



Leica CV5030

Robotic Coverslipper

Instruction Manual

Leica CV5030 - Robotic Coverslipper

V1.2 English - 11/2002

Always keep the manual near the instrument!
Read it carefully prior to operating the instrument!

Leica

MICROSYSTEMS

NOTE

The information, numerical data, notes and value judgments contained in this manual represent the current state of scientific knowledge and state-of-the-art technology as we understand it following thorough investigation in this field.

We are under no obligation to update the present manual according to the latest technical developments, nor to provide our customers with additional copies, updates etc. of this manual.

For erroneous statements, drawings, technical illustrations etc. contained in this manual we exclude liability as far as permissible according to the national legal system applicable in each individual case. In particular, no liability whatsoever is accepted for any financial loss or consequential damage caused by or related to compliance with statements or other information in this manual.

Statements, drawings, illustrations and other information as regards contents or technical details of the present manual are not to be considered as warranted characteristics of our products.

These are determined only by the contract provisions agreed between ourselves and our customers.

Leica reserves the right to change technical specifications as well as manufacturing processes without prior notice. Only in this way is it possible to continuously improve the technology and manufacturing techniques used in our products.

This document is protected under copyright laws. Any copyrights of this document are retained by Leica Microsystems Nussloch GmbH.

Any reproduction of text and illustrations (or of any parts thereof) by means of print, photocopy, microfiche, web cam or other methods – including any electronic systems and media – requires express prior permission in writing by Leica Microsystems Nussloch GmbH.

For the instrument serial number and year of manufacture, please refer to the name plate at the back of the instrument.

© Leica Microsystems Nussloch GmbH

Published by:

Leica Microsystems Nussloch GmbH
Heidelberger Str. 17 - 19
D-69226 Nussloch
Germany

Phone: +49 (0) 62 24 143-0

Fax: +49 (0) 62 24 143-200

e-mail: histo_info@leica-microsystems.com


Internet: <http://www.histo-solutions.com>

Table of contents


| | | |
|------------|--|-----------|
| 1. | Important information | 5 |
| 1.1 | Symbols in this manual and their meaning | 5 |
| 1.2 | Designated use | 5 |
| 2. | Safety | 6 |
| 2.1 | Safety regulations | 6 |
| 2.2 | Caution notes | 7 |
| 3. | Unit components and specifications | 9 |
| 3.1 | Overview – Components / functions | 9 |
| 3.2 | Functions of the control panel | 10 |
| 3.3 | Scope of delivery | 11 |
| 3.4 | Technical data | 12 |
| 4. | Initial setup | 13 |
| 4.1 | Location requirements | 13 |
| 4.2 | Setup and initial operation | 13 |
| 4.3 | Transport lock | 16 |
| 4.4 | Refilling consumables | 16 |
| 5. | Operating the CV5030 | 17 |
| 5.1 | Electrical connection | 17 |
| 5.2 | Key designations and their functions | 17 |
| 5.3 | Program flow | 19 |
| 5.4 | User MENU | 21 |
| 5.5 | Priming | 24 |
| 5.6 | Coverslipping | 24 |
| 5.7 | Interrupting the coverslipping process | 26 |
| 5.8 | Process-based interruptions | 27 |
| 6. | Operating the CV5030 in connection with the TS5025 transfer station | 29 |
| 6.1 | Differences compared to CV5030 stand-alone operation | 29 |
| 6.2 | Requests by the robotic color multistainer ST5020 | 29 |
| 6.3 | Interruption by the user | 30 |
| 6.4 | Process-based interruptions | 31 |
| 7. | Switching off the unit | 32 |
| 7.1 | Standby mode | 32 |
| 7.2 | Switching off the main switch | 32 |
| 8. | Cleaning and maintenance | 33 |
| 8.1 | Daily cleaning | 33 |
| 9. | System and error messages | 35 |
| 10. | Accessories | 41 |
| | Media Parameter Settings | 43 |
| 11. | Warranty and service | 45 |

1.1 Symbols in this manual and their meaning



Caution notes are highlighted in gray and marked by a  warning triangle.



Notes, i.e. important information for the user, are highlighted in gray and marked by the  symbol.

(5)

Numbers given in parentheses refer to positions in illustrations.

**RUN/
STOP**

Function keys to be pressed on the control panel are printed in boldface and with capital letters.

1.2 Designated use

The Leica CV5030 is a robotic coverslipper for coverslipping tissue sections, cells or swabs mounted on slides with coverslips made out of glass using a variety of different coverslip media.

Any other use of the unit represents an unauthorized operation.

2. Safety



**The safety and caution notes in this chapter must be observed at all times.
The user should read these notes even if he or she is familiar with the operation and use of Leica equipment.**

2.1 Safety regulations

This instruction manual contains important instructions and information for the operational safety and maintenance of the unit. It is an important component of the unit and must be read carefully prior to setup and use and kept close to the unit.



The instruction manual must be expanded by corresponding instructions if this becomes necessary due to existing national regulations on accident prevention and environmental protection in the country where the unit is operated.

This unit was manufactured and tested according to the safety regulations for measurement, control, automatic control and laboratory equipment:

- CE guidelines
- CSA.

To maintain this condition and ensure safe operation, the user must observe all notes and warnings contained in this instruction manual.

Device type

All information contained in this instruction manual applies solely to the device type listed on the cover page.

A name plate with serial number is attached to the rear of the unit.

Leica Mikrosysteme
GmbH
A- 1170 Wien - Austria
Made in Austria
Type: 709125
Ser.No.: 517149



Watts: 100 W
Voltage: 100-240 V
Frequency: 50-60 Hz
Fuse:

CAUTION:
Electric shock hazard! Disconnect from
mains supply before opening!



**The protective devices located on the unit and the accessories must not be removed or modified.
The unit must only be opened and repaired by service technicians authorized by Leica.**

2.2 Caution notes

The safety devices attached to this unit by the manufacturer form only the basis for accident prevention.

The main responsibility for accident-free operation lies primarily with the businessperson where the unit is operated, as well as the persons he or she designates for operating, maintaining or repairing the unit.

To ensure perfect operation of the unit, the following notes and cautions must be observed.

Transport and installation



The unit must be transported in upright position only.

The unit must be connected only with the supplied power cable and only to a grounded power receptacle. The protective function must not be removed through the use of an extension cord without protective conductor.

The use in hazardous areas is not allowed.

With extreme temperature differences between storage and installation site and high humidity, condensation of water may occur. In this case, a two-hour waiting period must be maintained before switching on the unit. If the waiting period is not maintained, the unit may be damaged.

The device must be aligned perfectly before startup.

2. Safety

Operating the unit



The unit may only be operated by trained laboratory personnel. It may only be used according to its intended use and the instructions in this instruction manual.

Avoid skin contact with solvents or coverslip media.

Ensure correct dosage of mounting media. Excessive media may spill from the specimen slide onto the working surface and thereby obstruct the movement of parts of the unit (notes on cleaning).

During operation, do not block motor-driven components through handling or objects. Danger of personal injury through broken glass!

Unit must be operated with vent, or fume tubing and activated carbon filter must be assembled and connected properly. Warning against hazardous fire and poison through solvent vapors.

Cleaning and maintenance



The unit may be opened for maintenance or repair work by authorized service technicians only.

Switch the unit off and unplug it before each cleaning.

