning	daily (after protocol run)
Pump calibration	monthly
Tubing and pump cassettes replacement	annually
Temperature calibration	

2.5.1 EU Directives, Technical Standards

DYNABLOT Heat has been manufactured, tested and validated in accordance with the requirements of the following documents:

Regulation 746/2017 on in vitro diagnostic medical devices

Directive 2014/30/EU: Electromagnetic compatibility (EMC)
The Instrument was tested by an independent accredited testing laboratory, which found that the device meets the requirements of technical standard EN 61326-1 - Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements.

Measurement of radiated interference
Testing and verification was carried out according to the technical standard EN 55011 Class B Industrial, scientific and medical equipment - Radio frequency interference characteristics - Limits and methods of measurement.

Endurance
The instrument has been tested by an independent accredited test laboratory, which found the instrument to comply with the technical standard EN 61326-1 Electrical measuring, control and laboratory equipment - EMC requirements - Part 1: General requirements.
Testing and verification was carried out according to the following technical standards:

Directive 2015/863/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
The device complies with the requirements of the Directive and does not contain any hazardous substances covered by the Directive.

Among the documents that are not required for CE marking but have a significant impact on the life cycle of the equipment is the European Directive for the disposal of electrical waste.
There are rules for the disposal of equipment that are in line with the European Directive 2012/19/EU on waste electrical and electronic equipment.

Waste Disposal Recommendation

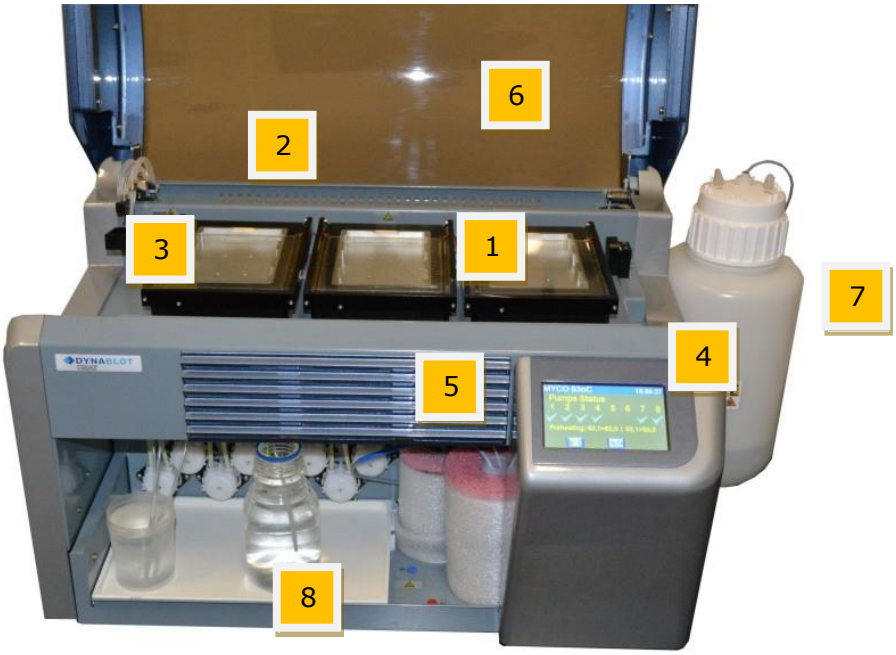
When recycling/disposing, please contact your supplier. Please note that in the event of contamination of the device it is the duty of the user to secure decontamination of the device before the disposal as well as a certificate of decontamination for his supplier securing the waste disposal.

2.6 Instrument Description

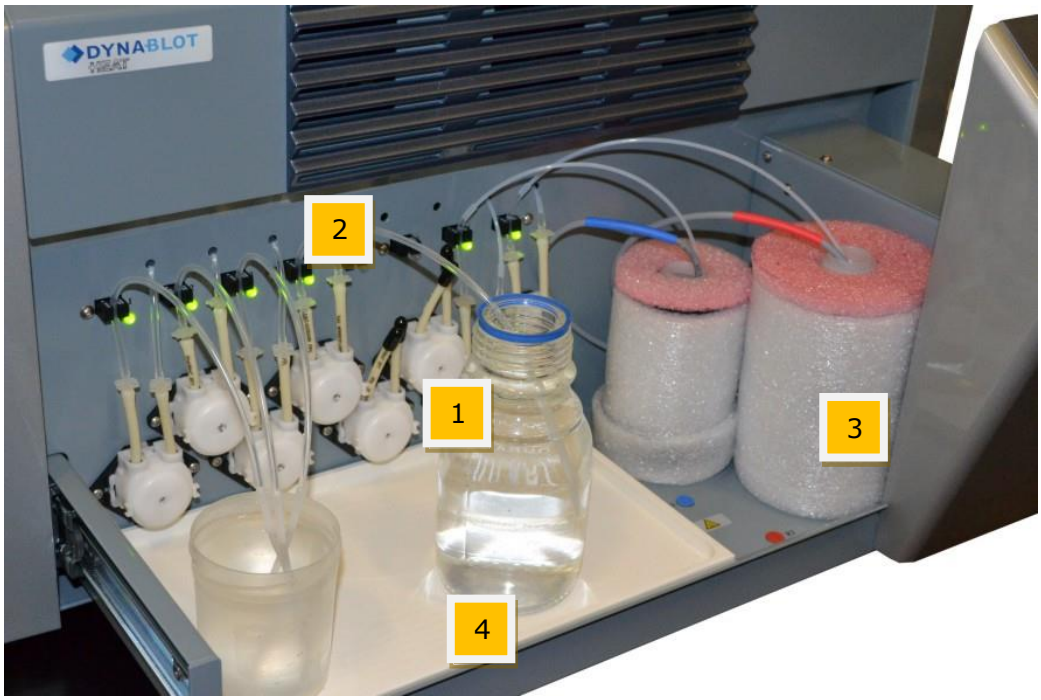
DYNABLOT Heat is a compact table top instrument which automatizes carrying out tests using strip methods. For hybridization methods it offers tray holder heating and two heating reagent positions with accurate temperature regulation. Using ventilators, the holder blocks are actively cooled by surrounding air for a transition from a heating to a non-heating assay part.
Up to 30 strips can be processed during a protocol run. The instrument is equipped with 3 independent heating blocks. In them trays with 10 reagent wells are placed.
The wells are filled with reagents by peristaltic pumps. There are 6 to 8 channels available. Every channel is able to detect whether there is enough of the reagent during filling. Reagent bottles are inserted into the front drawer. Two reagent positions are equipped with heating adapters for different bottle types as well as a magnetic stirrer drives.
Well contents aspiration is conducted using negative pressure in the waste bottle. The bottle is also equipped with an overflow sensor.
The instrument is controlled by a synoptic colour display with touch screen buttons.

Files containing its run history (log files) are saved in the instrument's memory. Assays and log files are accessed via a PC that is connected to the instrument by a USB cable.

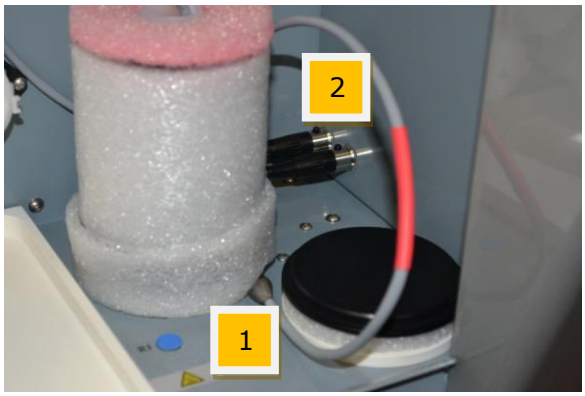
2.6.1 Front Views



1 – Three heating tray blocks on a common rocking holder
2 – Arms for reagent filling and tray well content aspiration
3 – Priming cuvette
4 – Touch screen display
5 – Cooling air inlet
6 – Workspace cover
7 – Waste bottle
8 – Reagent drawer (see next image)

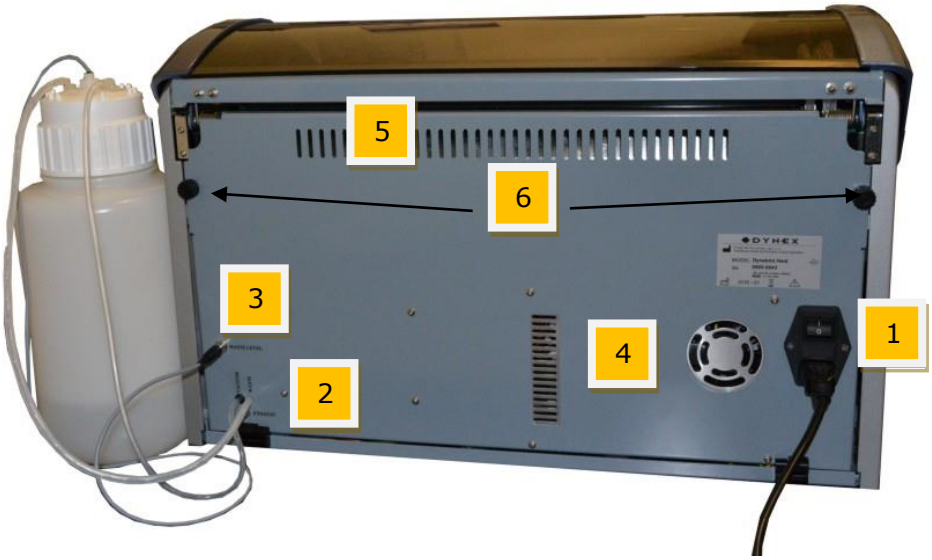


1 – Eight peristaltic pumps for reagents
2 – Eight tube liquid sensors
3 – Two heating reagent bottle positions including magnetic stirrer drive
4 – Reagent bottle pad



1 – Two external temperature sensors for heated reagents
2 – External temperature sensor connectors
3 – USB connector for PC

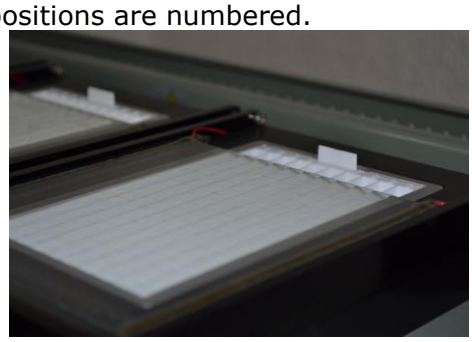
2.6.2 Rear View



1 – Power supply cable connection and the main switch
2 – Vacuum tube and waste tube outlet, vacuum pump exhaust
3 – Connector of the waste bottle overflow sensors
4 –Power supply vents
5 – Cooling air outlet from the workspace
6 – Safety bolts of the rear removable cover

2.6.3 Disposable tray

The disposable tray contains 10 wells. The well positions are numbered.



