



Original Operating Manual
Liquid Particle Counter Syringe



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2 General Safety Instructions

2.1 Safety Instructions for Installation and Operating Staff

The operating manual contains fundamental safety instructions that need to be followed during installation, operation, and maintenance.

Failure to observe these may result in danger to persons, to the environment, and to the machine/plant:

- ⇒ Failure of important device functions.
- ⇒ Danger to persons due to electrical, mechanical, and chemical effects.

Before installation/start-up:

- Read the operating manual.
- Sufficiently train installation and operating staff.
- Make sure that the responsible staff completely understands the content of the operating manual.
- Manage areas of responsibility.
- Create a maintenance plan.

During operation:

- Keep the operating manual available at the place of operation.
- Follow the safety instructions. Only operate the device according to the performance data.
- Do not use the display with pointed, hard, or metal objects.

If you have questions:

Ask the manufacturer.

2.2 Structure of Warning Notices

Warning notices are, when possible, structured in the following way:

Signal Word	
Partially with symbol	Type and source of hazard ⇒ Possible consequences of failure to comply. • Measures to avoid the hazard.

2.3 Warning Notices Used

 DANGER!
Immediate danger! ⇒ Failure to comply may result in serious injury or death.
 WARNING!
Possibly dangerous situation! ⇒ Failure to comply may result in serious injury or death.
 CAUTION!
Possibly dangerous situation! ⇒ Failure to comply may result in moderate to minor injury.
ATTENTION!
Possibly dangerous situation! ⇒ Failure to comply may result in damage to equipment.

2.4 Symbols Used:

	Note Irritants
	recommendations
•	tasks that need to be done
⇒	describes the reaction(s) to tasks

2.5 Symbols on the Device

Symbol	Location	Meaning
	Nameplate	Caution, general danger zone! Before start-up and operation, read the operating manual!

3 General Information

3.1 Manufacturer

Markus Klotz GmbH
Theodor-Heuss-Str. 27
D-75378 Bad Liebenzell
Tel.: +49 (0) 7052/92330
Fax.: +49 (0) 7052/92338

3.2 About the Operating Manual

Date: 22.05.18
Version: 00

4 Intended Use

 DANGER!
NOT PERMITTED: - different use – without consulting the manufacturer - use in EX zones.
 CAUTION!
This particle counter may only be used in the operating conditions as specified in the contract documentation and operating manual. Any other use or use exceeding intended use is considered improper use. The manufacturer is not liable for resulting damages in such cases.

The liquid particle counter syringe is exclusively used for the determination of particles in watery solutions, e.g. infusion solutions.

- The device may only be operated within the specified performance limits (see Technical Data).
- Compliance with the operating manual and observance of the service and maintenance rules are requirements for intended use.

	The validation of the system is carried out between manufacturer and customer. The release of the system must be based on the samples to be measured.
	When using the syringe in pharmaceuticals, it is necessary to make sure that the device complies to customer requirements. The customer must backup and check the measuring data.

4.1 Requirements for the Staff

Only authorized persons may operate the device. They must be familiar with the safety devices and regulations before they start to work.

5 Misuse

Any other use or use exceeding intended use is considered improper use. The manufacturer is not liable for resulting damages in such cases.
In case of changes or improper maintenance or repair, the manufacturer assumes no liability.
Only original parts from the manufacturer are approved as replacement parts and accessories. Replacement parts and accessories that are not supplied by the manufacturer have not been tested for operation and may impair operational safety. The manufacturer assumes no liability for damage resulting from the use of non-approved replacement parts and accessories.