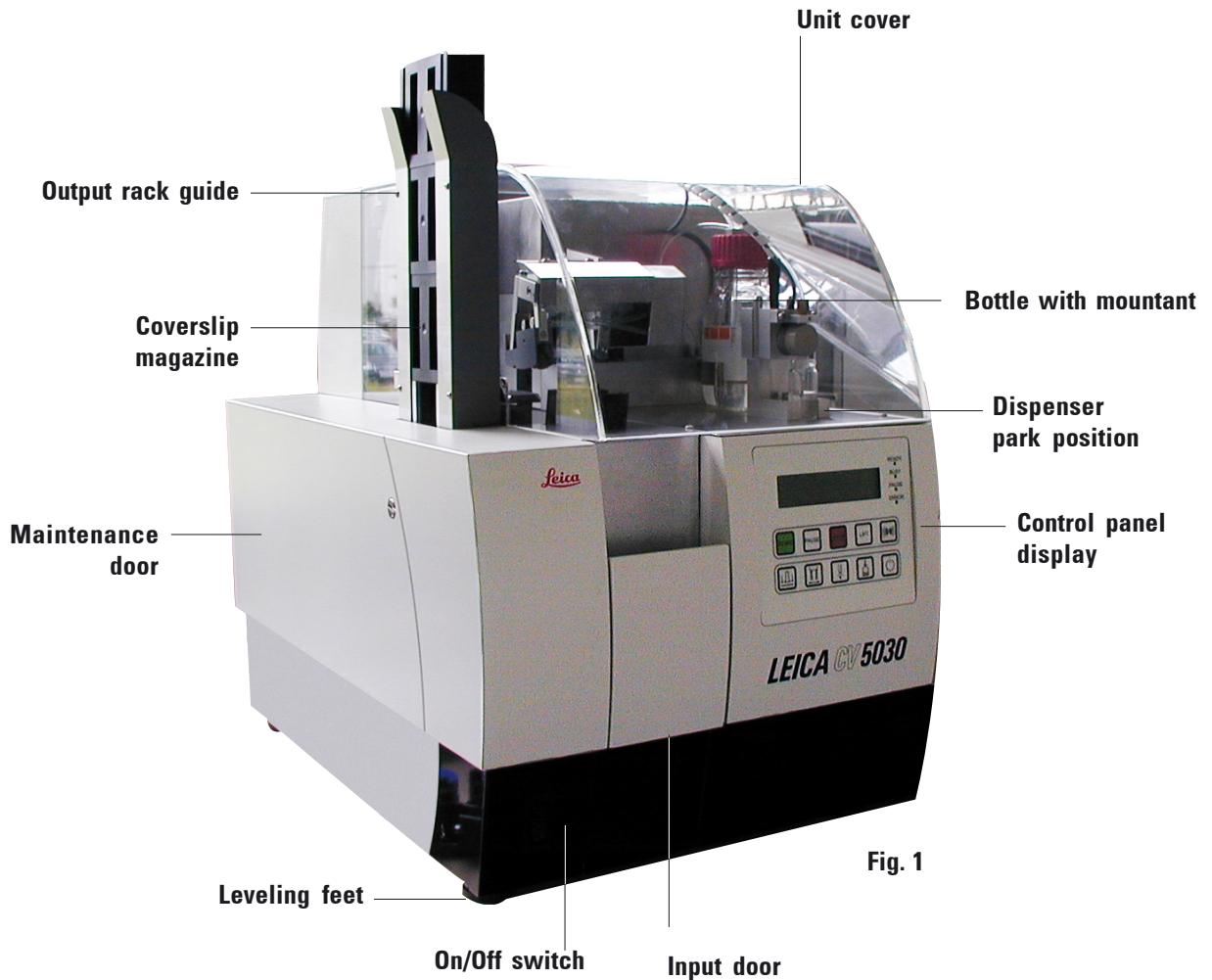
Do not use any solvent containing acetone, chloride or xylene for cleaning the surface. While operating and cleaning the unit, do not let any liquid enter the unit.

While handling cleaning materials, observe the safety regulations of the manufacturer and the lab regulations.

Dispose of used reagents while observing applicable local regulations and the disposal regulations of your company/lab.

3. Unit components and specifications

3.1 Overview—Components / functions



3. Unit components and specifications

3.2 Functions of the control panel

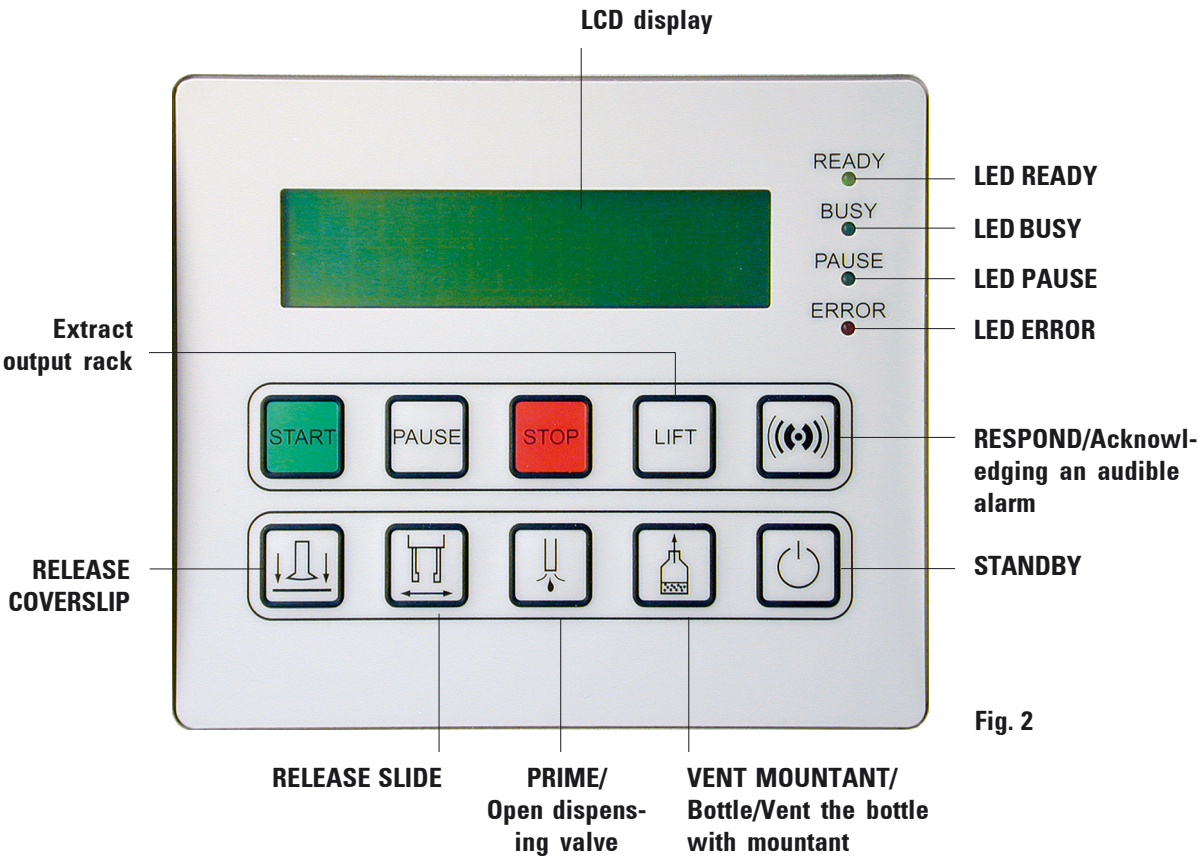


Fig. 2

3.3. Scope of delivery

The basic unit is operational without additional accessories. The standard equipment of Leica CV5030 consists of:

- 1 basic unit,
- 1 accessory kit consisting of:
 - 1 slide rack 30, plastic, pack of 5,
 - 2 bottles for mountant, 250 ml, with cover,
 - 1 mains cable set: - 1 mains cable UK ST/BU F-5A,
 - 1 mains cable D,
 - 1 mains cable USA-C-J,
 - 1 single open-end wrench 13,
 - 1 activated carbon filter (xylene),
 - 1 CV5030 instructions for repacking,
 - 1 Leica CV5030 instruction manual—E/F/G/S,
- 2 nozzles, 1x large – 18 G, 1x small – 20 G,
- 1 insert for Leica slide racks for 30 slides,
- 5 output racks for 30 slides,
- 3 coverslip magazines, MultiSize™ 40-60x24 mm,
- 3 coverslip magazines, MultiSize™ 40-60x22 mm,
- 1 pack of suction cups (2 pieces),
- 1 priming container,
- 1 fume tubing, 3 m long, 32 mm diameter ID,
- 1 "Leica" brush,
- 1 Allen key, SW 2.5,
- 1 Allen key, SW 3.0.