3 Installation Procedure

3.1 Introduction

This chapter contains the necessary information for installing the instrument.

3.2 Package Contents

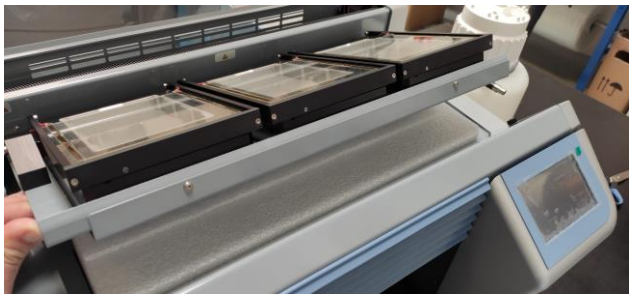
NOTE
DYNABLOT Heat is a heavy instrument. At least two people must carefully lift the instrument out of the box.

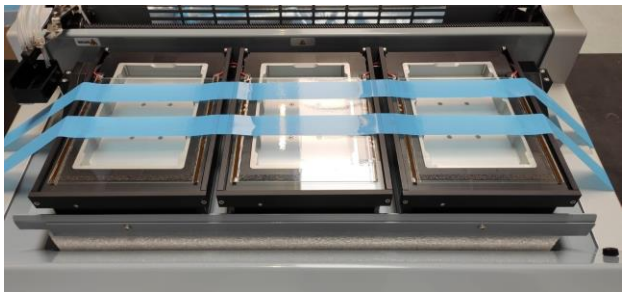
1. DYNABLOT Heat
2. Power cable
3. USB cable
4. 8 input tubes with reducers
5. External reagent thermometers R1(blue) and R2 (red)
6. Waste bottle (4l)
7. Reagent bottle pad
8. Adapters of heated reagents positions by selection
9. 12 incubation trays
10. User manual
11. Declaration of conformity
12. Final testing protocol
13. CD (the instrument ID file, Blot Editor Uni installation, manuals)

3.3 Unpacking Procedure and Inspection

1. Visually inspect the container for damage before opening.
Report any damage immediately on the installation report.
2. Place the carton in an upright position and open it.
3. Take out and set apart the packed accessories.
4. Lift the instrument out of the box and place it on a flat surface, free from dust, vibration, and away from direct sunlight.
5. Visually inspect the instrument for loose, bent or broken parts.
Report any damage immediately.
6. Compare the serial number on the rear panel of the instrument with the serial number on the delivery (shipping) note.
7. Check the instrument accessories with the delivery (shipping) note.
8. Take out all fixtures holding the tray holder in transport position.
9. Save all packing materials as they may be required for later transportation.

IMPORTANT
In case of transporting the instrument, please use the original packaging. Pay attention to the tray holder, which must be supported by the safety insert and secured with tape.





In the event of incompleteness, missing parts or damage of any part of the instrument upon delivery please contact DYNEX TECHNOLOGIES, spol. s r.o. or its representative.

3.4 Power Requirements

The device is powered by supply voltage, which must meet the values in accordance with the technical parameters of the device
There is no need to set the instrument to the correct voltage.
Connect the power only to an electricity supply system with protective earth.
In case of an electric black out, a power failure occurs.

3.5 Environmental Requirements

The instrument should be placed on a level surface that is free from dust, solvents and acidic vapours.
Vibration, strong magnetic field, direct sunlight, draught, high humidity levels and large temperature fluctuations must be avoided to ensure correct results.

Operating temperature:	+5°C - + 40°C IMPORTANT: If the device was exposed to temperatures outside of this range, it has to be left to stand for some time before being turned on to be able to properly function in the given temperature range. Neglecting this procedure may lead to damaging of the device.
Storage Temperature:	1°C – 50°C
Operating altitude:	Up to 2000 MASL
Max. relative humidity:	80%, non-condensing
Degree of pollution:	2
The method of disposal:	Toxic waste

3.6 Instrument Installation Procedure

CAUTION
Before the instrument is installed and switched on, it should be left to stand for at least 3 hours so there is no possibility of condensation causing a short circuit.

The following procedure describes the necessary steps to be followed when installing the instrument.

1. Place the instrument on a level surface.
2. Ensure that the distance between the back panel of the instrument and the wall is at least 10 cm.
3. Place the waste bottle on the right side of the instrument. Connect the tubes from the rear of the instrument to the connectors placed on the bottle cap – the "Vacuum" tube to the V connector and the "Waste" tube to the W connector. Connect the waste bottle overflow sensors connector to the connector on the rear side of the instrument. Tighten the bottle cap.
4. Make sure the instrument switch is in the 0 position (Off). Using a power cable connect the instrument to a power socket with a protective earth.

CAUTION
Check for any possible obstruction to avoid collision of the moving unit.

1. Switch the instrument on using the switch on the rear panel – I position.
2. The display lights up and the instrument conducts initialisation and selftests.

When everything is checked, the Main Menu is displayed on the screen and the instrument is ready for use.

INFORMATION

Instrument warranty will only be guaranteed if a completed copy of the enclosed installation report is sent to the address of DYNEX TECHNOLOGIES, spol. s r.o.

4 Operating Instructions

4.1 Switching ON the Instrument

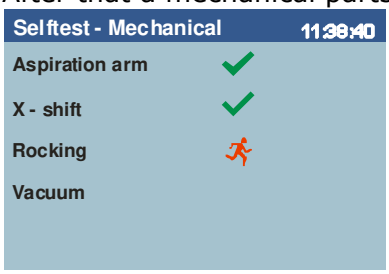
Make sure that:
- power cable is plugged in.
- waste and vacuum tubes as well as waste bottle overflow sensor connector are connected.

Turn the instrument ON by switching the 0/I switch on the rear panel to the I position.

At first the instrument conducts communication check of internal units. It shows the instrument serial number and firmware versions of all units. The Lang in the Main board line means the language file version number (f.e. 1.0, 1.2, ...) compatible with the firmware.

Press the button to pause the image. Otherwise the initialization continues automatically.
If the image has been paused, the initialization is resumed by pressing the button.

After that a mechanical parts check follows.



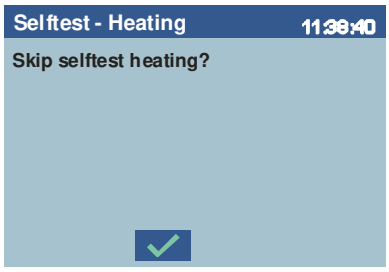
Mechanical parts check - icon meanings:

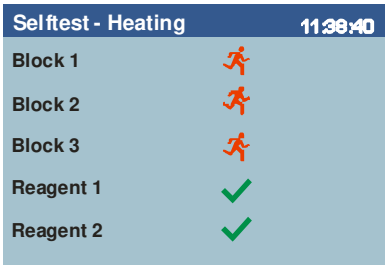
Test is running

Test has been carried out

Error – an error message follows (see the next chapter)

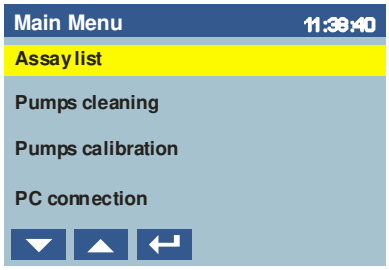
Afterwards a block heating check and a reagent positions check follow. This check lasts approx. 2 minutes. It is possible to skip performance of this check without affecting the instrument's performance.

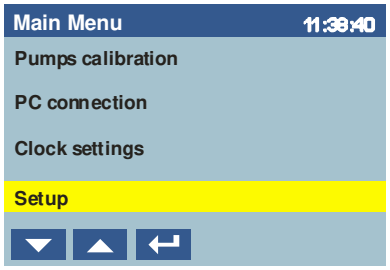




If the button is not pressed within 4 seconds, heating test is conducted. For the next 60 seconds the blocks and reagent positions are heated and for the next 60 seconds they are cooled.

After conduction of selftests the Main Menu is displayed and the instrument is ready for use.





and buttons – moving the cursor within the menu. Press the button to execute a selected item.

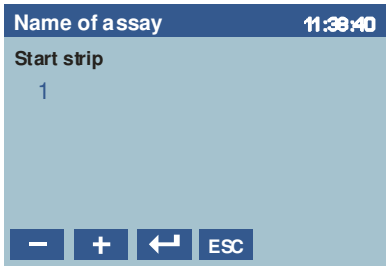
4.2 Assay List

4.2.1 Protocol starting and running

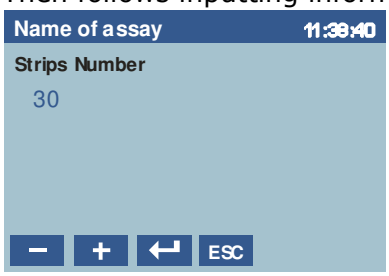
In the Main Menu choose the *Assay list* item. A list of assays saved in the instrument's memory is displayed.

, move the cursor within the list.
, move the list by one screen.
choose an assay to run a protocol.
ESC return to the previous menu (a general function for all the following screens)

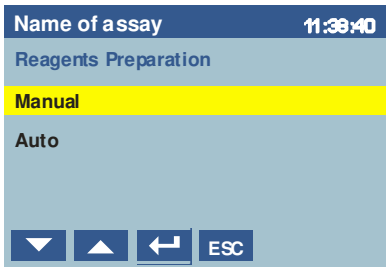
An inquiry about the position of the initial strip is displayed. This function can be used when running a protocol with a tray that was previously partially used. The run starts on the first clean well.



Then follows inputting information about the number of strips to be processed.

