SAKURA®

DRAFT VERSION

Autowrite

Cassette and Slide Printer

Operating Instructions

Autowrite Cassette/Slide

V1.2 English – 06/2002

Always keep this manual together with the instrument.
Read this instruction manual carefully before working with the instrument.

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.
Sakura 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.

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

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1.1 Symbols used in this manual and their meaning

Warnings appear in a grey box and are marked by a warning triangle ⚠.

Notes, i.e. important user information appears in a grey box and is marked by an information symbol ℹ.

(5) Figures in brackets refer to item numbers in drawings.

ENTER Function keys to be pressed on the touch screen are written in bold-print capital letters.

1.2 Designated use

The Autowrite ink-jet printing module are designed for high-throughput printing at superior, chemical resistant printing resolutionand therefore unmatched printing quality and flexibility.

The instruments are designed for use in pathology laboratories, and only for performing the following tasks:

- AutoWrite S for printing on histology slides.
- AutoWrite C for printing on histology cassettes.
- The instruments may be operated only according to the instructions contained in this manual.

Any other use of the instrument is considered improper!

1.3 Qualification of personnel

- The AutoWrite C/S may be operated only by trained laboratory personnel.
- The instrument may be operated only according to the instructions contained in this manual.

1.4 Instrument type

All information provided in this manual applies only to the instrument type indicated on the title page.

A name plate indicating the instrument serial number is attached to the back of the instrument.

Make sure to comply with the safety instructions and warnings in this chapter.
Make sure to read these instructions, even if you are already familiar with the operation and use of other products.

21 Safety instructions

This instruction manual includes important instructions and information related to the operating safety and maintenance of the instrument.
It is an important part of the product, which must be read carefully prior to operating the instrument for the first time and must always be kept with the instrument.

If additional requirements on accident prevention and environmental protection exceeding the scope of this manual, are imposed by laws/ regulations of the country of operation, this instruction manual must be supplemented by appropriate instructions to ensure compliance with such requirements.

This instrument has been built and tested in accordance with the following safety regulations on electrical measuring, control, regulating and laboratory devices:

- EN55022
- EN55024
- EN61000-3-2
- EN61000-3-3
- EN60950

In order to maintain this condition and to ensure safe operation the operator must comply with the instructions and warning contained in this instruction manual.

The protective devices on both instrument and accessories may neither be removed nor modified.
Only authorized and qualified service personnel may access and repair the internal components of the instrument.

22 Warnings

The safety devices installed in this instrument by the manufacturer only constitute the basis for accident prevention.
Primarily responsible for accident-free operation is above all the institution which owns the instrument and, in addition, the designated personnel who operates, services or repairs the instrument.
To ensure trouble-free operation of the instrument, make sure to comply with the following instructions and warnings.

Transport and Installation

Once unpacked, the instrument may only be transported in an upright position.
Follow the unpacking instructions carefully to avoid damage to the instrument!
Place the instrument on a laboratory bench an ensure it is exactly horizontal.
Do not expose the instrument to direct sunlight (window)!

The instrument MUST be connected to an earthed mains power outlet socket. The instrument must not be connected to an extension cord without protective earth conductor.
The instrument automatically recognizes the connected voltage/frequency.

Do not operate the instrument in rooms with explosion hazard.

Condensation water may form in the instrument, if there is an extreme difference in temperature between the warehouse and the installation site and if air humidity high. In these cases, a waiting period of at least two hours must be observed before the instrument is switched on. Failure to adhere to this waiting period may result in damage to the instrument.

Warnings – Markings on the instrument itself

Markings on the instrument showing the warning triangle indicate that the correct operating instructions (as defined in this manual) must be followed when operating or replacing the item marked.
Failure to adhere to these instructions may result in an accident, personal injury, damage to the instrument or accessory equipment.

Warnings – instrument operation

The AutoWrite C/S may only be operated by trained laboratory personnel, according to its designated use and as per the present instruction manual.

In the event of an emergency, switch off the mains switch and unplug the instrument from mains.

Do not touch the ramp during operation. Risk of injury through sharp edged slides or broken glass.

Do not open the reflector flap of the flashlight while the instrument is ON – risk of burns and blinding.

Warnings – Cleaning and maintenance

Each time before cleaning, switch the instrument OFF and unplug from mains.

Prevent liquids from entering the interior of the instrument while the instrument is being cleaned or during operation.

Do not use alcohol, detergents containing alcohol (window cleaner!), abrasives and/or solvents containing acetone or xylene for cleaning.