Not installed, but included:

- 1 dispensing module,
- 1 bath for receiving slides.

All listed consumables can be replaced by the user.

3. Unit components and specifications

3.4. Technical data

| | |
|---|--|
| Supply voltages: | 100 - 240 V AC, 100W; 50 - 60 Hz |
| Fuse: | thermoelectric, integrated in the main power switch, Tripping current: 5A |
| Operating environment: Temperature: | 10 °C - 35 °C, Absolute humidity: 10 % - 80 % (non-condensing) |
| Connections: | RS 232C, serial communications for service |
| Slide throughput: | 1 slide in approx. 9 s. |
| Slides catered for: | high-quality slides with ground edges* |
| Coverslip magazine capacity: depending on coverslip size | 120 pcs. (22 - 24mm x 60 mm), 160 pcs. (22 - 24mm x 40 mm) |
| Coverslips catered for: | 22 - 24mm x 40 - 60 mm |
| Mountant bottle capacity: | 250 ml |
| Mountant volume: | individually adjustable (volume and type) |
| Mountant types: | all commercial media** |

Dimensions and weight:

| | |
|---------------------------|---------------|
| Width: | 420 mm |
| Depth: | 600 mm |
| Height: (with lid closed) | 550 mm |
| Weight: | approx. 57 kg |

Manufacturing country: Austria

* Contact your supplier for additional information!

** Recommendation: Leica CV Ultra™

4.1 Location requirements

The equipment location must meet the following requirements:

- Stable, plane, vibration-free lab table.
- Largely vibration-free floor.
- Space of approx. 25 cm on the left side of the unit (to open the side door).
- Space behind the unit for connecting the fume tubing.
- Room temperature generally between +10 °C and +35 °C.
- Relative humidity 80% maximum, non-condensing.



The use of the unit in hazardous areas is not allowed.

4.2 Setup and initial operation

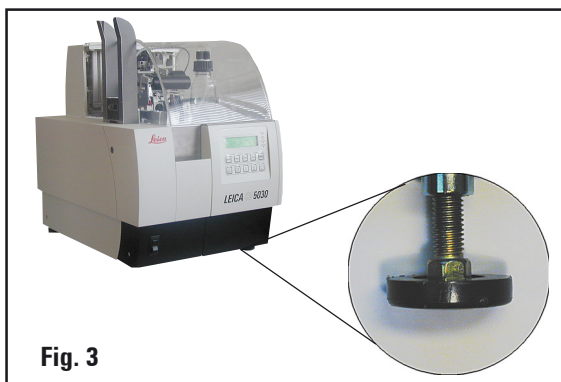


Fig. 3

Adjust the height of the threaded feet (Fig. 3) to ensure that the unit is level in all directions.



The chemicals used in the Leica CV5030 are easily inflammable and hazardous to health. The installation location of the CV5030 must be well-ventilated; there should be no ignition sources there of any kind.

To lift the unit, pick it up by reaching under the sides (at least 2 persons are required—the device weighs approx. 57 kg) and lift it onto a solid laboratory table.

- Pull the protective plastic cover upwards to remove it.
- Ensure that the delivered accessories are complete in accordance with the order.

Perform the repacking of the unit in reverse order to the unpacking instructions. The packing material should, therefore, always be kept (unpacking instructions on the outside of the transport packaging).

Mountant bottle must be taken from the unit. Remove all residues from the system using a suitable solvent.

The unit must be transported in upright position only as indicated by labels on the outside of the transport box.

4. Initial setup

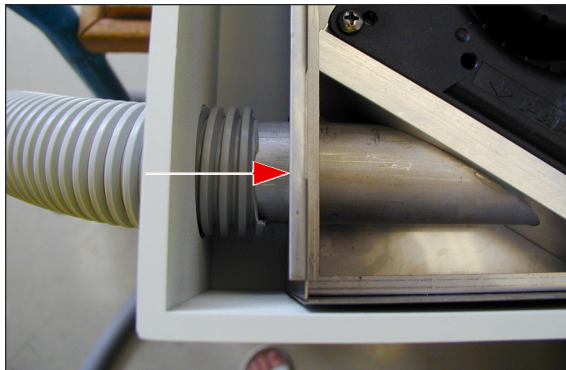


Fig. 4

Operate the unit with the vent or insert activated carbon filter and properly connect the fume tubing (fig. 4).

- Fit the nozzle to the dispensing valve.
- Fill prime container halfway with xylene or xylene substitute (according to the mountant used).
- Insert the dispensing valve in paused position on the operating plate.
- Plug the cable to the dispensing valve into the sleeve of the cover plate behind the operating plate.
- Connect the tubing from the lid of the mountant bottle with the pressure output in the cover plate behind the operating plate.
- Place the insert according to the respective input rack in the bath and place it in the input door.
- Operate the unit with the vent or insert activated carbon filter and properly connect the fume tubing.

4.2.1 Vent system

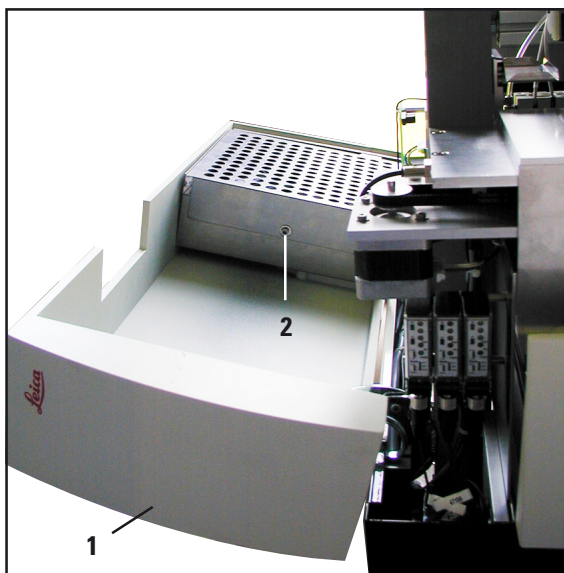


Fig. 5

4.2.2 Coverslip collection tray and suction cups

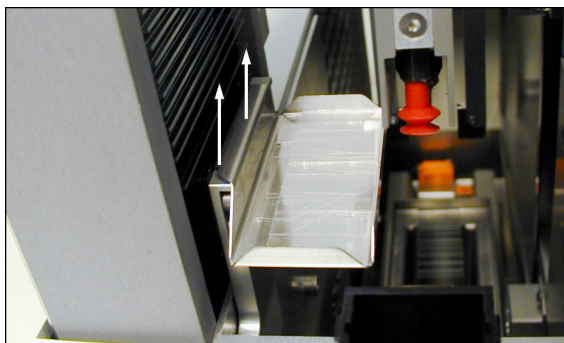


Fig. 6

The coverslip collection tray is hung on the right side on the slide ejector. It can be removed for cleaning purposes.

Replace the activated carbon filter every six months or when solvent vapors exit the air outlet at the rear of the unit.



If xylene is used in the bath, the activated carbon filter must be replaced every month!

1. Release the screw of the service flap (1) on the left side of the unit.
 2. Now release the Allen screw (2) and push the cover up.
 3. Insert the filter and tighten the screws in the reverse order.
- Use the supplied tools for assembly.

4.2.3 Changing the needle

Insert the needle into the needle retainer (1) and turn one corner counterclockwise over the plate.