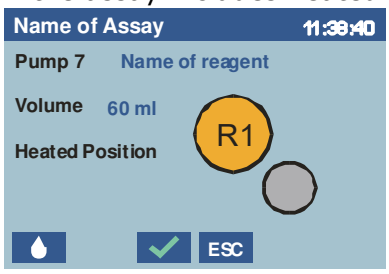


After that comes reagents preparation. It starts after choosing one of the following variations:



Manual – individual reagents are in steps gradually inserted into the instrument. Operator is guided to insert, rinse and prepare of reagents as well as start the preparation of heated reagents.
Auto –The operator inserts all reagents into the instrument in advance – rinsing, preparation and heating are then executed automatically in sequence. This procedure is recommended for well-established and tested methods – operator mistakes cannot be eliminated well enough. Automatic preparation can be interrupted by ESC. Preparation can be finished in the manual mode.

If the assay includes heated reagents, their preparation follows.



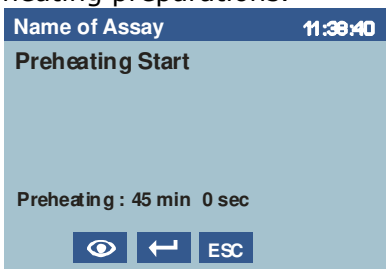
Insert the reagent bottle in heating holder R1 or R2 as shown to the right.
If external reagent thermometers are used, insert the cable with the probe into the bottle together with a tube of a corresponding channel and a magnetic stirrer. LED indicator on the front of the reagent drawer of the channel being prepared flashes. Channel number and reagent name are shown on the top line. The needed volume of the reagent being prepared is shown on the line below
Press the button to fill up the tubes by the corresponding pump. Watch the ascent of the filling arm above the rinsing cuvette. Press the button as many times as needed until the reagent flow is smooth. Confirm this by pressing the button. Calibration is conducted, tube liquid sensor is active and LED indicator of the corresponding channel remains lit – then the reagent is considered ready.

CAUTION
Protect the heating holder from a reagent leakage. The heating element can be damaged. Do not fill the reagent to bottle when it is inserted to the heating holder.

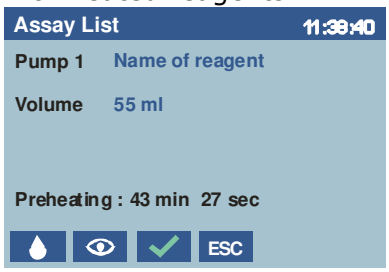
WARNING

When a magnetic stirrer is used together with external reagent thermometers pay attention to selection of the appropriate stirrer size. Use the stirrers as small as possible to prevent strong collision of the stirrer with probe body. Check in time whether the probe surface is damaged by stirrer.

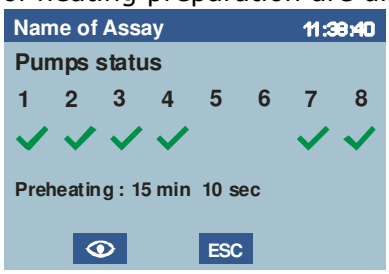
After finishing the preparation of the last heated reagent an inquiry about beginning the heating preparations.

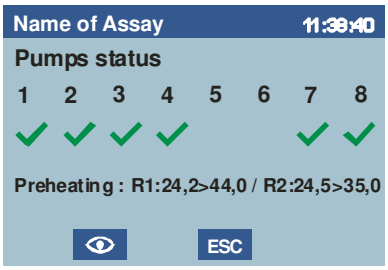


Preparations of non-heated reagents are the next steps. The bottles are inserted into the reagent drawer in front of pumps. Then follow the preparation guide on the display like with heated reagents.



After finishing the preparation of the last reagent, a pump status and time until the end of heating preparation are displayed.



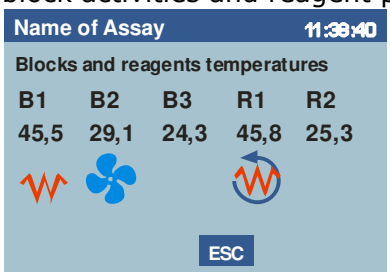


According to reagent thermometer setting (Internal or External, see Setup menu) the „Preheating" field displays:

- for internal thermometers - time until the end of preparation
- for external thermometers - actual and target reagent temperatures; after reaching target temperatures blocks start their preheating for 5 minutes.

Preheating time length or target temperatures are in accordance with chosen assay parameters.

Press the button to open a screen displaying details about temperature, heating block activities and reagent positions.



B1 to B3 – heating blocks by their order on the holder
R1 and R2 – reagent positions

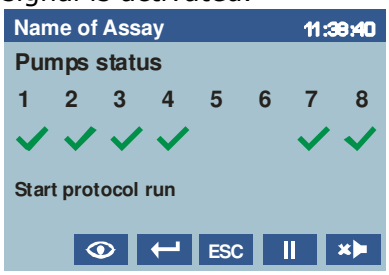
The number under the block identifier represents current temperature, the icon represents a process

- block regulator is active, regulates the block temperature to the required value, block LED indicator is lit

- block is being cooled to ambient temperature by ventilators

- position regulator is active, the position is regulated to required temperature, magnetic stirrer drive is switched on.

The instrument is ready for a protocol run after preheating time runs out. An acoustic signal is activated.



- starts protocol run

- starts a protocol run with an immediate pause activation (see Pause menu). It can be used for completing a previous protocol run that has somehow been interrupted by starting a new run from any assay step.

- silencing of the acoustic signal

During a protocol run information about a current step is displayed.

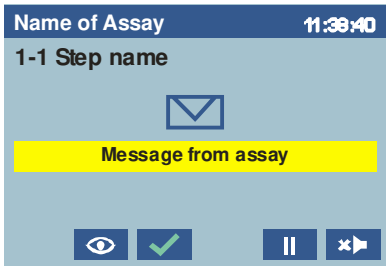
This information is displayed:

- Step number– a sequential number of a cycle, a name of a step
- Incubation time – remaining incubation time in this step.
- Presumed actual protocol finish time
- Approximate temperature of the used blocks (the number of used blocks depends on an initial strip selection and on a number of strips).

CAUTION

When the arm leaves its position over the rinsing cuvette during reagent filling or aspiration, the reagent drawer is locked. This is indicated by lighting of the reagent space. Do not try to take the drawer out by force.

If a step is of manual type or if a transition to a next step is conditioned by a confirmation by the operator, a protocol run is paused. An assay guide is displayed on the screen.



- Confirmation of further operation of a protocol

NOTE

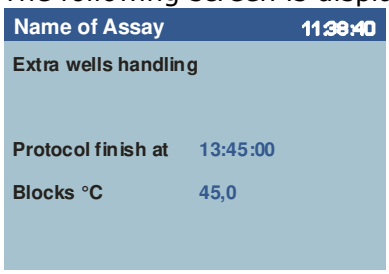
For example, the manual step is typically used in the assay beginning for the instruction to user to insert the trays to the blocks, because the tray inserting is not part of the preparation before the protocol start

If there are heating steps in an assay and there is an empty well before the first or after the last well, these wells are to be filled with a selected reagent (defined by an actual assay). Then even the lateral wells planted with strips have identical temperature conditions. The extra wells handling can be disabled in assay.

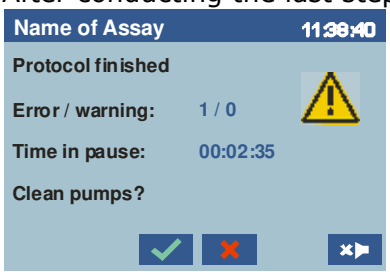
NOTE

In the event of a repeated use of a tray for another protocol it is necessary to consider that the so called extra well has already been used when selecting an initial strip.

The following screen is displayed during filling of these extra wells.



After conducting the last step, a message about a protocol run end is displayed.



Error / warning – displays the number of events which came up during a protocol run. Detailed information is saved in history file of a given run (see further). The ⚠ icon is displayed when the number of at least one event is more than zero.

Time in pause – displays total time of a protocol being paused, whether by an action of an operator or by an emergence of an error.

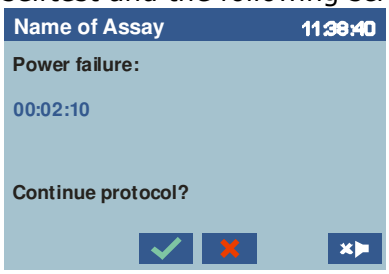
It is possible to end a protocol by pressing the button for ending it with a cleaning of the used pumps or by pressing the button for ending it directly.

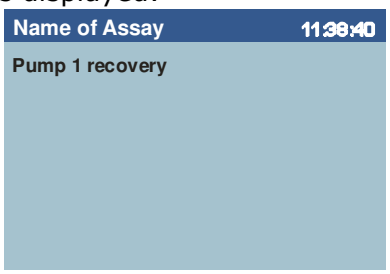
The screen returns to the Main menu.

4.2.2 Resuming Operation after Power failure

In an event of power outage during a protocol run the instrument is equipped with a function allowing it to resume the protocol after power supply is restored.

After a power outage the instrument stops its operation right away and the arms remain in their last position. When the power is restored the instrument conducts a mechanics selftest and the following screen is displayed:





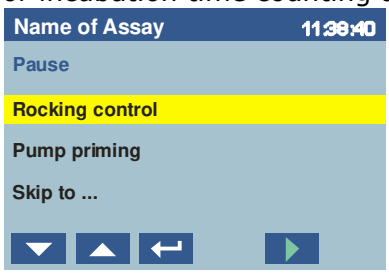
- status recovery of used pumps and continue the interrupted protocol run
- protocol end, the protocol run will not be restored

NOTE

The operator decides the continuation or end of a protocol based on the length of the power outage and on the state of the unfinished run. In case of doubts the operator may continue the run. If the restoration has not been suitable in terms of reactions, he can end the protocol run from the Pause menu.

4.2.3 Protocol Run Pause

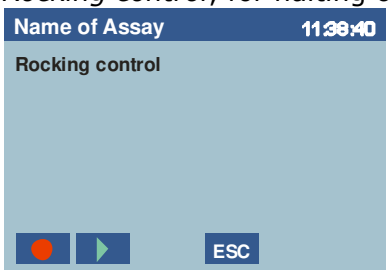
Protocol run pause is activated by pressing the button. Current instrument operation or incubation time counting are paused and Pause menu is displayed.