Use a mild household cleaner for cleaning covers, control panel and housing. The painted surfaces and the control panel of the instrument are not resistent to xylene or acetone!

3.1 Overview – instrument

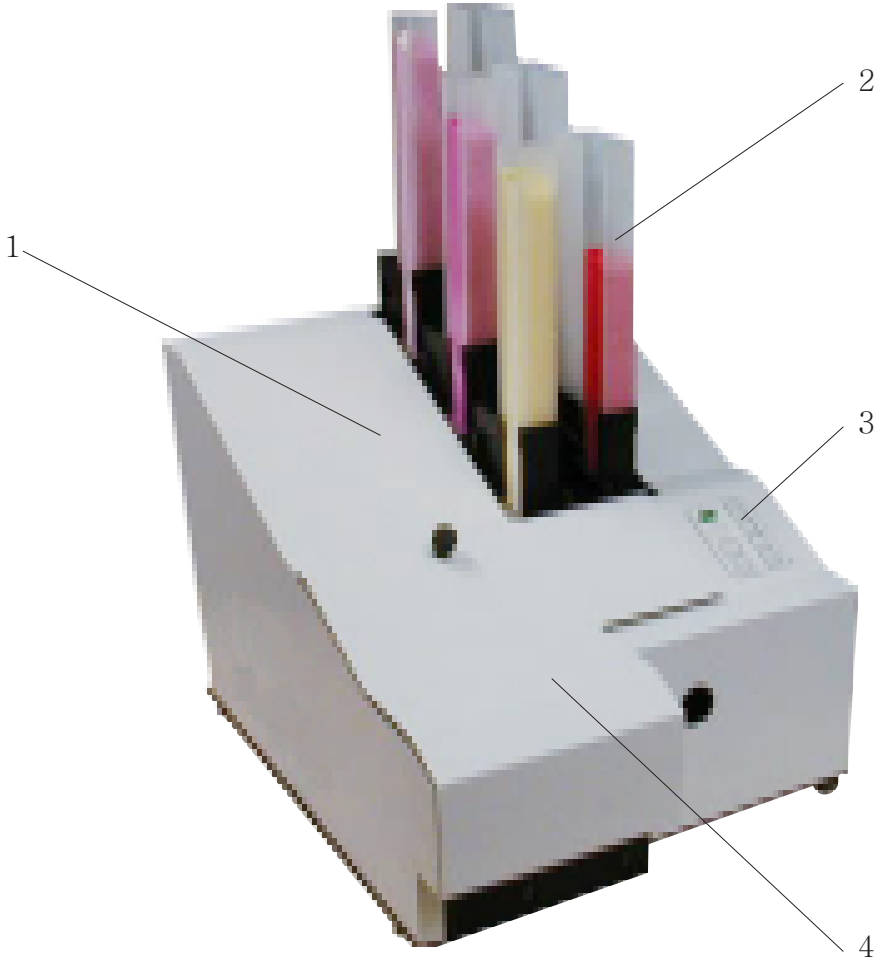


Fig. 1

Overview – instrument components

1 – Basic instrument
2 – Cassette magazine
3 – Control panel
4 – Cover

Lid open

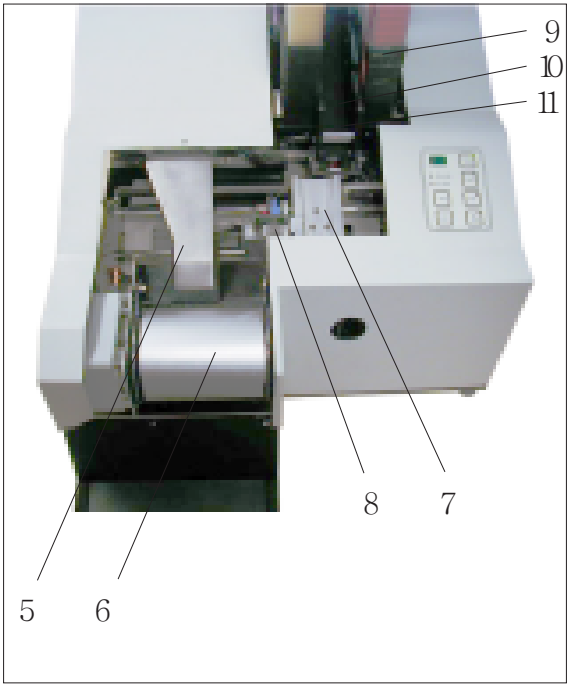


Fig. 2

5 – Drying station
6 – Cover flap – flashlight
7 – Print sledge
8 – Print head
9 – Magazine holder
10 – Feeding chute
11 – Transfer point : chute – clamp