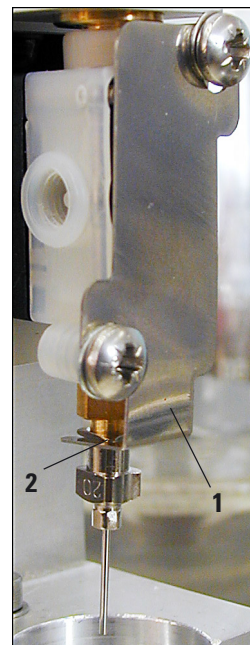
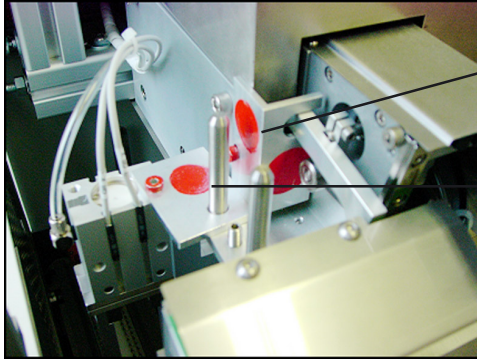


Fig. 7

4. Initial setup

4.3. Transport lock



Transport lock for coverslip transfer module

Transport lock for the gripper

Fig. 8

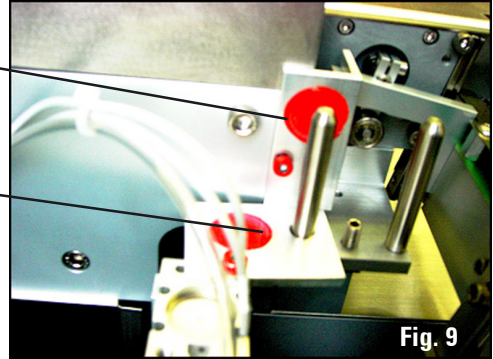


Fig. 9

4.4 Refilling consumables

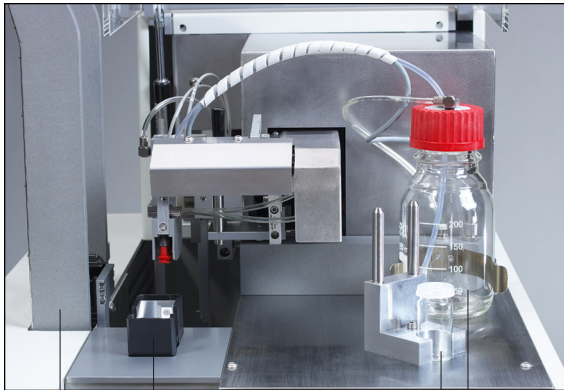


Fig. 10

- Slowly fill the mountant bottle with mountant (1) (max. 250ml) to avoid air bubbles. It is essential that the mountant bottle stands open for several hours (overnight) in the vent.
- Screw the lid of the mountant bottle firmly onto the bottle.
- Select the coverslip magazine (2) for the desired coverslip type (22mm or 24mm wide).
- Fill the coverslip magazine with coverslips (length 40-60mm) and insert it.



Use the glass bottles from the standard delivery or suitable GLASS containers – but never use PLASTIC containers.

- Fill the bath with xylene*.
- Fill the bottle (3) for the paused position of the dispensing valve with xylene*.
- Insert the output rack (4) into the lateral guide (on the left side of the unit).



Fig. 11

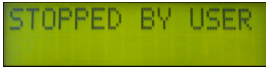
Replace damaged or deformed suction cups. To replace a suction cup, remove it by pulling it downward and insert a new one.

* **xylene substitute, depending on the mountant**

5.1 Electrical connection

The unit is dimensioned for:
100 to 240 V AC; 100 W; 50/60 Hz.

5.2 Key designations and their functions



START starts the coverslipping process from READY and PAUSE mode (exception: if PRIME is shown on the display, PRIME must be carried out first) and after removable errors (coverslip magazine is empty, coverslip is broken). After pressing the **STOP** key (display shows “**STOPPED BY USER**”), it causes a reinitialization of the unit (see section 4.3).



Pressing **PAUSE** interrupts the coverslipping process (**BUSY LED** lights up) after the currently processed slide is placed in the output magazine; **PAUSE LED** lights up. Press **START** to continue. Device parameters can be changed.



STOP interrupts the unit operation immediately; **ERROR LED** lights up in red. Use **START** to reinitialize the unit.



Pressing **LIFT** raises the output rack to the extraction position (not available while the **BUSY LED** is lit).



After the output rack reaches the extraction position, all slides must be removed before the process can be started (again). Non-observance can lead to damage of the slide.



Pressing **RESPOND** acknowledges an audible alarm; in **READY** or **PAUSE** mode, this key is used to enter the menu (holding the key pressed for 2 s) to set the coverslip parameters.



The **RELEASE COVER SLIP** key releases the suction devices on the coverslip transfer arm (locked while the **BUSY LED** is lit), and the coverslip is released.

5. Operating the CV5030



The **RELEASE SLIDE** key opens the gripper jaws as long as the key is pressed (blocked while the **BUSY LED** is lit). After extended non-operating times, it may take several seconds until the gripper opens.



The **PRIME** key opens the dispensing valve as long as the key is pressed (blocked while the **BUSY LED** is lit).



The **VENT MOUNTANT** key vents the bottle with the mountant (blocked while the **BUSY LED** is lit).



Press the **STANDBY key for 2 s:** The unit switches to standby mode (**READY LED** lights red), which can be exited only through initialization (pressing the **STANDBY** key for 2 x 2 s).

5.3 Program flow



Activate power switch → device enters STANDBY mode (READY LED red)

- if the transfer station is connected, the message TS 5025 PRESENT will be displayed for 1s

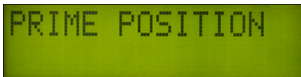
[STANDBY] for 2s → device initialized



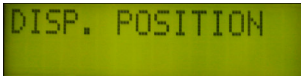
Welcome message



After initialization: priming required; extended warning signal if incorrect key pressed (e.g. [START]); if ST5020 is connected, a regular 3s warning sequence will be triggered as the CV5030 is not prepared to accept a rack



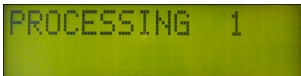
Dispenser located at P&P, i.e. not in the prime position (after startup or when [PRIME] is pressed; accompanied by characteristic audible signal)



Appears after pressing [START] if the dispenser is in the prime position (accompanied by characteristic audible signal); periodic alarm when connected to ST5020



(n=1-4): device is ready, process with parameter set n can be launched by pressing [START]



Device coverslips with parameter set **n** (in this example, **1**)



Appears in the second line when P&P grips below the preset level when getting the cover glass. The message is not cleared until the sensor recognizes a higher level and otherwise remains active when READY, PAUSE, PROCESSING etc.

5. Operating the CV5030



If not enough coverslips are present at startup, this will not be recognized until the first slide is coverslipped!

The factory setting for the limit value is approx. 40 coverslips.

PAUSING 1

[PAUSE] was pressed; this message appears while the coverslipping of the current slide is completed.

PAUSE 1

CV5030 is paused; press [START] to continue the coverslipping process with parameter set n (in this example, **1**).

REFILL
COVERSLIPS

Coverslip magazine is empty; coverslipping operation interrupted (accompanied by continuous audible signal).

FINISHED

20s audible signal after completion of the process, FINISHED remains on display until a key is pressed or the bath opened.