- pause termination and resume a protocol run

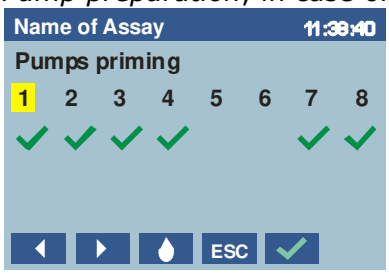
When in a pause state it is possible to control the following operations:

Rocking control, for halting of rocking in case of manipulation of inserted trays.



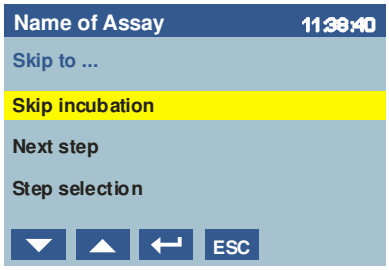
- rocking stop
- rocking start

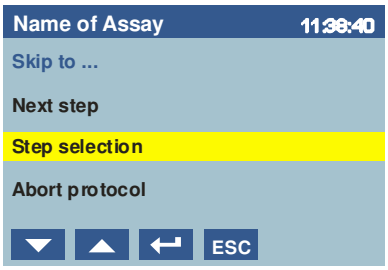
Pump preparation, in case of additional manipulation with inserted reagents.



Choose a number of the required pump by pressing the ◄ and ► buttons and perform similar activities as during a reagent preparation before starting a protocol run.

Skip to ... This function allows to skip a current incubation, skip to another assay step or end a protocol run. These functions can be used during a protocol control run of an assay being newly created (to cut incubation time) or to start a protocol from a different step than the first one.

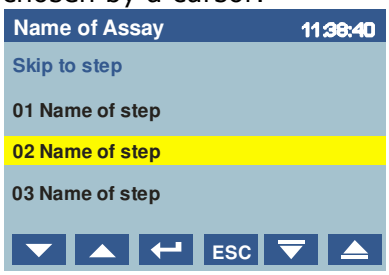




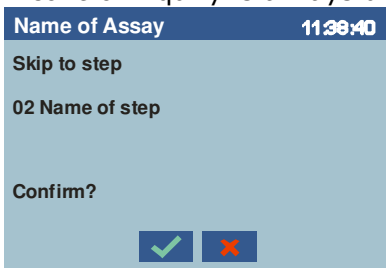
Skip incubation – ends incubation in the current step

Next step – starts to work on a step that follows after the current one

Step selection – displays a list of assay steps. A protocol run continues from a step chosen by a cursor.

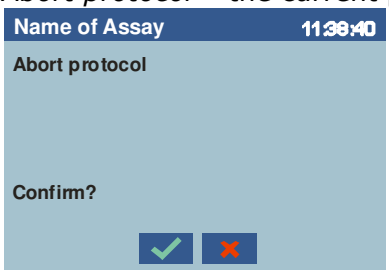


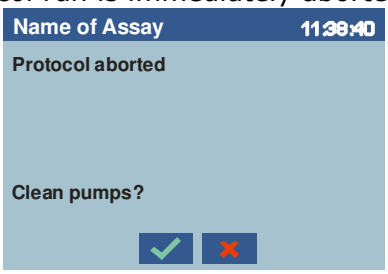
A control inquiry is always displayed before the protocol run is started.



✓ - confirmation, protocol run will be started
✗ - cancel the "skip" request

Abort protocol – the current protocol run is immediately aborted.





After immediate abortion it is possible to select or refuse pump cleaning.

4.3 Pump Cleaning

Use the pump cleaning function for flushing the tubes or for their emptying before putting the instrument out of operation.

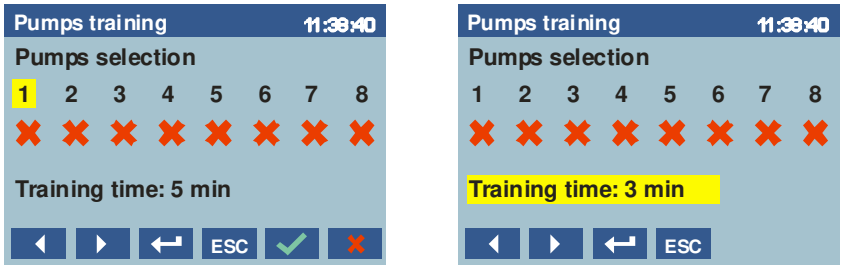
and - move the cursor over pump numbers and "pumped volume" input
- selection of a pump to be cleaned
- selection of a pump not to be cleaned
and - decrease or increase the "pumped volume" value to be used for cleaning of every pump
- start of a cleaning process during which the selected pumps will be cleaned

4.4 Pump Calibration

Use the pump calibration function for a periodical calibration of filling volume precision of peristaltic pumps.

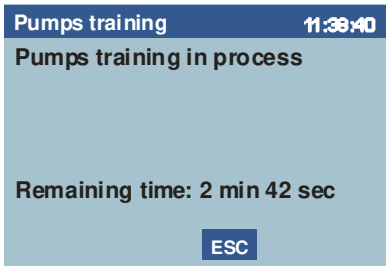
Before a calibration it is possible to perform a pump training time which is best used primarily after changing cassettes or after a longer period of time during which the instrument has been put out of operation. It serves to stabilise their mechanical properties before a first calibration. A recommended duration is 5 minutes.

CAUTION
To prevent the priming bowl overflow, take all reagents tubes out from some bottles with liquid during the pumps training.

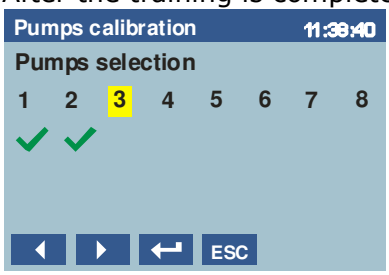


and - move the cursor over pump numbers and training time input
- selection of a pump to be trained
- selection of a pump not to be trained
and - training time increase or decrease
- training time process initiation

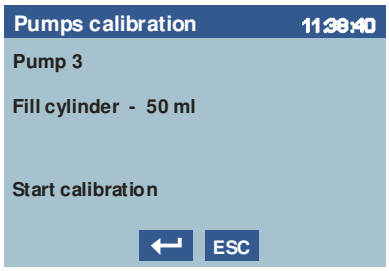
Selected pumps are trained at the same time. Remaining time is displayed during the training. If no pump is selected for training, the following screen is skipped:



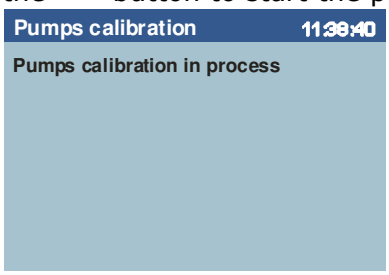
After the training is completed a screen with a pump calibration selection is displayed.

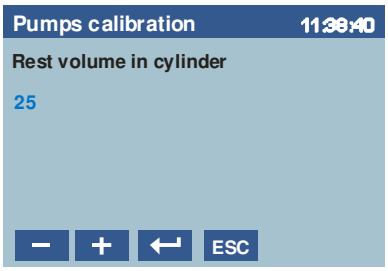


The ✓ marking under a pump number signifies that calibration has already been conducted in this run.
A calibration process is initiated for a selected pump. Follow the instructions on the screen.



Fill a graduated cylinder with 50 ml of distilled water and put the pump tube in it. Press the ↵ button to start the pump to measure doses.



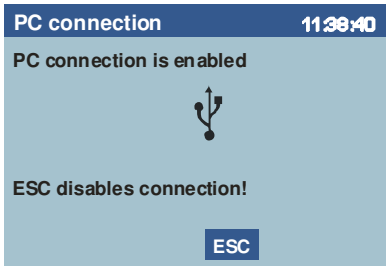


After finishing a pump run use the − and + buttons to input the volume that remained in the graduation cylinder. It is possible to set the volume in a range of 10 – 35 ml. If the measured volume is out of this range, it is not possible to conduct new calibration. Press the ESC to return. The original calibration constant is stored.
↵ - input volume confirmation. A calculation is conducted and a new calibration constant is saved in the device's memory.

The screen returns to a pump calibration selection menu and it is possible to continue a calibration of another pump or to abandon the function.

4.5 PC connection

Activate the instrument USB by opening of the *PC connection* screen.



Connect USB cable between the instrument and PC. After a moment the windows with the instrument memory folders is opened on the PC.
ASSAY – contains assay files, the content can be changed by the BlotEditor only. Don´t manipulate with this folder content.
BMP – system folder. Don´t manipulate with this folder content.
LANG – contains the language versions files
LOG – contains log files with protocol runs and maintenance history (see Chapter 6 Protocol run history)
FW – location of the firmware update files. Don´t manipulate with this folder content.

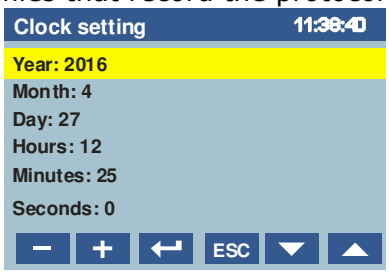
Now the SW BlotEditor can be connected to the instrument to read and write the assays in the instrument memory.

After the work finishing close the BlotEditor and the window with folders, use the Windows function for safe removing USB device MQX Mass storage and disconnect the USB cable.
Communication is terminated by pressing the ESC button to return from the screen.

NOTE
Details of creating and storing assays in the instrument's memory can be found in software Blot Editor user manual.

4.6 Clock Setting

This menu is used for real time setting. The instrument contains an internal clock data of which are used as time information during a protocol run as well as time stamps for log files that record the protocol run.



− and + - value change in the selected line. The default value in the lines is time of opening the screen.
↵ - save new time
▼ and ▲ - moves the cursor within the menu

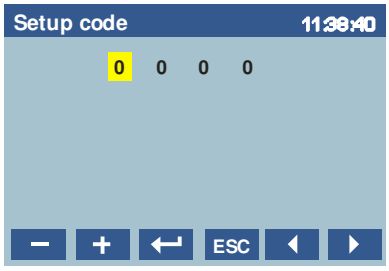
4.7 Setup

Setup menu contains items for setting and controlling of the instrument's parameters and functions.