Rear panel and electrical connections

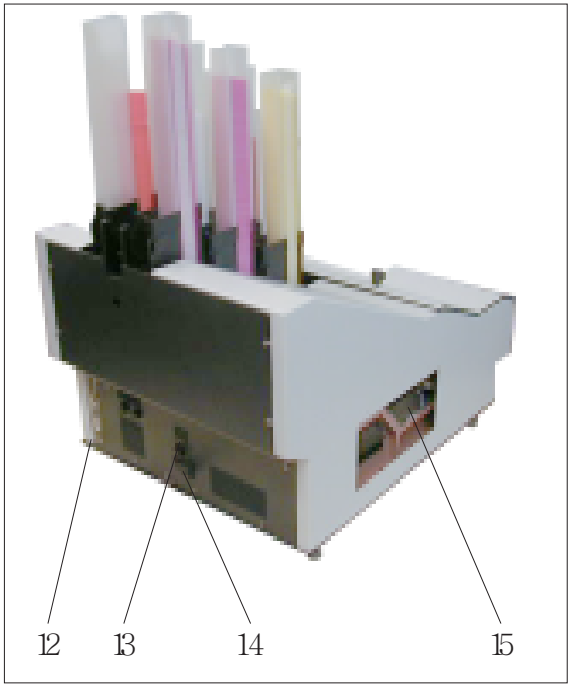


Fig. 3

12 – Plug socket for printer cable (serial data cable)
13 – Mains switch
14 – Mains connection
15 – Cleaning fluid cartridge

Attention item nos. 15.
This is the delivery state!
Prior to operation, the cleaning fluid cartridge must be exchanged for an ink cartridge – see chapter 4.3!

32 Technical data

Nominal voltage:	100 – 120V, 200 – 240 V
Nominal frequency:	50 to 60 Hz
Maximum power draw at 100 V:	10A
Secondary fuses:	2 x 3.15 AT (UL-listed)
Nominal power:	700VA
Dimensions (W x D x H), in mm:	460 x 580 x 415 (without magazine)
Dimensions, (W x D x H), in mm:	460 x 580 x 560 (IPS with magazine)
Dimension, (W x D x H), in mm:	460 x 580 x 960 (IPC with magazine)
Empty weight, without packing material:	approx. 28 kg
Weight including packing material:	approx. 65 kg
Working temperature range:	15 ℃ to 35 ℃
Relative air humidity:	10% to 80%, non-condensing

Performance data

1. AutoWrite S

Load capacity:	3 magazines, up to 150 slides per magazine.
Print speed:	
Batch-job printing:	approx. 13 slides/minute (two-line print).
Individual prints:	approx. 10 sec per slide.

2. AutoWrite C

Load capacity:	6 magazines, up to 80 cassettes per magazine.
Print speed:	
Batch-job printing:	approx. 15 cassettes/minute.
Individual prints:	approx. 10 sec per cassette.

4.1 Site requirements

- The AutoWrite C/S needs approx. 650 x 500 mm floor space. Additional space is required for the PC containing the control software.
- Stable laboratory bench and practically vibration-free floor.
- Stable ambient temperature between + 10 °C and + 35 °C.
- Relative air humidity of maximum 80 %, non-condensing.
- Avoid shock/vibration, direct sunlight, and any significant variation in temperature.

The installation site must be well-ventilated.
Operating the instrument in areas where there is a danger of explosion is not permitted.

42 Electrical connection

The instrument MUST be connected to a grounded mains socket.
Of the set of mains cables supplied, only use the one that is appropriate for the local power supply (plug must fit wall outlet on site).

Instrument rear panel
Electrical connections

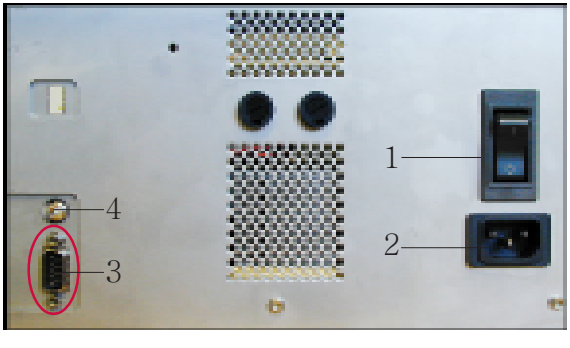


Fig. 4

- Make sure the printer is OFF – mains switch (1) in position „0" (OFF).
- Insert mains cable into mains power connecting socket (2).
- To use the printer, a serial data cable is required (part of standard delivery).
  Connect the data cable to a serial port of the PC hosting the control software and to connecting socket (3) on the printer.
- If required, connect the remote alarm system (optional) to the alarm socket (4).