6 Functional Description

6.1 Main Components



Fig. 1: Main components

No.	Description
1	LED green "Power"
2	sensor LED red "not ready"
3	adjustable slide
4	suction needle sensor
5	syringe holder
6	fixing screw

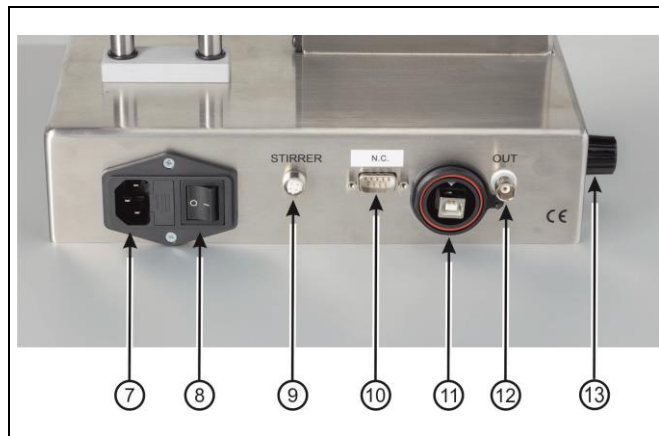


Fig. 1: Main components (continued)

No.	Description
7	power plug
8	ON/OFF switch
9	stirrer
10	N.C. (unallocated)
11	USB port
12	BNC port
13	Control knob to set speed of magnetic stirrer

6.2 Functional Principle

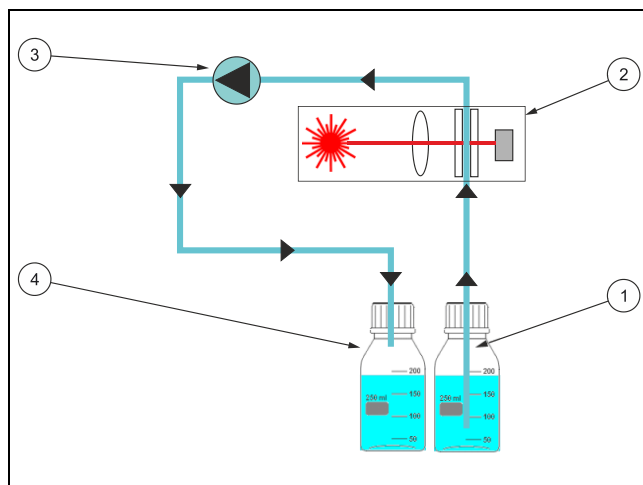


Fig. 1: Functional principle

1

The measuring medium is drawn in from the measuring container.

2

The measuring medium is conveyed through a laser measuring cell. The particles are measured there.

3

The piston conveys the measuring medium through the device.

4

The measuring medium is conveyed into the waste container.

6.3 Measurement Principle

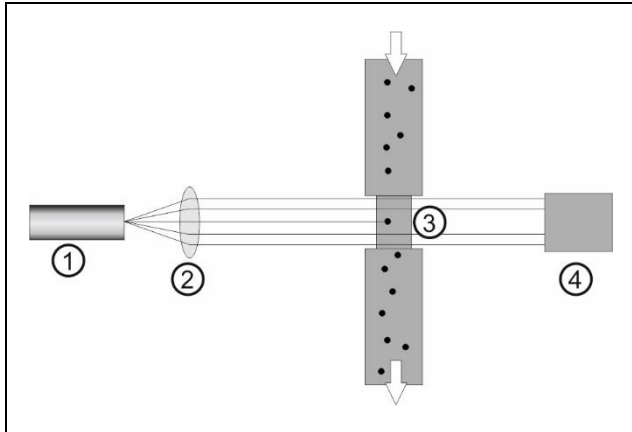


Fig. 1: Measurement principle

1

A laser beam is generated in a laser diode with collimator.

2

The laser beam is sent via a lens system through the medium in the test area.

3

If the laser beam hits a particle, the laser beam is weakened.

4

A detector captures the light intensity of the laser beam. The weakening of the light by particles is a measure for the number and size of the particles.