CAUTION

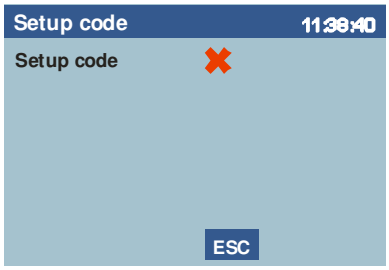
A user has to know a meaning of menu items so he does not use the instrument improperly or destroy it.
User profiles required for this action are Professional User – Administrator Level and Service Technician.

Access to the Setup menu is protected by the setup code. The code value is saved in the instrument parameters (see the Service manual).

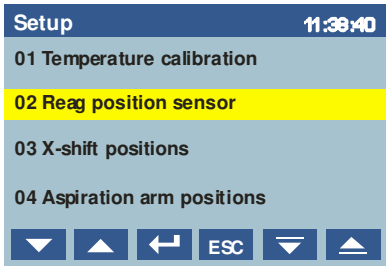


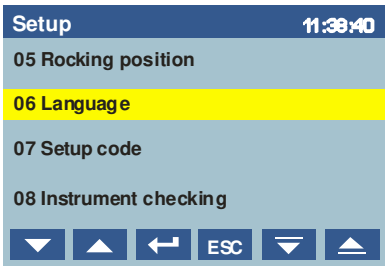
[−] and [+] - value change of the selected number.
[↵] - enter the code
[◄] and [►] - moves the cursor

When a code is not right the Setup menu is not opened and the message appears



Otherwise Setup menu opens



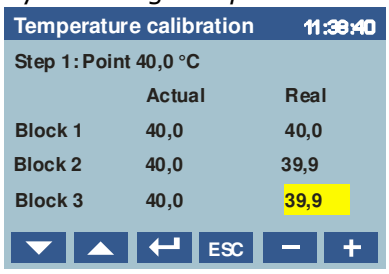


[▼], [▲] move the cursor within the list.
[⊽], [⊼] move the menu by one screen
[↵] choose an item to execute.

4.7.1 Temperature Calibration

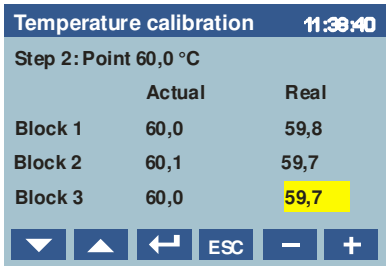
Temperature calibration in heating blocks enables saving of constants which reflect a difference between the temperature measured by a thermometer placed in the heater and the real temperature in the space for strip tray insertion. These constants are then used for temperature regulation during a protocol run.
Calibration procedure

Prepare a measuring device consisting of the adapter as shape of strip tray and the external thermometer.
By choosing *Temperature calibration* item run the first calibration step.



Actual - temperature value measured by a thermometer placed in the heater
Real - a field for a temperature measured by a measuring device to be input
▼ , ▲ move the cursor over block lines
↵ confirmation of input teal temperature values, transition to a next step
− , + decrease or increase a real temperature value (in a range of +/- 5 ˚C)

Put the adapter in the first heating block, close the block lid and put the temperature probe to the adaptor opening as deepest as possible. Place the external thermometer side of the instrument and close the instrument lid. Wait until the temperatures stabilize. The temperate in the *Actual* column should stabilize at 40,0 ˚C (+/- max 0,1 ˚C). Set the temperature value from the external thermometer in the *Real* column. Repeat the procedure for next two blocks.
Confirm the values. The calibration process transitions to a second step.



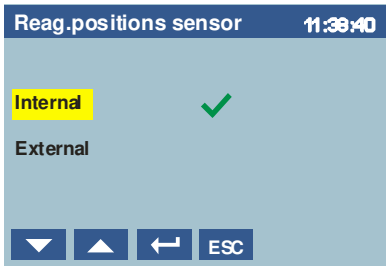
Repeat the process of the first step.
After confirming input temperatures calibration constants are calculated and saved and the screen returns to the *Setup* menu.

NOTE
If the default values are confirmed in the steps (40,0 and 60,0), the calibration constants are saved and there is no correction of temperature between the thermometer at the heating element and temperature in the space of trays.

4.7.2 Reagent Position Sensors

For temperature control in heating reagent positions an internal thermometer placed in reagent positions heating or external probes that are to be submerged in reagent bottles can be used.
When using internal thermometers, the heating temperature is regulated to a value set by a running assay. A reagent's own temperature can be a few degrees Celsius lower because of a possibilities of temperature transition between the heater and the reagent.
When using external thermometers, the heater temperature is controlled in a way that the reagent hats to the value set by a running assay. In this mode the inner sensor is used to limit the highest heater temperatures, meaning 15 degrees of Celsius above a final reagent temperature value. This measure helps to speed up reagent heating to the target temperature.

Sensor selection for heating positions temperature regulation is conducted in the following screen

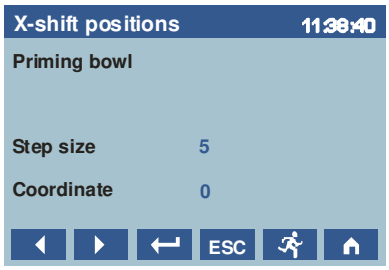


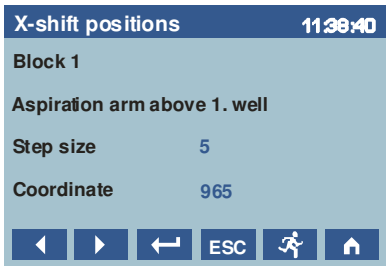
✓ marks current setting.
For changing a sensor type set the cursor to A required item by using the ▼ , ▲ buttons and confirm by pressing ↵ .

4.7.3 X – Shift Positions

This menu is used for instrument adjustment, e. g. after servicing. Here it is possible to set coordinates of important X arm positions.

After item selection a corresponding menu is displayed and the arm moves to a currently set coordinate.





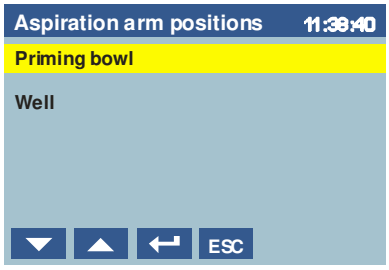
◄ and ► - arm shift left and right one coordinate value further in the *Step size* line.

Current arm position coordinate is displayed in the *Coordinate* line.
↵ - save a new coordinate
🏃 - coordinate value change in the *Step size* line (5, 10, 100, 1000)
⌂ - moves the arm to the reference sensor

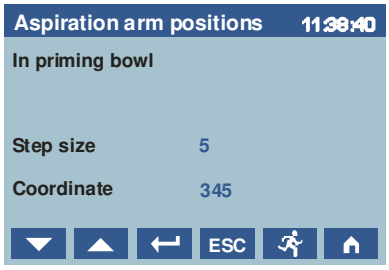
NOTE
Priming cuvette coordinates are set in a way that the aspiration tube is to be located ca. in the right third of the cuvette.
Block coordinates are set in a way that the aspiration arm tube is to be located in the centre of the 1st plate well inserted in a corresponding block.

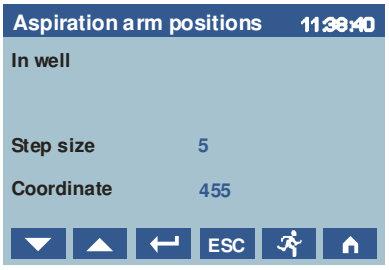
4.7.4 Aspiration Arm Positions

This menu is used for instrument adjustment e. g. after servicing. Here it is possible to set coordinates of important aspiration arm positions.



After item selection a corresponding menu is displayed and the arm moves to a currently set coordinate. When *Well* item is selected, the arm moves above the 1st tray well of the block.





and - arm shift down and up one coordinate value further in the *Step size* line
Current arm position coordinate is displayed in the *Coordinate* line
- save a new coordinate
- coordinate value change in the *Step size* line (5, 10, 100)
- moves the arm to a reference sensor

NOTE
The coordinates for both priming cuvette and well are set by setting the aspiration tube to lightly touch the bottom of the cuvette or the well.

4.7.5 Rocking Position

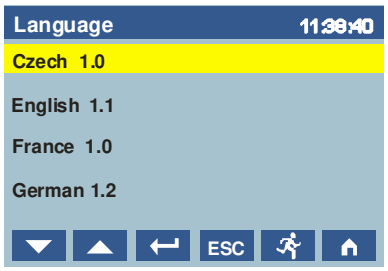
This menu is used for instrument adjustment e. g. after servicing. Here it is possible to set coordinates of tray holder horizontal rocking position.

and - coordinate change by the *Step size* line value
Current rocking position coordinate is displayed in the *Coordinate* line
- save a new coordinate
- value change in the *Step size* line (5, 10, 100, 1000)
- moves the arm to a reference sensor

NOTE
Set the coordinate around 0 so the block holder position is in a horizontal position. During lesser than 100% angle selection the rocking will be conducted around this position. (given by the value used in an assay).

4.7.6 Language

This menu is used for selection of language. The texts on the display change according to selected language set. The list of the language versions depends on the content of the LANG folder (see Chapter 4.5 PC connection). The first number of the version must fit with the mainboard firmware (see Chapter 4.1 Switching ON the instrument).



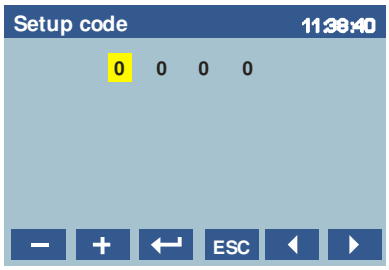
▼ and ▲ - moves the cursor within the menu
↵ - select new language

NOTE

This language selection applies to the texts saved in the instrument firmware only. Texts and language in the assays (reagents names, step names, messages) are determined during assays creation in Blot Editor software. It is recommended to use in the instrument setting and in assay texts the same language. Then some special characters used by the language can be displayed correctly.

4.7.7 Setup code

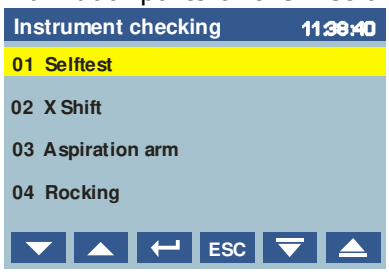
This menu is used for a new value of the code access to the Setup menu saving.