Once the instrument has been set up and connected to mains, mains switch (1) should always remain in position „1" (ON).

4.3 Exchanging the cartridge

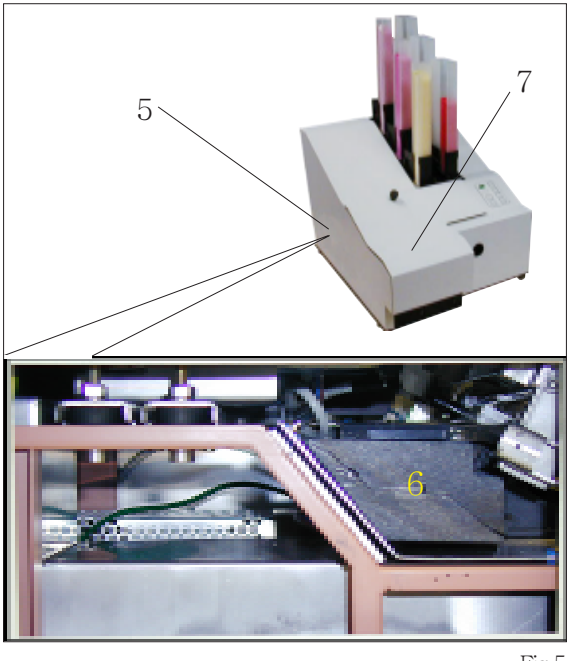


Fig. 5

The printer is delivered with the cleaning fluid cartridge inserted. To be able to print, the cleaning cartridge must be exchanged for an ink cartridge.

To do so, proceed as follows:

- Switch on the instrument with the main switch at the rear. (see (1) in Fig. 4)
- Remove cover (5) on the left side of the instrument (Allan key size 2.5).

Always be sure to store used cartridges in a horizontal position – Risk of leakage!

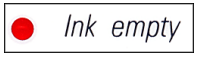
Automatic recognition of cartridge change

- Pull out cleaning fluid cartridge (6) at the left of the instrument.

If the the cartridge (6) is pulling out, a sensor in the cartridge slot initiates the start of the changing-routine from cleaning liquid to ink and vice versa.

- All functions are disabled, in order to ensure that air is not drawn into the ink system.
- The indicator LED „Ink Empty“ illuminates and remains ON.

Ink empty



- Insert a new cartridge (a ink cartridge is part of standard delivery) and push fully home (limit stop).
- The sensor in the cartridge slot recognize the presence of a new cartridge.
- The indicator LED „ Ink Empty" goes out, code 88 appears in the display.
- Put the cover back into place.

Finally, the instrument has to „ informed" , about the type of cartridge new installed into the slot.
There are three options:

1. New ink cartridge:
   Press the key LOADED – the printer resets the ink meter to full.

2. Used ink cartridge:
   Press the key ERROR – the printer resumes calculation at the ink-meter percentage calculated beforehand.

3. Used or new cleaning fluid cartridge:
   Press the key CLEAN – the percentage, calculated by the ink meter is saved.

- After starts the ink flushing routine; air is bled from the hoses and the system is refilled.
- Code 88 disappears from the display and code 00 appears for the time the ink flushing routine is in process.