CHECK BATH
CS LOW

Bath not OK; either no bath found (vessel could not be initiated after [START]) or bath guide not actuated since last FINISHED (occurs when pressing [START] or when connecting to ST5020)

BATH NOT READY
CS LOW

Bath guide open and [START] pressed or query from ST 5020 (in this case: regular 3s warning sequence)

CHECK LIFT

Output rack either full or not present

CHECK SLIDES
CS LOW

The gripper could not take the slide in three attempts (slide crooked or following slide too close)

ST 5020 PROC. 1

A rack received from the ST5020 is processed with parameter set n (in this example, **1**)

5.4 User MENU

Pressing [RESPOND] for 2s while in READY or PAUSE mode opens the User MENU



SET: 1 MENU A
STK VOL TYP LEN

Menu A for the current parameter set n (in this example, **1**); the keys associated with the abbreviations in the second line open the appropriate settings menu;

- Use [START]/[PAUSE] to switch parameter sets
- [RESPOND] → Menu B
- [STANDBY] quits the menu



MOUNTANT STROKE: 60 1

Setting of the mountant stroke for the parameter set n (in this example, **1**); NN=40, 50, 55 or 60; the mountant volume is adjusted to suit the coverslip length;

- [START]/[PAUSE] switches to higher/lower values
- [RESPOND] → MENU A main screen
- [STANDBY] quits MENUs



MOUNTANT VOLUME: 1 1

Setting of the mountant volume for the parameter set n; (in this example, **1**) N=1-9; the mountant volume is controlled via the dispenser opening time; raising by one step results in an increase by 25%;

- [START]/[PAUSE] switches to higher/lower values
- [RESPOND] → MENU A main screen
- [STANDBY] quits MENUs

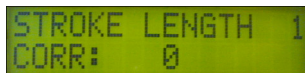


MOUNTANT TYPE: 5 1

Mountant type for the parameter set n (in this example, **1**); N: 1-5; the parameter directly affects the bottle pressure; raising by one step means a pressure increase of 25%;

- [START]/[PAUSE] sets the value
- [RESPOND] → Menu A main screen
- [STANDBY] quits MENUs

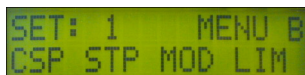
5. Operating the CV5030



STROKE LENGTH 1
CORR: 0

Correction of the mountant stroke for the parameter set n (in this example, **1**); NNN can be a value from -100 to 0 (in increments of 10), with -100 being a reduction by 10 mm; the total volume of mountant does not change, but is distributed over a shorter line from a different starting point;

- [START]/[PAUSE] switches to higher/lower values
- [RESPOND] → MENU A main screen
- [STANDBY] quits MENUs



SET: 1 MENU B
CSP STP MOD LIM

Menu B for the parameter set n (in this example, **1**); the keys associated with the abbreviations in the second line open the appropriate settings menus;

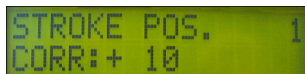
- [START]/[PAUSE] changes parameter set
- [RESPOND] → Menu A
- [STANDBY] → quits MENUs



COVERSLIP POS. 1
CORR:- 5

Coverslip position for parameter set n (in this example, **1**); the value is relative, NNN from -30 to 30 (-3 mm to 3 mm) in individual steps; 0 corresponds to the value of 60 in version 1.04

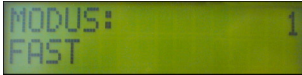
- [START]/[PAUSE] changes value (in steps of 1, i.e. 0.1 mm)
- [RESPOND] → Menu B main screen
- [STANDBY] quits MENUs



STROKE POS. 1
CORR:+ 10

Setting of the mountant stroke position for the parameter set n (in this example, **1**); the value is relative (thus CORR for CORRECTION), NNN can be a value from -100 to 100, with a positive operational sign resulting in a shift toward the label field. 0 corresponds to the earlier value 800; the value represents 1/10 mm, i.e. -50 corresponds to -5 mm;

- [START]/[PAUSE] changes to higher/lower value (in steps of 10)
- [RESPOND] → MENU B main screen
- [STANDBY] quits MENUs



MODUS: 1
FAST

Operating mode for parameter set n (in this example, **1**);

XXXXXX: FAST or SECURE; SECURE: gripper waits with taking a slide from the input rack until P&P has found a coverslip;

- [START] enables SECURE
- [PAUSE] enables FAST (i.e. SECURE disabled)
- [RESPOND] → Menu B main screen
- [STANDBY] quits MENUs



MAGAZINE LIMIT
ADJUST?

Sets the limit value for the CS LOW display (universal parameter, applies to all parameter sets);

Procedure: place coverslip stack with desired height in coverslip magazine

Press **START!**



MAGAZINE LIMIT
STARTED

P&P now moves to coverslip magazine and lowers to the top coverslip before returning to the INIT position →



MAGAZINE LIMIT
FINISHED

Procedure complete, new limit value stored

- [RESPOND] → MAGAZINE LIMIT main screen



MAGAZINE LIMIT
MAGAZINE EMPTY

Error message if no coverslip found

- [RESPOND] → MAGAZINE LIMIT main screen

From MAGAZINE LIMIT main screen:

- [RESPOND] or [PAUSE] → Menu B main screen
- [STANDBY] → quits MENUs

5. Operating the CV5030

5.5 Priming



Pressing the PRIME key opens the dispensing valve as long as the key is pressed. If the operating pressure dropped with extended non-operating time, the pump is automatically switched on after pressing the key to build up operating pressure again.

- If the tubing between mountant bottle and dispensing valve and the nozzle are filled with air, hold the dispensing valve during the priming in such a way that the nozzle opening points upward until mountant exits the nozzle.
- Mountant can be let off into the prime container at the paused position for the dispensing valve (do not overfill!).
- After refilling or replacing the mountant bottle, please check that all air bubbles escape from the tubing between mountant bottle and dispensing valve by means of priming.
- PRIME disappears from the display after initial pressing of the key; at this time, the coverslipping process can be started.

5.6 Coverslipping



Fig. 12

- Place the slides in the input rack so that the side to be coverslipped points to the front of the unit. Verify that the slides are fitted loosely and straight in the magazine.
- Open the door (1) in front of the bath (2) (next to the main power switch) and pull out the guide rail. If the bath is not in the front position, it will automatically be transported to this position.
- Pull the bath out of the unit on the guide rails. Place the filled slide racks (3) in the insert (cuts pointing to the user side).
- Push the bath into the unit. Push the guide rails in until they stop and close the door.
- Check coverslip magazine and mountant bottle for sufficient supply.
- **Insert the dispensing valve into the coverslipping position.**
- Check the output racks for sufficient output capacity.

Starting the coverslipping process



Pressing the **START** key:

- The unit now moves the bath to the rear and then begins searching the first slide.
- The output rack is positioned.
- Slides are sequentially coverslipped and moved to sequential positions of the output rack (from top to bottom).



The coverslipping process ends after the last slide with an audible signal and the note "FINISHED" (viewable for several seconds) on the display.



- The bath is now ready for removal of the empty input rack.
- Output racks remain positioned on the next empty slot.
- The display is erased after a few seconds (READY mode).



- Place the dispensing valve in the pause position (prime container) to prevent the nozzle from drying up. It does **not** have to be performed after every rack – at the end of the working day or after extended non-operating times.
- The empty input rack can be removed from the bath and filled for the next cycle or replaced by a full magazine (do not forget to close the door).
- If all or individual output racks must be removed, use the LIFT key to raise the racks to the extraction position. (A removal is not necessary if the remaining capacity is sufficient for the next coverslipping cycle.)



If the output racks are raised to the extraction position using the LIFT key, all slides must be removed.

5. Operating the CV5030

5.7 Interrupting the coverslipping process



Press **PAUSE** to interrupt the coverslipping process.

- The currently processed slide is completely coverslipped and pushed into the output rack.
- The **PAUSE LED** lights up.
- For extended non-operating times, place the dispensing valve in the paused position (prime container).
- The slides and mountant (vent the mountant bottle and prime it after closing it) can now be refilled.
- Output racks are raised to the extraction position and can be replaced with empty racks.



If the output racks are raised to the extraction position, all slides must be removed from them!



- The **RESPOND** (2s) key is used to modify the coverslipping parameters in the user menu (see section 5.4).
- After opening the door and pulling out the bath guide, the bath is moved to the front position, which changes the operating mode from **PAUSE** to **READY**.



- By pressing **START**, the coverslipping process can be continued.



If the dispensing valve was placed in the paused position, reset it!

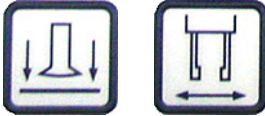


Emergency stop using **STOP**.

- The unit switches to ERROR mode.



The **RESPOND** key acknowledges the audible alarm.