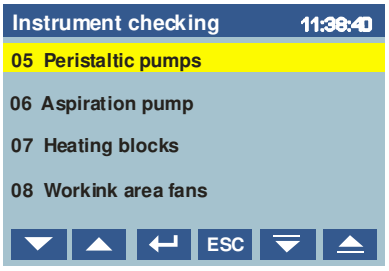


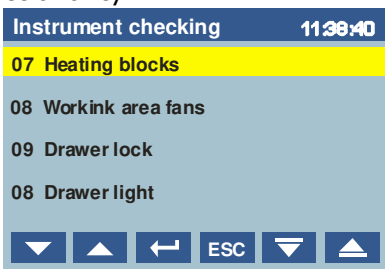
− and + - value change of the selected number.
↵ - saving the code to the instrument memory
◄ and ► - moves the cursor

4.7.8 Instrument Checking

Items in this menu are primarily used for servicing. They offer a possibility of controlling individual parts of the instrument in order to control their functionality.







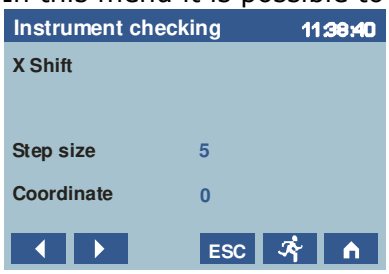
Move the cursor on an item and confirm.

4.7.8.1 Selftest

By selecting *Selftest* an automatic instrument initialisation and check are conducted. The same occurs after switching the instrument on.

4.7.8.2 X Shift

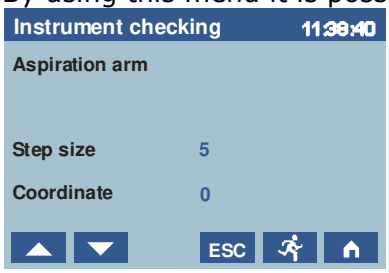
In this menu it is possible to arbitrarily move the X shift.



and - arm shift left and right one coordinate value further in the *Step size* line
Current arm position coordinate is displayed in the *Coordinate* line.
- coordinate value change in the *Step size* line (5, 10, 100, 1000)
- moves the arm to a reference sensor

4.7.8.3 Aspiration Arm

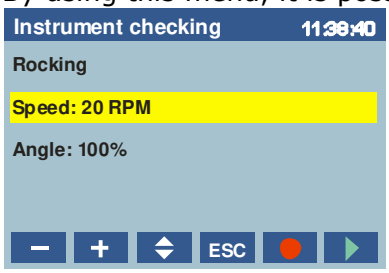
By using this menu it is possible to arbitrarily move with the aspiration arm.



and - arm shift up and down one coordinate value further in the *Step size* line
Current arm position coordinate is displayed in the *Coordinate* line
- coordinate value change in the *Step size* line (5, 10, 100)
- moves the arm to a reference sensor

4.7.8.4 Rocking

By using this menu, it is possible to run rocking with set parameters.



and - change of a value selected by the cursor
The rocking drive speed can be set in a range of 1 to 40 revolutions per minute in continuous rotation. This speed also corresponds to the number of rocks per minute, if the rocking angle is set to 100%.
The angle can be set in a range of 0 – 100 % of maximal rocking angle, which is +/- 8˚.
- move the cursor
- stop rocking

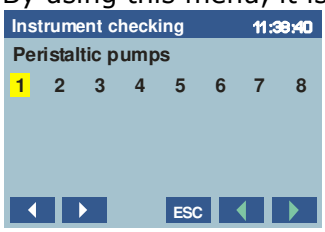
- start of rocking/newly input parameters confirmation, if rocking has already been initiated.

NOTE

The number of rocks per minute is given by the combination of speed and angle. This menu can be used for searching for a suitable combination when creating an assay using SW Blot Editor. The discovered values are to be input in a step parameter.

4.7.8.5 Peristaltic Pumps

By using this menu, it is possible to start up individual peristaltic pumps.

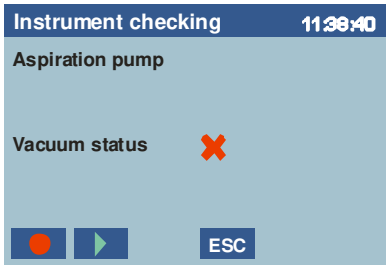


and - move the cursor to a pump number to be started
- start a 2 ml dose in the direction of returning the reagent to the bottle
- start a 2 ml dose in the direction of filling the reagent in the tray

A LED light of a corresponding pump lights up during dosing.

4.7.8.6 Aspiration Pump

By using this menu, it is possible to start the aspiration pump and watch the status of the vacuum sensor in the waste bottle.



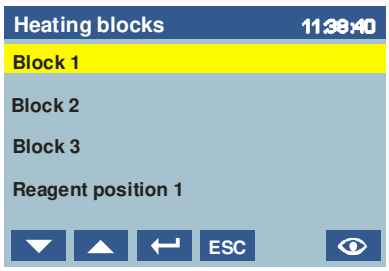
- stop the pump
- start up the pump

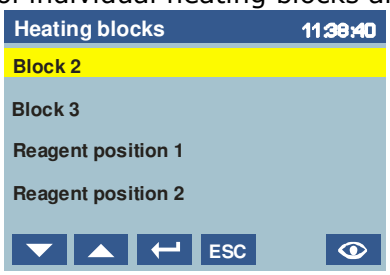
The meaning of the icons on the *Vacuum status* line is:

- not enough negative pressure
- enough negative pressure

4.7.8.7 Heating Blocks

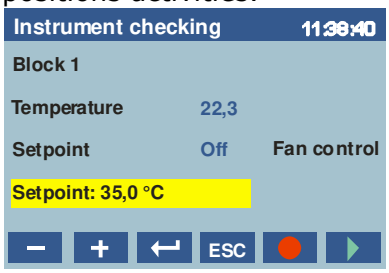
The menu items can be used to control individual heating blocks and reagent positions.

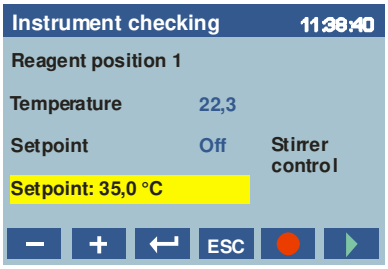




After selection of an item a corresponding block or control screen displays.

- opens a screen with details on temperatures as well as heating blocks and reagent positions activities.



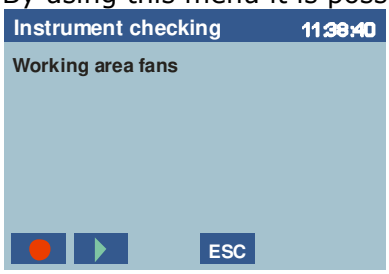


Temperature - current temperature measured by the thermometer in the block or in the reagent position (take care during the Internal/External sensor selection)

Setpoint - a current setting of the required temperature value. If *Off* text is displayed, the regulator is switched off.
Setpoint: - a new required value.
and - required temperature value change.
- confirmation of the new required value. If sent for the first time, regulator is switched on.
- stop of block cooling ventilators or position magnetic stirrer drive
- an initiation of block cooling ventilators or position magnetic stirrer drive

4.7.8.8 Working Area Fans

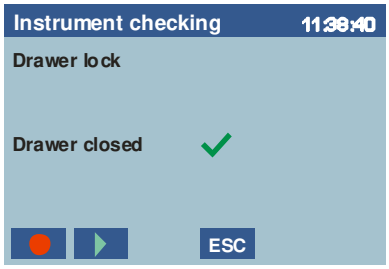
By using this menu it is possible to switch on workspace ventilators.



- stop ventilators - start up fans

4.7.8.9 Drawer lock

By using this menu, it is possible to activate a lock electromagnet and watch the status of the drawer locked position sensor.

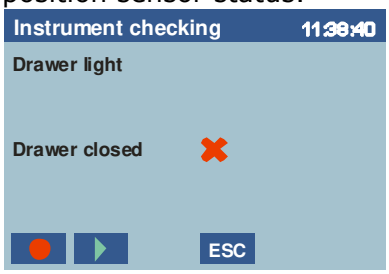


- switch the electromagnetic lock off
- switch the electromagnetic lock on

The meaning of the icons on the *Drawer closed* line is:
- sensor is not switched, meaning that the drawer is not in a locked position
- sensor is switched, meaning that the drawer is in a locked position

4.7.8.10 Drawer Light

By using this menu, it is possible to activate the light and watch the drawer locked position sensor status.



- switch the light off
- switch the light on

The meaning of the icons on the *Drawer closed* line is:

✖ - sensor is not switched, meaning that the drawer is not in a locked position

✔ - sensor is switched, meaning that the drawer is in a locked position

NOTE

When the *Instrument control* menu is left, all components left switched on after the control of individual items automatically switch off.

4.8 The instrument shut down

Turn the instrument OFF by switching the 0/I switch on the rear panel to the 0 position.

NOTE

It is safe to switch off the instrument anytime.
The switching off during the protocol run causes that next instrument switching on will be done according to "after power failure" scenario (see capture 4.2.2)

5 Error Handling

Information about error conditions that may occur during operation of the instrument are displayed on the screen while at the same time an audio signal is activated and the reagent drawer light starts to flash. If the instrument is not irreversibly damaged, the user can fix the error and continue in the activity that caused it.
There are two levels of error significance:
Warning – the malfunction is not critical. The user is notified, but the error has no influence on the protocol currently running
Alarm – the malfunction is critical and operations of the instrument are paused. It is not possible to operate it if the malfunction is not removed.