44 Inserting the flash bulb

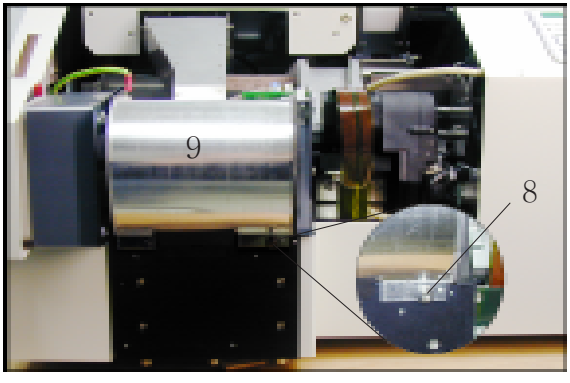


Fig. 6

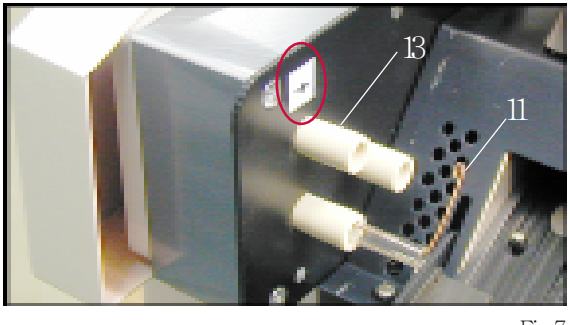


Fig. 7

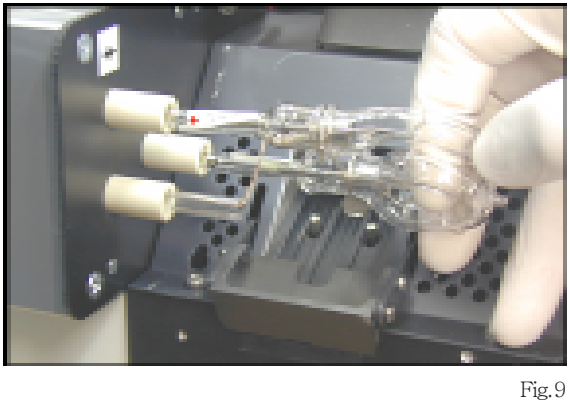


Fig. 9

Switch the instrument off and unplug its power plug.
Only touch the flash bulb wearing gloves.

Open the lid (7, Fig. 5) to gain access to the reflector.

Remove screw (8) (use Allan key size SW 2,5).

Swing the reflector (9) upwards.

Make sure the lamp is inserted correctly ¦ lamp electrode (10) marked with a + must be inserted into the socket (13) bearing the same mark (Fig. 9).

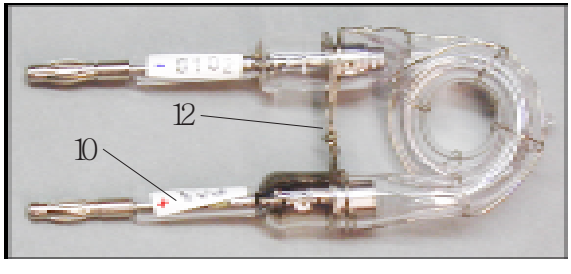


Fig. 8

When installing the flash bulb, do not squeeze it. Instead, hold it by the sides and push it in. Installing the lamp with incorrect polarity drastically reduces its life span.

To insert, carefully push the lamp inwards as far as it will go.

Contact spring (11) must sit close to the priming wire (12) of the lamp.

Swing the reflector downwards. Reinsert and retighten the screw.

Close lid (8).

5.1 Control panel functions

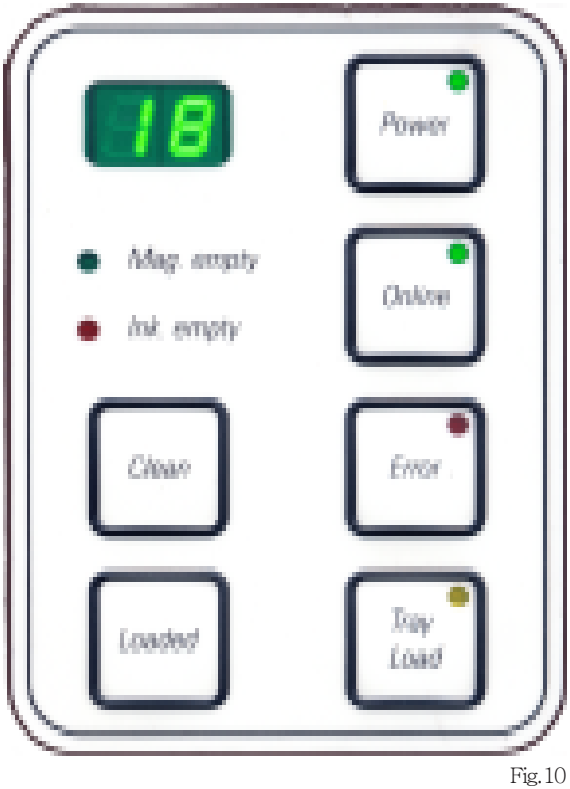


Fig. 10

INK EMPTY LED

LED off:

Ink empty

Remaining ink > 25%,
printing possible without restrictions.

LED flashes:

Ink cartridge will be empty shortly – flashing starts when remaining amount <25%.
(see also chapter 5.4 „ Ink indicator")

LED illuminates:

Ink cartridge empty, no further printing possible – indicated when remaining amount < 10% (see „ Exchanging the cartridge")

The control panel

- consists of a membrane keyboard with six pressure-sensitive keys (four of them with an LED), two LED displays and a two-figure seven-segment display.
- controls the printer functions and the print jobs, defined via the control software.
- indicates current printer status and processes in progress.
- indicates errors and / or error messages.
- controls the (optional) unload station.

