

CAT

Ingenieurbüro CAT
M. Zipperer GmbH

Instruction Manual

Microdosing Pump DP 200



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1. User Instructions

1.1. Important Instructions for your safety



The DP 200 pump has been constructed according to state-of-the-art technology and recognized safety instructions. However, risks may still arise during installation, operation and maintenance.

To maintain the proper safety and operational functions of the instrument, the user has to follow the instructions and safety guidelines in this manual.







- Every user must read and understand this manual completely before use. Only instructed users may operate the instrument. Failure to do so can result in serious injury or death.
- Follow general instructions for hazard prevention and general safety instructions, e.g. wear protection clothing, eye protection and gloves.
- Every user must read and understand this manual completely before use. Failure to do so can result in serious injury or death.
- Comply with all safety and accident-prevention regulations applicable to laboratory work.
- Follow general instructions for hazard prevention and general safety instructions, e.g. wear protection clothing, eye protection and gloves.
- This operating manual is part of the product. Thus, it must always be easily accessible.
- This instruction sheet does not purport to address all of the safety problems which might result from the use of this device, chemicals, reagents, apparatus or equipment employed in any specific test or protocols. It is the responsibility of the user to consult their authorized safety advisors and establish appropriate health and safety practices and then determine the application of regulatory limitations prior to use.
- Enclose this operating manual when transferring the device to another place.
- If this manual is lost, please request another one. Please contact your dealer or

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1.2. Danger symbols and levels in this operating manual

The safety instructions in this manual appear with the following danger symbols and danger levels:



Danger symbols:







	Hazard point		Electrical shock
	Risk of fire		Explosion
	Bio hazard		Chemical hazard

Danger levels:


 DANGER	Will lead to severe injuries or death
 WARNING	May lead to severe injuries or death
 CAUTION	May lead to light to moderate injuries
NOTICE	May lead to material damage

2. General safety warnings and instructions

	<p>⚠ DANGER Risk of explosion</p> <ul style="list-style-type: none"> Do not operate the device in the vicinity of highly flammable or explosive substances. The instrument is not explosion-proof. Do not use this device for processing any substances which could generate an explosive atmosphere. Do not use this device to process any explosive or highly reactive substances.
	<p>⚠ DANGER Electric shock as a result of penetration of liquid.</p> <ul style="list-style-type: none"> Do not allow any liquids to penetrate the inside of the power supply Switch off the device and disconnect the power plug before starting cleaning or disinfection work. The On/Off Switch on the device does not disconnect the device from the power source. Only plug the device back in if it is completely dry, both inside and outside.

	<p>▲WARNING Electric shock due to damage to device or mains cable</p> <ul style="list-style-type: none"> ● Only connect the power supply to the mains supply if the device and the mains cable are undamaged ● Only use devices that have been properly installed or repaired. ● In case of danger, disconnect the device from the mains supply by pulling the power plug from the mains socket or by using the isolating device intended for this purpose (e.g. emergency stop switch)
	<p>▲WARNING Damages to health due to infectious liquids and pathogenic germs.</p> <ul style="list-style-type: none"> ● When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the material safety data sheets and the manufacturer`s application notes. ● Wear personal protective equipment ● For comprehensive regulations about handling germs or biological material of the risk group II or higher, please refer to the “Laboratory Biosafety Manual” in its respectively current valid version from the World Health Organisation
	<p>▲WARNING Damages to health due to corrosive and noxious substances</p> <ul style="list-style-type: none"> ● Always check the pump for leaks and air bubbles. Special attention should be directed to determine that all push-ons, threaded connections and suction tubes are firmly in place before beginning operation. ● Leaking solutions may endanger persons and materials ● Observe the nationally prescribed safety environment when working with hazardous, toxic and pathogenic samples. Pay particular attention to personal protective equipment (gloves, clothing, goggles, etc.), extraction, and the safety class of the lab. ● Decontaminate the device and the accessories before storage and shipping. ● Only employ the instrument for the purpose intended by the manufacturer, and particularly within the resistance limits of the instrument. If in doubt, contact your supplier, or the manufacturer's factory representative at the phone number shown at the front page of this operating instruction.
	<p>▲WARNING Risk of fire</p> <ul style="list-style-type: none"> ● Do not use this device to process any highly flammable liquids
	<p>▲CAUTION Poor safety due to inadequate fixing of the unit</p> <ul style="list-style-type: none"> ● Ensure that the unit is firmly attached to a solid stand.
	<p>▲CAUTION Poor safety due to incorrect accessories and spare parts.</p> <p>The use of accessories and spare parts other than recommended by Ingenieurbüro CAT, M. Zipperer GmbH may impair the safety, function and precision of the device. Ingenieurbüro CAT, M. Zipperer GmbH cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment.</p> <ul style="list-style-type: none"> ● Only use accessories and spare parts recommended by Ingenieurbüro CAT, M. Zipperer GmbH