The coverslip or slide is released.



- The **LIFT** key raises the output racks to the extraction position.



Prior to reinitialization, all slides must be removed from the output racks!



- The automatic action of the bath operation is deactivated by pressing **STOP**. The bath must be manually pulled from the bath channel if it needs to be removed. However, it is not necessary to remove the bath prior to reinitialization.
- By pressing **START**, the unit can now be reinitialized.
(Same state as that following the activation of the unit)
- Interruption by pulling out the bath guide:
 - The unit finishes the coverslipping process of the current slide and pushes it into the output rack.
 - The bath is moved to the front position.

The unit switches to **READY** mode.

5.8 Process-based interruptions

Empty coverslip magazine

- In quick mode (selectable via user MENU, see section 5.4):
 - The coverslip transfer arm moves to the resting position,
 - **ERROR** mode: Continuous alarm, display shows "**CHECK COVER SLIPS**",
 - Acknowledge the audible alarm by pressing the **RESPOND** key,
 - Fill the coverslip magazine,
 - Continue the coverslipping process with **START** (after acknowledging the alarm).

5. Operating the CV5030

- In secure mode (see section 5.4)
 - The processes are identical to those in quick mode, but since no slide has been removed from the bath, only a short alarm sequence is triggered to indicate the error state.



Coverslip broken

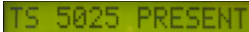
- The automatic discharge automatically recognizes a broken coverslip and discards it in the discharge tray at the slide transport mechanism.
- After receiving a new coverslip, the process is automatically continued.



Output rack full

- The unit automatically switches to **PAUSE** mode after filling the last slot.
 - An audible alarm indicates that the output rack must be emptied. Display: "**CHECK LIFT**".
 - After emptying the output racks, operation can continue analogous to the regular **PAUSE** mode.
 - If the end of the input rack is reached at the same time, **CHECK LIFT** is not displayed; instead, the process is concluded with **FINISHED**.
- Error in the unit or process
 - **ERROR** mode: Continuous alarm, display shows "**ERROR**" + error number; the condition is identical to pressing **STOP**.

6. Operating the CV5030 in connection with the TS5025 transfer station

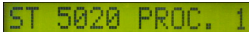
A green rectangular display showing the text "TS 5025 PRESENT" in black, monospaced font.

If the TS5025 is connected, the message “**TS 5025 PRESENT**” appears for 1 s on the display after activating the main power switch.

6.1 Differences compared to CV 5030 stand-alone operation

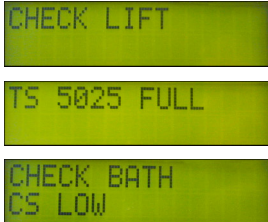
- Requests by ST5020 are accepted in READY mode (request approx. every 5-10 seconds).
Prerequisite:
 - Use the insert for Leica slide racks (**30**) in the bath.
 - Keep the bath clear, i.e. do not deposit any slide racks.
 - Refill consumables (coverslips, mountant) as soon as possible.
 - Empty output racks as soon as possible.
- Empty slide racks must be removed from the output slide ramp of the TS5025. The second deposited rack activates a sensor that prevents the processing of additional racks.

6.2 Requests by the robotic color multistainer ST5020

A green rectangular display showing the text "ST 5020 PROC. 1" in black, monospaced font.

- Requests are permitted if the CV5030 is in READY mode (or a rack is being processed) and no interaction is required of the user (e.g. priming, emptying of output magazine):
 - The slide rack is transferred by ST5020.
 - After all slides have been coverslipped (for interruptions see section 5.5), the empty slide rack is discarded via the ramp of the TS5025 transfer station.
 - If the output racks are full or the slide rack is already the third on the ramp, the user is requested to remove it.
 - Status changes to **READY**.
- ST5020 recognizes if the CV5030 is switched off or not switched to standby mode (no feedback). If the CV5030 is not ready for operation, the racks are placed in the exit station of the ST5020 and must be transferred manually.

6. Operating the CV5030 in connection with the TS5025 transfer station



- If CV5030 is activated but not ready for processing a new input rack, the TS5025 is prompted for a delayed request:
 - If priming is required: "**PRIME**" display and audible signal.
 - If the output magazines are full: "**CHECK LIFT**" display and audible signal.
 - If the output slide ramp TS5025 is full: "**TS5025 FULL**" display and audible signal.
 - If the bath guide is pulled out: "**CHECK BATH**" display and audible signal.
 - Racks loaded manually and bath not removed.
 - Bath forward, does not move back (sensor sees slide/gripper arm in front of rack).
 - Bath sensor does not respond (bath not present).

6.3 Interruption by the user



PAUSE has the same function as described in section 5.3 (as long as the bath guide is not pulled out, the slide rack is removed by the TS5025 if the coverslipping process is continued or concluded).

The **STOP** key interrupts the process in an emergency (see section 5.3) and places the CV5030 in **ERROR** mode. The input rack can remain in the bath during reinitialization. Be sure to remove all racks from the bath!

The remaining slides can be processed by pressing the **START** key; the empty input rack must then be manually removed from the bath (using the door and pulling out the bath guide).

- Pulling out the bath guide also interrupts the process. However, the TS5025 transfer station is subsequently initialized and no longer available for the removal of the empty slide rack.

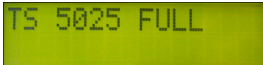


6. Operating the CV5030 in connection with the TS5025 transfer station

The remaining slides can, therefore, be processed by pressing the **START** key. An empty slide rack must then be manually removed from the bath (using the door and pulling out the bath guide).

6.4 Process-based interruptions

- Empty coverslip magazine, coverslip break and full output rack are handled as described in section 5.4. Following the processing, the empty input rack is placed on the ramp of the TS5025.
- Error in the unit or process
 - **ERROR** mode: continuous alarm, the display shows "**ERROR** " + error number (see chapter 9, System and Error Messages)
 - Status identical to that reached by pressing **STOP**.
- If the transfer station contains 3 input racks the message "**TS5020 FULL**" will be displayed.
Open TS flap and remove racks.
- **START** initializes the device.



TS 5025 FULL



7. Switching off the unit

7.1 Standby mode



- **STANDBY** deactivates the standby mode:
 - **READY LED** lights up in red,
 - The mountant bottle is vented,
 - The gripper closes and a lifted coverslip is discarded,
 - Pressure and vacuum are not adjusted,
 - Ventilating fan is running.
- The unit can only be reactivated by pressing **STANDBY** for 2s.
- Before activating the standby mode, all slides must be removed from the output racks and the input rack must be removed from the bath.
- If the unit is switched off for a short period of time (e.g. overnight), the dispensing valve should be moved to the paused position so that the nozzle dips into the filled prime container.
- If the unit is switched off for a longer period of time (e.g. over the weekend), remove the mountant from the mountant bottle. Clean the bottle, dispensing valve and nozzle by rinsing with a suitable solution*.
- Empty the bath into a tight-sealing container and discard according to existing lab regulations, if necessary.

7.2 Switching off the main switch

- Before de-energizing via main power switch:
 - Remove the slide rack from the bath,
 - Remove the output racks,
 - Empty the bottle for mountant media and thoroughly rinse the dispensing valve with solvent, then blow it clean with air,
 - Empty/dry all containers with solvent (particularly the bath) or remove them from the unit and place them in a suitable vent.
- For extended non-operating times (e.g. overnight) place the unit in standby mode and do not switch it off via the main power switch.



If solvents remain in the unit after it is de-energized, solvent vapors can develop. If the unit is not operated using a vent, danger of fire and poisoning exists!