MAG. EMPTY LED

Mag. empty

LED off:

Magazines are full or up to that point no further cassette/slide has been requested from a magazine that has just been emptied.

LED flashes:

Mag. empty

LED flashing and number on display indicate which magazine is empty.
If several magazines are emptied at the same time, their corresponding numbers are indicated in a recurring sequence.

After refilling the magazine(s), LOADED must be pressed to inform the printer that all magazines has been refilled.
The printer will assume that cassettes/slides of the same color as before have been added and will resume the interrupted print job.

POWER

Switching from POWER ON to STANDBY mode and back.

POWER LED:

LED on	|	POWER ON mode
LED flashes	|	STANDBY mode
LED off	|	Printer disconnected from mains

POWER ON mode:

- Power is supplied to all printer systems.
- The flash mains power supply is continually being recharged.
- The printer is ready to print immediately.

STANDBY mode:

- All power absorbers of the printer with the exception of those related to the processor (power saving mode).
- The printer performs a print head clean at regular intervals (e.g. 4 times a day). For that purpose it switches into POWER ON mode for a short period of time.

Printing is possible in POWER ON mode only.
To activate POWER ON with the printer being in STANDBY mode, press POWER. – POWER ON will be activated via the PC interface.
If no print job is received within a certain period of time, the printer automatically switches over to the STANDBY mode.
After switching from the STANDBY mode, there will be a reduced print output until all systems have reached their proper operating temperature.

ONLINE

Interrupting connection to the PC.

ONLINE LED

LED on:
Printer is ready and waiting for new a print job.

LED flashes:
A data transmission is in progress or a print job is being carried out.

LED off:
No data transmission in progress. No print job is in progress or a print job in progress has been temporarily interrupted.

- Pressing ONLINE while a print job is in progress interrupts printing. The online LED goes out.
  At that point the printer can be accessed manually (e.g. for removing a half-empty magazine and refilling it).
- To resume the previously interrupted print job, press ONLINE again.
  The online LED goes back on or – if there is still a job that has not been completed – starts flashing.

ERROR

To acknowledge an error displayed.

ERROR LED

LED flashes:
An error has occurred.
The corresponding error code is shown on display.

LED off:
Instrument working trouble-free.

If ERROR is pressed after having eliminated the source of an error and after all obstacles in the processing areas have been removed, the printer resumes normal operation and the error indication disappears.
If there are several errors simultaneously, the error of the highest priority is displayed first. After acknowledging that error by pressing ERROR the error of the second highest priority is displayed and so on.

CLEAN

To clean the print head and carry out a print test

Pressing CLEAN briefly

While a print job is in progress:

- The print job is interrupted. A print head clean is carried out and subsequently the print job is resumed.

If no print job is currently in progress:

- A print head clean is performed immediately.

Pressing CLEAN briefly and then releasing the button starts a print head clean (indicated by „00" being displayed) which takes about 1 sec to complete. To extend the total duration of the clean, press CLEAN again immediately when the display starts to read „00" . Hold CLEAN for as long you wish the clean to continue (max. duration = 10 sec).

Pressing CLEAN for a longer period of time (minimum 2 sec)

If no print job is currently in progress:

- Printer switches to off-line mode.
- A print head clean is performed and subsequently a test print is carried out on the print medium currently being processed. The printer then remains in off-line mode to enable the user to verify the print quality before resuming the current print job.
  If necessary, an additional clean(s) can be performed.
- To resume printing, press ONLINE to return to online mode.

If a print job is in progress:

- The print job is interrupted.
- All steps are performed as described above.
- The print job is resumed.

TRAYLOAD

Controls the movement of the elevating tray of the unload station (optional)
If your printer is not equipped with an unload station, no function is assigned to this button!

LOADED

To confirm a magazine exchange

Press LOADED briefly:

Informs the printer that an empty magazine has been refilled and put back into place. (Or, if you wish to use another color, that a magazine has been removed and replaced by another containing material of a different color).