5.1 Error list

Number	Name	Type	Description	Solution (if the malfunction happens again, professional servicing is necessary)
1	Asp.leaving home	A	The desired movement of the aspiration arm did not occur during selftest.	Check for an obstruction of the aspiration arm.
2	X leaving home	A	The desired movement of the X arm did not occur during selftest.	Check for an obstruction of the X arm.
3	Rocking leaving home	A	The desired movement of the rocking drive did not occur during selftest.	Check for an obstruction of the rocking drive.
4	Vacuum switch	A	The vacuum sensor is unexpectedly switched on.	The aspiration tube is either clogged or squeezed between aspiration arm and the waste bottle.
5	Vacuum low	A	There is not enough negative pressure in the waste bottle.	The cap is not tightened enough or the waste bottle is not hermetic.
6	1. Block cooling	A	Cooling of the 1st block did not occur during heating selftest.	Blocked inlet of cooling air or high ambient temperature.
7	2. Block cooling	A	Cooling of the 2nd block did not occur during heating selftest.	Blocked inlet of cooling air or high ambient temperature.
8	3. Block cooling	A	Cooling of the 3rd block did not occur during heating selftest.	Blocked inlet of cooling air or high ambient temperature.
9	1. Block heating	A	Heating of the 1st block did not occur during heating selftest.	Block malfunction. Servicing necessary.
10	2. Block heating	A	Heating of the 2nd block did not occur during heating selftest.	
11	3. Block heating	A	Heating of the 3rd block did not occur during heating selftest.	
12	1.position heating	A	Heating of the 1st reagent position did not occur during heating selftest.	The reagent in the bottle placed in the position during a test is very cold.
13	2.position heating	A	Heating of the 2nd reagent position did not occur during heating selftest.	
14	Waste bottle full	W	The waste surface has reach to the lower floater.	Empty the bottle. Check if the overflow sensor is connected and if the **lower** floater slightly moves.
15	Waste bottle overfull	A	The waste surface has reach to the upper floater.	Empty the bottle. Check if the overflow sensor is connected and if the **upper** floater slightly moves.
16	Block cooling timeout	A	Block cooling time has run out during transition to a lower required level.	Blocked inlet of cooling air or high ambient temperature.
17	Drawer not closed	A	The reagent drawer is not shut before the X arm leaves its position over the splash cuvette.	Shut the reagent drawer.
18	Temp. out of range R1	W	Reagent position 1 temperature is out of range of the value required according to the assay of the running protocol.	Check if the bottle adapter is properly attached and the heat insulation placement around the position.
19	Temp. out of range R2	W	Reagent position 2 temperature is out of range of the value required according to the assay of the running protocol.	
20	1.Block SP out of range	A	When the block 1 is switched on, the input temperature is out of the 35 -65ºC range.	Unexpected assay value. Save the right assay into the instrument's memory.
21	2.Block SP out of range	A	When the block 2 is switched on, the input temperature is out of the 35 -65ºC range.	
22	3.Block SP out of range	A	When the block 3 is switched on, the input temperature is out of	

			the 35 -65°C range.	
23	1.Block Corr.out of range	A	When the block 1 is switched on, the temperature correction is out of the -5 to 5 range.	Unexpected value of the block thermal calibration. Calibrate.
24	2.Block Corr.out of range	A	When the block 2 is switched on, the temperature correction is out of the -5 to 5 range.	
25	3.Block Corr.out of range	A	When the block 3 is switched on, the temperature correction is out of the -5 to 5 range.	
101	Asp.home timeout	A	The aspiration arm did not reach the reference position within the time limit.	Remove the obstruction that prevents the arm or mechanism from moving
102	X home timeout	A	The X arm did not reach the reference position within the time limit.	
103	Rocking home timeout	A	The rocking mechanism did not reach the reference position within the time limit	
104	Asp.arm error	A	The aspiration arm lost its expected position.	
105	X shift error	A	The X arm lost its expected position.	
106	Rocking error	A	Rocking mechanism lost its expected position.	
107	Fan error Bl.1	W	One of the blocks 1 fans is not moving.	Remove the item that blocks the fans on the lower side of the block.
108	Fan error Bl.2	W	One of the block 2 fans is not moving.	
109	Fan error Bl.3	W	One of the block 3 fans is not moving.	
110	Signal -Liq.senzor 1	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 1 tube.	The tube is too dirty. Change the reagent tube.
111	Signal -Liq.senzor 2	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 2 tube.	
112	Signal -Liq.senzor 3	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 3 tube.	
113	Signal -Liq.senzor 4	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 4 tube	
114	Signal -Liq.senzor 5	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 5 tube	
115	Signal -Liq.senzor 6	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 6 tube	
116	Signal -Liq.senzor 7	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 7 tube	
117	Signal -Liq.senzor 8	W	Unable to reach the required signal strength during reagent presence sensor calibration in channel 8 tube	
118	Reagent lack - Ch1	A	Not enough reagent in channel 1 detected during filling.	If the tube is not sufficiently submerged in the reagent, correct its position or replenish the reagent in the bottle.
119	Reagent lack - Ch2	A	Not enough reagent in channel 2 detected during filling.	
120	Reagent lack - Ch3	A	Not enough reagent in channel 3 detected during filling.	
121	Reagent lack - Ch4	A	Not enough reagent in channel 4 detected during filling.	
122	Reagent lack - Ch5	A	Not enough reagent in channel 5 detected during filling.	

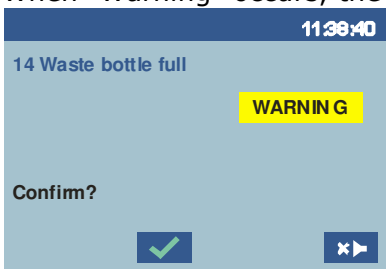
123	Reagent lack - Ch6	A	Not enough reagent in channel 6 detected during filling.	
124	Reagent lack - Ch7	A	Not enough reagent in channel 7 detected during filling.	
125	Reagent lack - Ch8	A	Not enough reagent in channel 8 detected during filling.	
201	Temp. out of range Bl.1	W	Block 1 temperature is out of range of the required temperature according to the protocol assay running.	A cold tray has been inserted or the block is being heated because of operation restoration after power failure. Wait till the temperature returns to the desired value. Short preparation time set in the assay.
202	Temp. out of range Bl.2	W	Block 2 temperature is out of range of the required temperature according to the protocol assay running.	
203	Temp. out of range Bl.3	W	Block 3 temperature is out of range of the required temperature according to the protocol assay running.	
204	Lab not found	A	Error in FLASH memory contents	Servicing necessary.
205	Damaged assay file	A	Bad assay file is saved in the instrument. Assay cannot be used in the protocol run	Use Blot Editor Uni and save a correct assay to the instrument
206	Assay ver. 3. Required 1-2	A	Incompatible assay is saved in the instrument. Assay cannot be used in the protocol run	Use correct version of Blot Editor Uni (see menu About) to create compactible assay.
207	Damaged language file	A	Bad language file is saved in the instrument. Language cannot be selected.	Copy correct language file to LANG directory at the instrument SD card.
208	Language ver.1.0 Required 2.x	A	Incompatible language file is saved in the instrument. Language cannot be selected.	Copy correct version of the language file to LANG directory at the instrument SD card.

NOTE

The operator is alerted to an error by an audio signal and by flashing of the reagent drawer light.

5.2 Warning

When "Warning" occurs, the following is displayed:



In the first line an identification number and a warning description are shown (see the table above).

- accepting of the warning by the operator. The screen returns to displaying current operation of the instrument.

- eventual silencing of the acoustic signal before accepting the warning

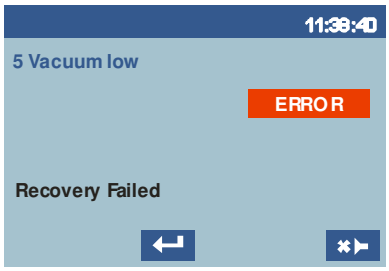
5.3 Alarm

When "Alarm" occurs, the following is displayed

In the first line an identification number and a warning description are shown (see the table above).
Use cursor to select an item and press the button to confirm the selection.
Recovery – starts an attempt to eliminate the cause of the error
Continue – continue the previous operation during which the error occurred. This item is not active (greyed out) until a successful recovery has been executed.
Abort – aborts the instrument's operation with no recovery. The screen returns to the Main menu. If the error occurred during a protocol run, the run is aborted.
- eventual silencing of the acoustic signal before selecting one of the items in menu.

In case of successful recovery an active *Continue* item is displayed.

If the recovery is unsuccessful, the instrument displays a current error condition together with information that the recovery has been unsuccessful (the current error can differ from the one that was the original cause of recovery)



- return to the screen that describes the original error. The *Continue* item will not be active.

CAUTION
If a recovery is unsuccessful, *Abort* item has to be used. Servicing is most likely necessary.
User profiles required for this action are Professional User – Administrator Level and Service Technician.

5.4 Non-standard failures

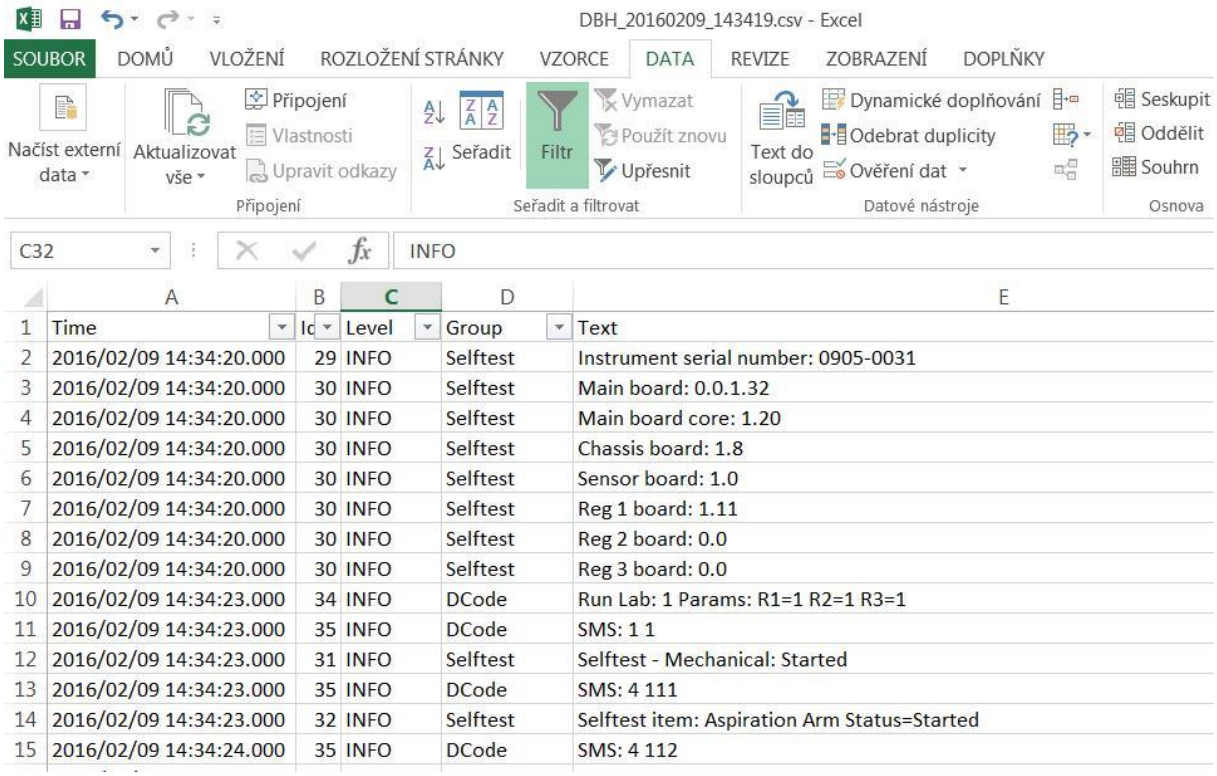
A non-standard fault can occur due to the high level of static electricity when operating the touch screen by the operator. The display stops responding to the device status or an unidentified display appears.
To rectify this fault condition, the device must be switched off and on again with the main switch.
If this fault is resolved during the protocol run, it is possible to continue its execution after switching on the device - see chapter 4.2.2 Resuming Operation after Power failure.