* e.g. xylene or substitute – depending on the mountant used

8.1 Daily cleaning

- After extended non-operating times and generally always before priming, the nozzle must be checked for dried residues of the mountant and cleaned, if necessary.
- The suction devices for lifting coverslips must be regularly checked for damage and dirt accumulation. Lightly contaminated suction devices can be cleaned with a cloth moistened with solvent. Damaged and heavily contaminated suction devices must be replaced.
- The skids of the feeder mechanism and the face of the capacitive sensor between the suction devices must also be checked for contamination during the suction check and cleaned, if necessary.
- Mountant buildup must be removed regularly from the headed dowels of the slide transport mechanism.
- The gripper must be regularly cleaned of mountant residues and glass fragments.
- Output racks must be cleaned of mountant residues before they are inserted.
- The area of the bath transport must be regularly checked for fallen glass fragments, coverslips and mountant.
- Before inserting coverslips into the coverslip magazine, it must be cleaned of any glass fragments and glass dust.
- The fume filter must be changed at regular intervals.

8. Cleaning and maintenance

Daily cleaning (continued)

| Action | daily | weekly | monthly | biannually |
|---|-------|--------|---------|------------|
| Clean nozzle | x | | | |
| Clean walking beam | x | | | |
| Remove mountant residues from output rack | x | | | |
| Check prime container, empty or fill, if necessary | x | | | |
| Replace activated carbon filter | | | x | x |
| Check suction cups, clean or replace if necessary | | x | | |
| Clean gripper | x | | | |
| Clean bath | x | | | |
| Check coverslip magazine | x | | | |
| Clean loading door | x | | | |
| Clean complete working area | x | | | |



BATH NOT READY
CS LOW

- **PRIME:** Appears after activating the unit from standby mode and venting the mountant bottle at the display. As long as this message is displayed, all keys except **PRIME**, **VENT MOUNTANT**, **STOP** and **STANDBY** are locked.

After pressing the **PRIME** key, the screen is cleared and all functions are available.

- **BATH NOT READY:** The bath guide is pulled out so that coverslipping is currently not possible (appears upon request through ST5020 and by pressing the **START** key); place the bath on the bath transport belt and push the bath guide inside until it stops; at that point, all unit functions are available again.

- **BATH NOT PRESENT:** It appears if the bath which is the first to be moved completely to the rear is not recognized after pressing **START**. In this case, either no bath is inserted or it is blocked in its movement, e.g. through a fallen piece of glass.

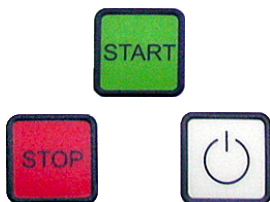
Remedy: Insert the bath (or remove it, remove blocking objects and reinsert it), push the bath guide back until it stops.

CHECK BATH
CS LOW

- **CHECK BATH:** After finishing a manual cycle (FINISHED), empty input racks must be removed. The bath guide is pulled out—the sensor responds. If this is not recognized between the end of a coverslipping process and the **START** of the next one (either manually by pressing **START** or through request from ST5020), then this message appears. **Remedy:** Manually remove the empty input rack.

9. System and error messages

CHECK LIFT



- **CHECK LIFT:** Is always displayed if an irregularity with the output racks is discovered. This may occur in the following cases: i) no more slot is available during the coverslipping process; ii) no output rack is found after pressing **START**; iii) not all slides were removed from the output racks after pressing **LIFT** or after all input racks were full during the coverslipping process.

Remedy: Replace full output racks with empty ones or insert empty racks.

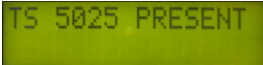
- **ST5020 REQUEST:** ST5020 maintains a slide rack for CV5030. But CV5030 is not capable of directly accepting (e.g. it may be busy processing another input rack); the message is generally accompanied by an additional message about the cause of the prevention. This prevention must be removed for the transfer to be successful (additional request through ST5020 after 60 s).

COVERSLIP
BROKEN



- **COVER SLIP BROKEN:** A coverslip at the coverslip transport arm is broken. Discard the coverslip by pressing the **RELEASE COVERSLIP** key; the coverslipping process can then be continued by pressing the **START** key.
- **REFILL COVER SLIPS:** The coverslip magazine is empty; fill the coverslip magazine and continue the coverslipping process with **START**.
- **STOPPED BY USER:** The **STOP** key was pressed. The unit is reinitialized by pressing the **START** key.
- **VACUUM IN PROC:** At the conclusion of a coverslipping process (FINISHED) or after 5 minutes in **PAUSE** mode, the mountant bottle is emptied to low vacuum. This message appears if a new coverslipping process is to be started during the pumping process. As soon as the pumping is finished, the process can be started as usual.

- **GLASS SENSOR DEF:** The transport mechanism for the coverslips features a sensor that detects broken glass or an empty coverslip magazine. A defect of this sensor is displayed.
Remedy: Check the sensor for dirt and clean thoroughly, if necessary; if the problem persists, a service technician must be called.
- **TS5025 FULL:** Three empty input racks are located on the output ramp of the TS5025. Remove all slide racks from the ramp.
- **TS5025 PRESENT:** Appears for 1 s during the initialization phase after activating the main power switch. It indicates that TS5025 was recognized by the electronics.
- **ST5020 CONTROL:** Indicates that the most recently processed input rack was received by the ST5020.
- **TS5025 WAITING:** An input rack was transferred from ST5020 to TS5025, but it could not be processed (due to user intervention, e.g. venting the mountant bottle) and is now waiting in the transfer position of TS5025.
Remedy: Prepare the CV5030 for operation (push in the bath guide, prime the mountant bottle); this erases the display and the rack is processed.



TS 5025 PRESENT

There are several error messages of the form ERROR N MM, (**N** one digit and **MM** two digits). These error messages are intended for the service department. If such an error message appears, the user can restart the unit (after removing all obstacles) by pressing the **START** key. Please read the following pages for more information!

If the error occurs repeatedly, contact the technical service.

9. System and error messages

Error type 1 - Device is switched on - standby, (Ready LED red)

From CPU version V1.02.02

| Error message | Area of problem | Action |
|---|---|---|
| <ul style="list-style-type: none">• Error 1 10• Error 1 30• Error 1 40• Error 1 50 | ANC/Plate Gripper Positioning Sledge | switch ON/OFF several times - if not successful, contact service technician |

Error type 2 - Device initialized - ready, (Ready LED green)

| Error message | Area of problem | Action |
|--|--|---|
| ANC: | | |
| <ul style="list-style-type: none">• Error 2 11• Error 2 12 | Plate Plate | Please contact our technical service. Please contact our technical service. |
| Grabber: | | |
| <ul style="list-style-type: none">• Error 2 31• Error 2 32 | Grabber Grabber | Please contact our technical service. Please contact our technical service. |
| Pick and Place: | | |
| <ul style="list-style-type: none">• Error 2 41• Error 2 42 | Positioning Positioning | Please contact our technical service. Please contact our technical service. |
| Slider: | | |
| <ul style="list-style-type: none">• Error 2 51 | Slider | Please contact our technical service. |
| Slider glass transport subgroup: | | |
| <ul style="list-style-type: none">• Error 2 53 | Slider | Please contact our technical service. |
| Slider output lift subgroup: | | |
| <ul style="list-style-type: none">• Error 2 54 Slider | | Please contact our technical service. |
| Transfer station: | | |
| <ul style="list-style-type: none">• Error 2 61• Error 2 62• Error 2 63 | Transfer station Transfer station Transfer station | Please contact our technical service. Please contact our technical service. Please contact our technical service. |

Error type 3 - Device in operation (Busy LED green)

| Error message | Area of problem | Action |
|----------------------------------|-------------------------------|---|
| From CPU version V1.02.00 | | |
| • Error 3 11 | Internal. communication error | Reinitialize! or contact our technical service. |
| • Error 3 12 | Internal. communication error | Reinitialize! or contact our technical service. |
| From CPU version V1.05.00 | | |
| • Error 3 21 | Internal. communication error | Reinitialize! or contact our technical service. |
| • Error 3 32 | Internal. communication error | Reinitialize! or contact our technical service. |