52 Display indications

Display indications (in combination with „ Mag. Empty„ LED)

01 magazine no. 1 empty
02 magazine no. 2 empty
03 magazine no. 3 empty
04 magazine no. 4 empty (cassette printer only)
05 magazine no. 5 empty (cassette printer only)
06 magazine no. 6 empty (cassette printer only)

Display indications – Status messages

00 Clean cycle in progress.
11 Temperature in the flash power supply is too high. (If the temperature does not drop to within the allowed range within 10 minutes, ERROR 55 is displayed). Switch off the instrument and let it cool; check the ambient temperature.
12 Drying station temperature too low / too high. (If the temperature does not drop to within the allowed range within 6 minutes, ERROR 43 is displayed).
13 Maximum working life of flashlight has been reached.
19 Intensive clean in progress, waiting for user intervention.
88 Ink cartridge being changed; instrument waiting for confirmation via ERROR, CLEAN, or LOAD button.

53 Acoustic signals

The printer has a beeper that issues acoustic signals to draw your attention to important states and functions

Button pressed:	1 short beep
Magazine empty/tray stack full :	2 short beeps
Error:	5 short beeps

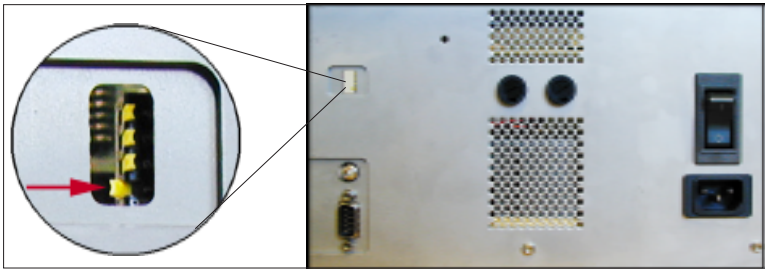


Fig. 11

The beeper can be deactivated by means of the DIL- switches at the rear of the printer.

Push the switch on the bottom in the direction, shown by the red arrow in Fig. 11, to turn off the beeper.

54 Ink consumption indicator

The ink consumption is calculated by the printer.

Ink reserve down to approx. 25%:

The LED „ Ink empty" starts flashing. The PC connected to the printer receives a message to this effect the next time it sends a print job to the printer.

You can continue printing, but it is advisable to wait no longer before ordering a new ink cartridge.

Ink reserve down to approx. 10%:

The LED „ Ink empty" remains permanently on.

You cannot continue printing. The PC connected to the printer receives a message to this effect the next time it sends a print job to the printer.

The printer uses the ink left in the cartridge to keep the print head clean, until a full cartridge is inserted.

55 Intermediate cleaning

When it is operating continuously, the printer pauses for intermediate cleaning every 30 slides or 50 cassettes.

Printing is interrupted for approximately 10 seconds, after which time the instrument automatically resumes.

56 Transporting the printer

If the printer is going to be disconnected from mains for more than 5 hours | e.g. for transport | the ink cartridge must be replaced by the cleaning fluid cartridge to prevent the ink system from getting clogged.

- Exchange the cartridge as described in chapter 4.3.
- Before switching off the printer verify that the print head is in parking position.
- Unplug the mains cable from its socket at the rear of the instrument.
- Unscrew / unplug the serial data cable.
- Remove all magazines.
- Crate instrument into demo box as per crating instructions.
- Transport

  Attention!
  Permitted temperature range: 0 – 40 °C, transport crate in upright position; do not tip, do not drop.
- Unpack instrument.
- Allow the instrument to acclimatize.
- Check the instrument for damage (if there is any considerable damage, do not switch on).
- Connect serial plug.
- Connect instrument to mains and switch on.
- Exchange cartridge (see chapter 4.3).

6.1 General

When an error message is displayed, the LED in the ERROR button is always flashing.

Error elimination:

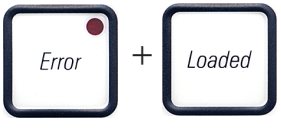
- Determine the cause of the error – see error list in (chapter 6.2).
- Eliminate error / remove obstructions – open lid if required.
- Remove all print objects which are still in the chute, in or next to the print sledge or in the drying station.

Do not reuse such objects to avoid any object being printed on twice.

Confirm elimination of error

- Close the lid and press ERROR to confirm to the printer that the source of error has been eliminated.
- The printer then verifies that all processing paths are unobstructed and that the source of error has been eliminated.
- If there are still any obstructions or if the source of error has not been thoroughly eliminated, the printer again displays an error message.
- Interrupted print jobs are resumed where previously left off.
- If an error message is displayed several times although all possible causes have been eliminated, a Reset should be carried out.