6 Protocol run history

Protocol preparation and run history as well as maintenance history are saved in the instrument's memory as so-called log files. The .csv files are located in the LOG directory. A new file is created with every start-up of the instrument, in the name of which a time of its creation is indicated:

DBH_yyyymmdd_hhmmss.csv

The file may be opened e. g. in Excel spreadsheet.



	A	B	C	D	E
1	Time	Id	Level	Group	Text
2	2016/02/09 14:34:20.000	29	INFO	Selftest	Instrument serial number: 0905-0031
3	2016/02/09 14:34:20.000	30	INFO	Selftest	Main board: 0.0.1.32
4	2016/02/09 14:34:20.000	30	INFO	Selftest	Main board core: 1.20
5	2016/02/09 14:34:20.000	30	INFO	Selftest	Chassis board: 1.8
6	2016/02/09 14:34:20.000	30	INFO	Selftest	Sensor board: 1.0
7	2016/02/09 14:34:20.000	30	INFO	Selftest	Reg 1 board: 1.11
8	2016/02/09 14:34:20.000	30	INFO	Selftest	Reg 2 board: 0.0
9	2016/02/09 14:34:20.000	30	INFO	Selftest	Reg 3 board: 0.0
10	2016/02/09 14:34:23.000	34	INFO	DCode	Run Lab: 1 Params: R1=1 R2=1 R3=1
11	2016/02/09 14:34:23.000	35	INFO	DCode	SMS: 1 1
12	2016/02/09 14:34:23.000	31	INFO	Selftest	Selftest - Mechanical: Started
13	2016/02/09 14:34:23.000	35	INFO	DCode	SMS: 4 111
14	2016/02/09 14:34:23.000	32	INFO	Selftest	Selftest item: Aspiration Arm Status=Started
15	2016/02/09 14:34:24.000	35	INFO	DCode	SMS: 4 112

Time – the time an event occurred in year/month/day hour:minute:second format
ID – event identification number
Level – log type by its importance.
ERROR - error log
WARNING - warning log
INFO - operating status log
Group - log type by current operating status of the instrument
Selftest - instrument initialization logs
Protocol - protocol run logs
Maintenance - instrument maintenance logs (pump cleaning and calibration)
Error - error logs
Temp - periodical logs of block temperatures and reagent positions
DCode - logs of instrument controlling

The logs are saved chronologically. By using *Group* column filter it is possible to choose the logs in a way that allows transparent monitoring of selected instrument operations. For example, by choosing Protocol and Error items it is possible to reconstruct the run of a chosen protocol.

7 Maintenance

7.1 Cleaning

7.1.1 After each run

Clean tubes with water after each protocol run. To do so use *Pump cleaning* menu offered after completing a run or it can be found in the *Main menu*. Put the pump tubes into a vessel with distilled water and start the cleaning. The tubes will then be flushed with the set volume of water. The initial amount is 5 ml (per one channel). The volume can be augmented in case of need of a more thorough flushing.
The tubes can be emptied after cleaning by placing the tubes out of the vessel and starting the cleaning with a volume of at least 15 ml. Then wipe the rinsing cuvette surroundings.
Empty the waste bottle and wash it out at the end of the workday.

7.1.2 Weekly cleaning

Put the tubes into a vessel with a solution suitable for cleaning of laboratory instruments and select *Pump cleaning* in the menu to flush the tubes with a volume of 5 ml. Leave the solution in the tubes for the prescribed time. Then put the tubes into a vessel with distilled water and start the flush with a volume of 15 ml. This step can be repeated. At the end empty the bottles with a volume of 15 ml and wipe the rinsing cuvette surroundings.
Empty the waste bottle and wash it out.

7.1.3 Waste Bottle Cleaning

Empty the waste bottle after finishing work. Keep the bottle clean. If needed, rinse the overflow sensor floats with water and detergent. Make sure the floats are able to move slightly.
The bottle cap has to be tightened during operation.

7.1.4 Display

The display may be cleaned using a tissue lightly moistened with water.

CAUTION
When using a larger amount of water, it is in danger of getting into the device through its display frame and may disrupt electronic parts within.

7.1.5 Workspace

Keep the workspace clean. In case of spilling reagents on its surface wipe it with soft tissue moistened with water and a detergent.

If leakage of a larger volume of liquid in the workspace occurs, it is accumulated in a safety tub under the rocking tray holder.
In that case take the trays out of the holder and fold the holder in a backward position.

WARNING
Hold the covers of the heating blocks during the folding so they don't impact the rear part of the workspace. By doing this you prevent damaging its surface.

Unscrew the two screws on the inner side of the workspace front cover (it is possible to do so without tools) and take the cover off. Dry and clean the safety tub. Then restore it to its original state.

7.1.6 Outer Surface and Cover

Outer surface and cover of the instrument may be cleaned using a soft tissue moistened with water and a mild detergent.

CAUTION
Never use organic solvents (e. g. acetone) – they irreversibly damage the cover.

7.1.7 Instrument disinfection

The user must ensure that the appropriate decontamination is carried out if hazard material is spilt onto or into the equipment.

WARNING
It is advisable to wear protective gloves, glasses and clothing when disinfecting the instrument.

It is very important that the instrument is thoroughly disinfected before it is removed from the laboratory or any servicing is performed on it.

Before the instrument is returned to the distributor for servicing, it must be disinfected and a disinfection certificate completed.

7.1.8 Disinfection procedure

The user must ensure that the manufacturer or his agent is consulted if there is any doubt about the compatibility or decontamination or cleaning agents with parts of the equipment or with material contained in it.

WARNING
Risk of fire and explosion!
Several disinfection products can be flammable and when improperly handled can lead to explosions. Proper laboratory safety precautions must be observed.

CAUTION
Please note that the disinfectant can influence the performance of the instrument if it is applied inside the instrument.

Filling and aspiration system disinfection

1. Prepare ca. 50 ml of disinfectant
2. Place the vessel with solution into the drawer and put reagent tubes in it. If all the tubes cannot reach a single vessel, divide the solution in more vessels. There has to be at least 5 ml of solution available for every pump
3. Start the pump cleaning with a volume of 5 ml
4. Wait the exposition time prescribed for the solution
5. Swap the disinfectant vessel with the distilled water vessel and put reagent tubes in it
6. Start a pump cleaning with a volume of 15 ml
7. Take the tubes out of the vessel and start a pump cleaning with a volume of 15 ml
8. Turn the instrument off and disconnect it from the mains
9. Disconnect the waste bottle from the instrument. Empty it and clean it (including floaters)

Surface disinfection

10. Carefully spray the surface of the instrument and the workspace with a disinfectant (or use a disposable soft paper towel moistened with a disinfectant solution)
11. Repeat the previous step after at least 10 minutes of exposure
12. Wipe the surface of the instrument and workspace with a soft paper towel moistened with a solution of water and detergent or just distilled water after at least 5 hours of exposure and remove the remains of the disinfectant
13. Dry the surfaces with paper towels
14. Wrap the instrument and its accessories
15. Disinfect your hands, then wash them using a soap
16. Fill the disinfection protocol (App 1) and place it on the outer side of the box with the instrument for it to be clearly visible.

7.2 Reagent Peristaltic Pumps

To keep accuracy, it is necessary to periodically calibrate the reagent peristaltic pumps. That eliminates gradual wear of plastic components and pump cassette tubing.
The pump calibration is a part of monthly maintenance. If necessary, it is possible to conduct the calibration in a shorter interval.

The peristaltic pumps are equipped with a changeable plastic cassette with gearing and a pumping tube. In normal use of the instrument it is recommended to replace the cassettes of the frequently used pumps annually (servicing).
After changing of heads, it is necessary to conduct training and calibrate the pumps with the new cassettes.

7.3 Waste bottle

Empty the waste bottle after work is finished. Keep the bottle clean. If needed, rinse the overflow sensor floats with water and detergent. Make sure the floats are able to move slightly.
The bottle cap has to be tightened during operation.

7.4 Instrument cleaning

Wipe the surface of the instrument with a moistened paper or cloth. Use detergent if particularly dirty.

Clean the aspiration tube, splash bowl and their surroundings with isopropanol.

Appendix 1 : Decontamination protocol

I declare that the instrument in this package has been decontaminated or disinfected to remove or inactivate any biological material, which could be dangerous to the service personnel, or that it has never been exposed to any hazardous biological material.

Contact person:.....

Company: .....

Function: .....

.....

Phone/Fax: .....

E-mail:

.....

Date of decontamination: .....

Method of decontamination applied: .....

.....

Date: .....

Signature: .....

I declare that the instrument in this package has been decontaminated or disinfected to remove or inactivate any biological material, which could be dangerous to the service personnel, or that it has never been exposed to any hazardous biological material.

Contact person:.....

Company: .....

Function: .....

.....

Phone/Fax: .....

E-mail:

.....

Date of decontamination: .....

Method of decontamination applied: .....

.....

Date: .....

Signature: .....