Error type 4 - Device in operation (Busy LED green)

| Error message | Area of problem | Action |
|---------------------------------------|-----------------|---|
| ANC: From CPU version V1.04.00 | | |
| • Error 4 11 | Plate | Reinitialize! or contact our technical service. |
| Grabber: | | |
| • Error 4 31 | Grabber | Reinitialize! or contact our technical service. |
| • Error 4 32 | Grabber | Reinitialize! or contact our technical service. |
| • Error 4 33 | Grabber | Reinitialize! or contact our technical service. |
| Pick and Place: | | |
| • Error 4 41 | Positioning | Reinitialize! or contact our technical service. |
| • Error 4 42 | Positioning | Reinitialize! or contact our technical service. |
| Slider: | | |
| • Error 4 51 | Sledge | Reinitialize! or contact our technical service. |
| • Error 4 52 | Sledge | Reinitialize! or contact our technical service. |

9. System and error messages

| Error message | Area of problem | Action |
|-------------------------------|------------------|--|
| (TS) Transfer station: | | |
| • Error 4 61 | Transfer | Reinitialize! or contact our technical service. |
| • Error 4 62 | Rack | Reinitialize! or contact our technical service. |
| • Error 4 63 | Home position | Reinitialize! or contact our technical service. |
| • Error 4 64 | Transfer station | Reinitialize! or contact our technical service. |

Optional accessories

- Leica CV5030 - nozzle (1x large, 18G)
(1x small, 20G)
- Leica - slide rack, metal
- Leica slide rack 30, plastic - pack of 5
- Leica slide rack 30, plastic - 1 piece
- Leica CV5030 - Output rack 30 (for 30 slides)
- Leica CV5030 - Output rack 20 (for 20 slides)
- Leica CV5030 - bottle for mountant medium, 250 ml, empty, with lid
- Leica CV Mount,
 - For all common coverslipping machines and manual coverslipping.4 bottles, 250 ml ea., in carton
- Leica ST Ultra, mounting medium
 - Leica ST Ultra was developed as a xylene replacement for histological specimen mounting, paraffin removal, as well as manual and automatic specimen mounting.

For specimen mounting, ST Ultra can only be used in conjunction with Leica CV Ultra.

1 canister, 10 liters
- Leica CV Ultra - mountant
 - For all common coverslipping machines and manual coverslipping. Does not contain xylene.6 bottles, 100 ml ea., in carton
- Standard activated carbon filter, xylene
- Leica CV5030 - coverslip magazine Multi-sizeTM
with inserts for a range of common coverslip sizes - 40-60 x 24 mm

10. Accessories

Optional accessories

- Leica CV5030 - coverslip magazine Multi-size TM
with inserts for a range of common coverslip sizes - 40-60 x 22 mm
- Fume tubing, solvent-resistant, flexible,
3 m length, 32 mm dia.
- Leica CV5030 - container for primer fluid
- Leica CV5030 - container for Leica
slide racks for 30 slides
- Leica CV5030 - container for Leica
slide racks for 20 slides
- Leica CV5030 - container for Sakura
slide racks for 20 slides
- Leica CV5030 - container for Microm
slide racks for 20 slides
- Leica CV5030 - container for Shandon-Gemini
slide racks for 20 slides
- Leica CV5030 - container for Medite/Hacker
slide racks for 20 slides
- Leica CV5030 - coverslip catch dish
- Leica CV5030 - suction cups, pack of 2
- Leica CV5030 - dispenser holder mount
- Leica CV5030 - demo packaging
- Leica TS5025 transfer station, complete

Media Parameter Settings

| Mountant Brand | Manufacturer | Type | Volume | Nozzle | Comment |
|------------------------------------|--|------|--------|--------|---|
| Based on Xylene: | | | | | |
| Entellan NEU | Merck | 5 | 1 | 20 | |
| DPX | BDH Laboratory Supplies England | 5 | 3 | 18 | |
| Vitro-Clud | R. Langenbrinck | 4 | 2 | 18 | |
| Permout | Fisher Scientific | 1 | 1 | 21 | |
| Histofluid | Mariefeld | 4 | 2 | 18 | Correction: Length: -50 |
| CV Mount | Leica | 5 | 2 | 20 | Correction: Length: -50 |
| Quick-D | Klinipath b.v. | 5 | 3 | 20 | Correction: Length: -100 STP: -50 |
| Consul-Mount | Shandon | 5 | 2 | 18 | Correction: Length: -50 |
| Hico-Mic | Hirtz&Co. Köln | 5 | 3 | 18 | Correction: Length: -50 |
| Pertex | Medite | 5 | 1 | 20 | |
| DePex | BDH Laboratory Supplies England, Gurr | 5 | 5 | 18 | Correction: Length: -50 STP: +50 |
| Eukitt | O. Kindler GmbH & CO. Freiburg | 5 | 6 | 20 | Correction: Length: -50 |
| Micromount | Surgipath | 5 | 6 | 20 | Correction: Length: -50 |
| Protocol Xylene Mounting Medium | Fisher Health Care | 1 | 1 | 21 | Correction: Length: -50 |
| Poly Mount | Poly Scientific | 4 | 1 | 18 | Correction: Length: -50 |
| Based on ST Ultra: | | | | | |
| CV Ultra | Leica | 5 | 3 | 18 | |

Media Parameter Settings

| Mountant Brand | Manufacturer | Type | Volume | Nozzle | Comment |
|---|---------------------------|---------|--------|--------|-------------------------------------|
| Based on Toluene: | | | | | |
| Mounting-Medium Toluene | Richard Allan Scientific | 5 | 2 | 21 | |
| Acrylmount Toluene | Anapath Stat Lab | 4 | 4 | 21 | |
| Acrytol Mounting Medium Toluene | Surgipath | 4 | 7 | 21 | Correction: Length: -50 |
| Cytoseal 280 Mounting Medium Toluene | Stephens Scientific | 5 | 8 | 21 | Correction: Length: -50 |
| Mounting Medium T Toluene | Acra Lab | 1 | 2 | 21 | Correction: Length: -100 |
| | | or 1 | 1 | 21 | Correction: Length: -50 |
| Protocol Secure Mount Mounting Medium Toluene | Fisher Health Care | 5 | 3 | 20 | Correction: Length: -50 STP: -50 |
| Protocol Mounting Medium Toluene | Fisher Scientific Company | 1 | 1 | 21 | Correction: Length: -50 |

Not recommended:

Because of

Medium

Neo-Mount:
(tested with Neo-Clear/Merck)

Very low viscosity:
May result in excess medium

But best result with:
- Type: 5 - Nozzle: 21
- Volume: 1 - Length: -100

Roti-R-Histokitt
(tested with Rotihistol/Roth)

Inconsistent stroke

Volume settings were defined under the following conditions: wet coverslipping, temperature approx. 25 °C, histology sections of approx. 3µm thickness, 50 mm coverslip, Stroke: 50. Optimized volume settings depend on and are affected by various factors.

| Factor | Effect on volume setting | Factor | Effect on volume setting |
|---------------------------|--------------------------|----------------------|--------------------------|
| Dry coverslipping | + | Smear sample type | + |
| High temperature (> 28°C) | - | Coverslip size 40 mm | - or shorter stroke type |
| Low temperatures (< 22°C) | + | Coverslip size 60 mm | ++ or longer stroke type |
| Monolayer sample type | - | | |

Warranty

Leica Microsystems Nussloch GmbH vouches for the fact that the delivered product underwent comprehensive quality control based on its strict internal testing criteria and is free of defects, and guarantees that all technical specifications and/or warranty of qualities was met.

The scope of the warranty is based on the content of the concluded agreement. The warranty terms of your Leica sales organization or the organization from which you have purchased the contractual product shall apply exclusively.

Service information

If you are in need of technical customer service or spare parts, please contact your Leica representative or the Leica dealer where you purchased the unit.

The following unit-related information is required:

- Model designation and serial number of the unit
- Location of the unit and a contact person
- Reason for customer service request
- Delivery date

Shutdown and disposal of the instrument

The unit or parts of the unit must be disposed of according to existing local applicable regulations.