7 Technical Data

7.1 Nameplate



Fig. 1: Nameplate

7.2 General Data

Syringe size:	1 ml, 5 ml, 10 ml, 25 ml
Smallest measuring volume:	100 µl
Backflushing:	Software command
Computer interface:	USB-Port
Power supply:	230 V/AC; 115 V/AC
Fuse:	T1, 6A
Dimensions (LxBxH):	260 x 260 x 400 mm
Weight:	8 kg
Option magnetic stirrer adjustable:	0-200 U/min
Environmental temperature:	5 .. 25°C

7.3 Environmental Conditions

Area of application:	indoors and outdoors
Max. height:	bis 1.000 m N.N.
Environmental temperature:	15 .. 25 °C
Humidity:	max. 75 %
Degree of contamination:	2

7.4 Power Supply

Power supply:	100 – 240 V ~ / 47 – 63 Hz,
Current:	700 mA
Permitted current fluctuations:	max. +/- 10 %

8 Transportation and Storage

Transportation

- Avoid vibrations
- Avoid electromagnetic radiation

Storage

- Only in an upright position
- Only in dry and frost-free rooms



9 Setting up the Device

9.1 Unpacking the device

- Open the box carefully.
- Remove the device carefully with both hands.

10 Start-up

⚠ WARNING!

Measuring area due to contamination or samples that cannot be measured!

- ⇒ Measuring errors due to contamination of parts of the measuring cell are not recognized as error.
- ⇒ Deviating of particle size determination due to deviating particles in the infraction index and particle structure.
- ⇒ Carrier liquid must be transparent and low viscous.
- ⇒ Shifting of particle size due to deviation in the structure and infraction index of calibration particles.
- Before starting measurement, check whether the system is contaminated and the samples can be measured with the system.

- Connect the plug of the power supply unit to the socket of the device.
- Insert the mains plug into a suitable outlet.
- Push the toggle switch.
- ⇒ The green LED lights up.

10.1 Connecting via USB Interface



Control and measuring is carried out via supplied software → Manual "SW-CA control and evaluation software"

- Insert supplied CD and install software on the customer computer.
- Connect device via USB cable.
- Start software
- Start measurement → Section 11, (Page 6)
- Backup data every day.

11 Carrying out Measurement

ATTENTION!

Damage of device due to splash water.

⇒ Failure to observe the warning may result in damage to equipment.

Make sure no splash water enters the casing.



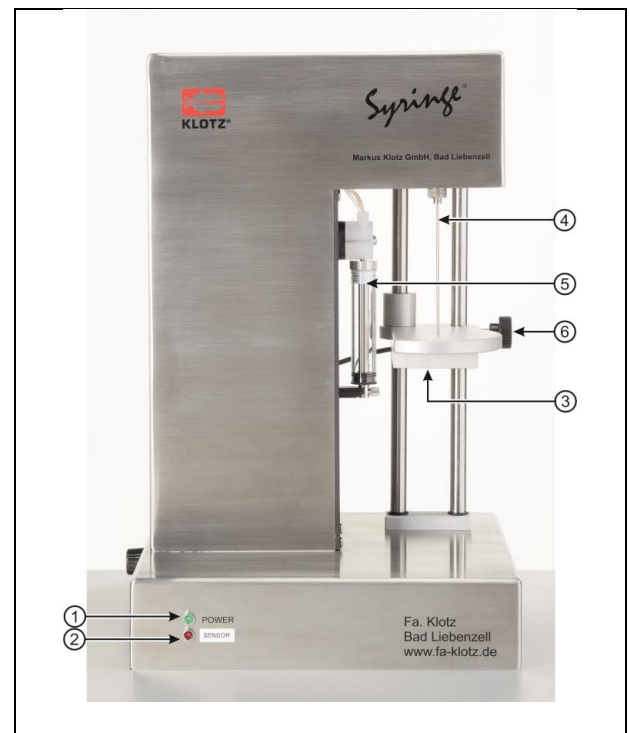
Before each measuring sequence, a rinsing cycle must be carried out to avoid measuring errors due to remaining particles.



Check syringe with test standard in regular intervals.
In case of critical samples, check syringe before and after the measurement with testing standard.



The needle must be inserted deep enough into the liquid to avoid drawing in of air.



- Loosen fixing screw (6).
- Move slide down (3).
- Place sample on slide (3).
- Move slide up (3).



In cases of suspected cell blockage, contact the company Markus Klotz GmbH.