Reset:



- Press LOADED and ERROR simultaneously.
- A Reset reinstates the status the printer was in directly after switching on. All print jobs in the print queue are deleted.
- If the same error continues to be displayed even after a Reset, switch the printer off via the mains switch (rear panel) and switch it back on after a short waiting period (approx. 30 sec). If this does not eliminate the problem either, call Technical Service.

62 Error messages

Display code	Source of error	Troubleshooting solution
20	The loader is mechanically blocked.	Remove the cause of the block.
21	Faulty ejection of a cassette or slide. Loader blocked.	Remove the cassette/slide.
22	The transfer of a cassette or slide from the loader chute to the print carriage failed. Horizontal motor is incorrectly positioned or mechanically blocked.	Remove the cassette/slide.
23	Cassette/slide is stuck in the loader chute.	Remove the cassette/slide.
32	The horizontal drive is mechanically blocked.	Remove the cassette/slide.
33	The vertical drive is mechanically blocked.	Remove the cassette/slide.
34	The rotational motion is mechanically blocked.	Remove the cassette/slide.
35	Faulty clamping of a cassette or slide. A cassette or slide did not reach the clamp, but did leave the load chute.	Remove the cassette/slide from the clamp.
36	A cassette or slide did not leave the clamp or was still located in the clamp during an initialization.	Remove the cassette/slide from the clamp.
37	The ink print head is getting too hot. Ambient temperature too high or electronics defective	Switch off the instrument and let it cool. The instrument will remain disabled until the print head cools to a regular temperature. Check the ambient temperature.
38	No or incorrect voltage at ink print head.	Inform your technical service representative.

Error messages (continued)

Display code	Source of error	Troubleshooting solution
41	Flash standby state not reached within the prescribed time. Charging electronics defective.	Inform your technical service representative.
42	Flash does not occur at all or is too short. Flash bulb dirty or defective.	Check whether flash takes place ¡ to do so, observe the stray light on the cover. Never open the cover to check whether the flash takes place! No flash --> install a new flash bulb. See chapter 4.4.
43	The temperature in the drying station is not within the permissible temperature range.	Carry out a RESET. See chapter 6.1.
44	The unloader is mechanically blocked.	Remove the cause of the block.
45	The heater fan does not run or runs too slowly.	Inform your technical service representative.
46	No cassette/slide is located in the drying station for flashing. A cassette/slide left the clamp, but did not reach the drying station.	Remove the cassette/slide.
47	A cassette or slide did not leave the drying station during ejection.	Remove the cassette/slide.
48	A cassette/slide was in the drying station during an initialization or before a print job.	Remove the cause of the block.
49	The flap of the drying station does not close or open; flap is blocked (for example, by a cassette or slide).	Remove the cause of the block.
50	Lifting table end sensor does not switch.	Inform your technical service representative.
51	Lifting table position sensor does not switch during positioning.	Inform your technical service representative.
55	Flash power supply: overtemperature for more than 10 minutes.	Inform your technical service representative.

Error messages (continued)

Display code	Source of error	Troubleshooting solution
60	Faulty control data received (program bug) Settings for the serial interface incorrect or the instrument configuration conflicts with the PC configuration.	Carry out a RESET on the printer.Check the cable connection to the PC. Check the configuration of the serial interface port on the connected PC and reboot the PC.
63	Receive confirmation missing for send data or send data not confirmed by PC.	Follow the same procedure as that for ERROR 60. Try another printer cable.
64	The print image exceeds the allowed vertical size.	Program bug.
65	The print image exceeds the allowed horizontal size.	Program bug.
66	The CRC test of the EEPROM returned an error when the instrument was switched on.	Inform your technical service representative.
70 ... 78	Internal firmware error or defective controller.	Inform your technical service representative.
81 ... 86	Warning: Problem during ejection from magazine X due to mech. sluggishness. (X = second digit of the error message)	Clean the magazine discharge using a small brush.
89	Power unit does not achieve standard operating voltage.	Inform your technical service representative.
90	Firmware only partially loaded or not loaded at all. Flash memory or defective memory range in flash.	Inform your technical service representative.

All error messages are accompanied by an acoustic alarm (a continuous tone). Clearing the error (by pressing the ERROR button) stops the alarm.

6.3 Changing the flash bulb

Code 13 appears on the printer. s display when the flash bulb reaches the limit of its rated service life. When this code is issued, the bulb have to be changed. In this case follow the description in chapter 4.4.

Before replacing the flash bulb, switch off the printer and unplug the mains power supply of the instrument.

10 sec.

After changing the bulb the printer can be switched on.

Then activate the offline mode, press and hold down the ERROR button for 10 seconds.

Code 13 disappears from the display.