2.1. Warning signs on the device

	<p>⚠WARNING This symbol indicates to read the instruction manual carefully prior to operation of the instrument. Please mark points which require special attention in your field of application so they are not overlooked. Disregarding of warnings may result in impairment of serviceability as well as impairment of the user.</p>
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2.2. Scope of Delivery

Inspect the content of the package for damage or missing parts:
 Included with the purchase of this instrument are the following items:

- 1 DP 200 pump PN: 6176x-0000(x depends on type of pumphead)
- 1 Instruction manual
- 1 Service manual
- 1 Power supply 24 VDC

A selection of additional discharge tubes and accessories may be found in the pricelist.

3. Intended Use

	<p>⚠DANGER Do not use flammable or explosive substances near the instrument.</p>
	<p>⚠WARNING It is the responsibility of the user to consult and establish appropriate safety and health practices, and then determine the applicability of regulatory limitations prior to use. Should there be any additional questions, after reading these instructions, concerning the set-up, operation or warranty, please contact either your distributor, or the manufacturer.</p>
	<p>⚠WARNING Use the instrument only in compliance of the intended use and in way that neither user nor any other persons are endangered. Please comply with all safety and accident-prevention regulations applicable to laboratory work.</p>

This instrument is designed for pumping liquids up to a concentration of max. 2 Mol/l, observing the following physical limits:




- 15 to 40 °C of instrument and reagent
- When the instrument is correctly used, the dispensed liquid comes into contact with only the following chemically resistant materials:
 - Al₂O₃,
 - PVDF

3.1. Operating Exclusions

Any use which deviates from the device's intended use is considered to be improper. Ingenieurbüro CAT, M. Zipperer GmbH does not accept liability for any damages resulting from not permitted use. The risk is carried by the operator alone.

Never use this instrument for:

- liquids attacking Al₂O₃, PVDF
- suspensions (e.g., of charcoal) as solid particles may clog or damage the instrument
- strongly crystallizing solutions, concentrated acids and bases as well as non-polar solvents which effect swelling of PVDF
- **carbon disulphide, as this media inflames easily**
- The pumpheads must not be autoclaved!

	▲ DANGER Do not use flammable or explosive substances near the instrument.
	▲ WARNING Compatibility of the instrument for the application must be checked by the user or contact the manufacturer
	▲ WARNING It is the responsibility of the user to consult and establish appropriate safety and health practices, and then determine the applicability of regulatory limitations prior to use. Should there be any additional questions, after reading these instructions, concerning the set-up, operation or warranty, please contact either your distributor, or the manufacturer.

4. Unpacking

Unpack the instrument carefully and check to see that it is not damaged. It is important that any damage incurred in transport be recognized at the time of unpacking. Notify your carrier or forwarding agent immediately in case of such damage.

▲ WARNING

- Read this instruction manual carefully before operating the instrument. Should there be any additional questions, after reading these instructions, concerning the set-up, operation or warranty, please contact either your distributor, or the manufacturer.
- After reading and understanding the instruction manual you may now start operating the unit.
- Store the instruction manual in a place easily accessible to every user.
- When operating the instruments in countries with different AC plug systems, use an approved power supply cord suitable for the country of operation.

5. Description of the pump

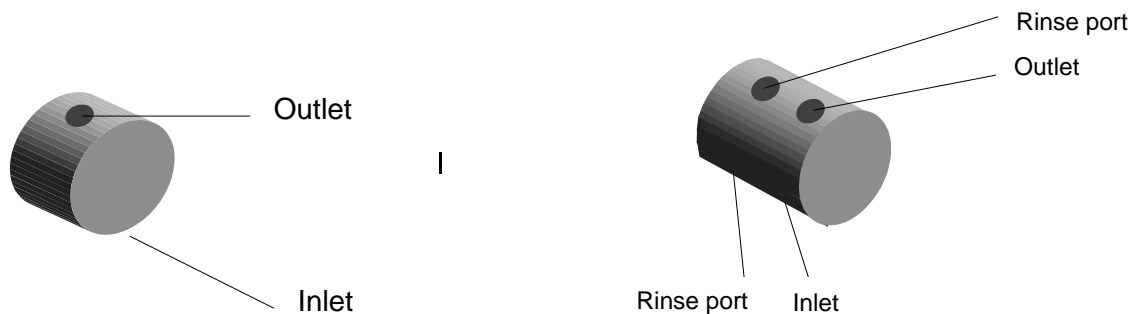
The piston and the cylinder of the microdosing pump consists of 99.7% AL_2O_3 . All other material, which comes into contact to the media, is PVDF.