Check the required parameters after cleaning.



In case air bubbles have been drawn, the liquid is too viscous or the sensor is clogged.

12 Operating via Software

	Operating instructions → Manual Software SW-CA XX.
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13 Magnetic Stirrer (optional)

⚠ WARNING!	
Measuring error due to too fast or slow stirring!	
⇒ Particles are minimized and mixed.	
⇒ Air bubbles are stirred in.	
• Adjust the speed so that no air bubbles are stirred in.	

	Customer must check whether the magnetic stirrer needs to be used.
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	In case of too sensitive samples, do not stir with the magnetic stirrer.
---	--

	Only use cleaned (particle-free) magnetic stirring rods.
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The magnetic stirrer is used to keep larger particles of the solution suspended. This prevents sedimentation.

13.1 Setting the Magnetic Stirrer

Set the speed of the magnetic stirrer via the knob:

- clockwise faster.
- counterclockwise slower.

14 Rinsing / Cleaning

	Backflushing of the system only by the service company.
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In rinsing mode there is a higher flow rate so that adhering particles are dissolved from the suction needle and measuring cell (sensor).
For better cleaning, air bubbles are generated in the system on purpose.

- Define suitable rinsing liquid.
 - After measuring, rinse the system with ultra-pure water.
 - After measuring, rinse with about 20 ml ultra-pure water.
 - Leave the residual water in the sensor.
- ⇒ This prevents the sensor from drying out.

15 Maintenance

⚠ WARNING!	
Unauthorized opening of the device	
⇒ Risk of injury	
⇒ Termination of warranty	
• Only the manufacturer is to service the device!	

	For proper functioning, observe calibration intervals.
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15.1 Inspection and Maintenance Plan

	The user must check the device regularly with a test standard. The user defines the time interval.
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	Faulty operation can be avoided by a daily check.
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- See also contract documentation
- A sticker with the next calibration date is attached to the device. It is carried out every 6 months by service staff of company Markus Klotz GmbH.

	As an option, calibration may be carried out by the distributor and/or user providing the applying guidelines are observed.
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Where	Interval	Unit	Task
on site	yearly	sensor	calibrate
on site	yearly	pump	check
manufacturer	every 3 years	pump and sensor	service at factory

16 Malfunctions

In case of malfunction, call customer service or send in the device.

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17 Disposing the Device

	The device contains electronic components.
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- Please ensure proper disposal of the device as electronic waste.

18 Error Table

Error	Possible Cause	Remedy
Device does not operate	No power supply	Check power plug, power switch
		Check power-LED
		Check fuse insert
	RS-232 cable / USB-cable not plugged in	Check connection cable
	Incorrect COM / USB port selected at PC	Restart software (login)
Magnetic stirrer without function	Control cable not plugged in	Check whether magnetic stirring rod is in the measuring container
No sensor signal	USB-cable not plugged in	Check cable connection Check USB connection
	Sensor clogged or contaminated	Rinse with ultra-pure water or contact service
Air bubbles in the system	Leaking pipe to sensor	Contact service
	Leaking syringe	Contact service
	Measuring medium too viscous	Dilute sample with suitable dilution liquid Set lower flow rate
	Flow rate too high	Reduce flow rate
	Suction needle not dipped deep enough into the liquid	

* The backup battery powers only the clock. The data loss refers only to the time. Measurement data are located on the flash memory and are independent of the backup battery.

19 Sensors

Sensor typ	Cell size	Measuring range	Max. concentration[P/ml] for 2 µm	Typ. flow [ml/min]	
LDS30/30-1.5-50	0.3*0.3	1.5-50	70 000	10	Standard
LDS30/30-2-100	0.3*0.3	2-100	70 000	10	Extended measuring range

Standardmaterial: Quartz glass,NBR seal,V4A:4404,Teflon
Option: Isolast seal, Sapphire glass

20 Accessories

No.	Designation	Order number
1	Magnetic stirrer	MR-Syr.
	For customized versions, please order a separate spare part drawing with a spare parts list.	

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