These materials guarantee a high resistance against aggressive media in the laboratory. The pump unit is driven by a robust stepper motor and is monitored optoelectronically.

Do not attempt electronic or other complex repairs. There are no parts inside the pump or the pumphead that should be serviced by the user. Repairs by the user result in incorrect measurements may also result in loss of warranty.

different available pumpheads:

<i>type of pumphead</i>	<i>threads of the inlet and the outlet of the pump</i>	<i>threads of the rinse ports</i>
20V und 20T	UNF-1/4"-28	-
20VCS und 20TCS	UNF-1/4"-28	UNF-1/4"-28
200V und 200T	UNF-1/4"-28	-
200VCS und 200TCS	UNF-1/4"-28	UNF-1/4"-28
300VCS und 300TCS	M8	UNF-1/4"-28



Pumphead Type V

Pumphead Type VCS

5.1. Using a pump with rinse ports

You should use a pump with rinse ports especially when you are operating aggressive media or a medium which tends to crystallize or to glue. This rinse port protects the pump against destruction by the used media. H_2O dist. or other corresponding cleaning solutions can be used for these rinse ports. Operating with less aggressive media, just connect both rinse ports with a water filled tube.

If you are operating with aggressive media, be sure that the pump is always cleaned with fresh cleaning solution. To achieve this, put the storage container of the cleaning solution higher than the pumphead, to let the cleaning solution flow through the pumphead by gravity.


NOTICE The pumphead must be flushed after operation to avoid sticking effects between piston and cylinder. Cleaning is carried out best when operating the pump with water for about 1 minute at max. speed. Do not forget to also flush the rinse port side of the pump!

5.2. Set-up

Ensure that the instrument is standing on a solid surface.

Please observe the specified ambient conditions (temperature and humidity) and mains voltage listed under „Technical Data“ as well as the safety instructions.

5.2.1. Discharge tube assembly

	▲WARNING Always check the pump for leaks and air bubbles. Special attention should be directed to determine that all push-ons, threaded connections and suction tubes are firmly in place before beginning operation. Leaking solutions may endanger persons and materials
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Install the discharge tube at the upper side of the pumphead.

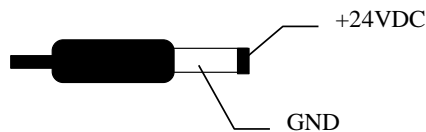
5.2.2. Install suction tube

	NOTICE Always use tube diameters as large as possible for the suction tube, to achieve a good flow of the liquid and accuracy.
	NOTICE Loose connections such as incomplete push-ons, loose threaded fittings or a poorly fitting suction tube lead to ventilation in the system. Inaccurate measurements will result!

Install the suction tube at the lower end of the pumphead.

5.2.3. Connection the power supply


To connect the pump with the delivered power supply, use the power supply's plug and the socket on the rear side of the pump unit.



Pinout of the power supply's plug

Notice



To connect the pump unit to the mains, first connect the power supply to the pump unit, and then connect the power supply to the mains.

	▲WARNING Make sure that the voltage printed on the power-supply corresponds to the voltage on your mains.
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5.2.4. Switching ON and OFF

To switch the pump on press the ON/OFF button. After initialisation the pump is ready to pump.

Pressing the ON/OFF button again switches the pump off.

	<p>▲WARNING Pumpheads and tubing may contain reagents, which endanger persons and material. Make sure that no chemicals remain in the tubing and pumphead at the end of the pumping job.</p>
	<p>▲WARNING Switching off does not disconnect the instrument from the power. To disconnect it completely please pull the plug.</p>

6. Operating of the Pump

	<p>▲ DANGER Use great caution when working in the vicinity of highly flammable or explosive substances. The instrument is not explosion-proof.</p>
	<p>▲WARNING Do not open the instrument. Repairs are only to be carried out by trained service technicians.</p>
	<p>▲WARNING Extreme caution should be exercised when handling toxic, corrosive, fuming, volatile or any other potentially dangerous substances.</p>
	<p>▲WARNING Please comply with all safety and accident-prevention regulations applicable to laboratory work.</p>
	<p>▲WARNING Only instructed users may operate the instrument.</p>
	<p>▲WARNING Observe all markings on the reagent bottles. Dangerous and fuming chemicals must be dispensed in a fume hood. Only employ the instrument for the purpose intended by the manufacturer, and particularly within the resistance limits of the instrument. If in doubt, contact your supplier, or the manufacturer's factory representative at the phone number shown at the front page of this operating instruction.</p>
	<p>▲WARNING Always use the instrument in such a manner that neither the operator, nor any other person is endangered. When dispensing, maintain a physical distance between the instrument and the body. Avoid splashes; use proper connecting vessels, protective clothing and gloves.</p>
	<p>▲WARNING Always check the pump for leaks and air bubbles. Special attention should be directed to determine that all push-ons, threaded connections and suction tubes are firmly in place before beginning operation. Leaking solutions may endanger persons and materials</p>
	<p>NOTICE Before connecting the power cord to the mains make sure that Voltage and frequency of the instrument's rating plate correspond to the local voltage and frequency.</p>
	<p>NOTICE In case of trouble (e.g., piston difficult to move or leakage), immediately stop pumping. Clean the instrument according to the cleaning instructions before any further use of the instrument or contact the manufacturer.</p>

6.1. User interface



Description of the buttons:

ON/OFF: Pressing the button switches the pump on and off.

START: In the Manual-mode the pump runs as long as the button is pressed. In the Auto-mode you start the set dosing cycle.

STOP: Pressing this button stops the pump.

+/-: With these two buttons you change the menu. When selected a changeable parameter you may change the value. When held pressed the value is changed quickly up or down.

SetValue: To enter a menu item and confirm the new parameter after changing.

BACK: To leave a menu item or to reject a set value of a parameter

6.2. Description of the Display

```
cal. Volume: 999,99ml
Dose:99,99ml Flow:99,99ml/min
Manual Auto Setup reverse
```

The picture shows the display in the Auto-mode: „Auto“ is marked in the menu bar bottom left. The dosed volume is displayed top right. The set volume is displayed beside „Dose“. The set flowrate is displayed beside „Flow“. Top left you see the calibration status, bottom right the flow direction.

An overview of all items and values shows the following table.

Item	Range:	Display:	Changeable from:	Stored when pump switched off:	Description:
Volume	0.00ml ... 9999.99ml	Always	Reset Manual and Automodus and RS485	No	Shows the dosed volume
Dose	See Technical Data (0ml = Continuously dosing. Display shows „Cont.“)	AutoModus	AutoModus and RS485	Yes	Shows the set volume
Flow	See Technical Data	ManualModus, AutoModus	ManualModus, AutoModus and RS485	Yes	Shows the set flowrate
Direction	Dispense Aspirate	Always	ManualModus, AutoModus and RS485	Yes	Shows the pump direction
Calibration	noCal. userCal	When needed	SetupMenü	Yes	Shows the calibration status. When the pump is not calibrated or calibrated by the user, you see a warning message.
Address	1 ... 255	SetupMenü	SetupMenü and RS485	Yes	Shows the address No. of the pump. Default setting: 1
Baudrate	1200 / 2400 / 4800 / 9600 baud	SetupMenü	SetupMenü and RS485	Yes	Shows the baudrate of the unit. Default setting: 9600 bd
Protokoll	RS485 / RS232	SetupMenü	SetupMenü und RS485	Yes	Shows the actual protocol setting.
FastAspirate	On / off	SetupMenü	SetupMenü und RS485	Yes	Shows the setting of the fast aspirate function

6.3. Manually pumping

- After switching on the pump is in the Manual-mode, „Manual“ is accentuated.
- The display shows all relevant parameters: dosed volume, flowrate, pump direction.
- With “Set value” and the + and – buttons the flowrate is changed.
- The dosed volume is set to zero with the “Back” button when the pump is not running.
- Pressing „Set value“ again takes the value and the flow direction is displayed. It might be changed with + or - .
- The pump cycle is then started with the “Start” button.
- The „Back“ button cancels the input and the pump goes back to the main menu.

The dosed volume is displayed top right. The pump runs as long the “Start” button is holded. The pump stops when the start button is released. The flowrate can be varied with the + and – buttons while the Pump runs (“Start” button is holded)

6.4. Volumetric and continual dosing

- After switching on the pump is in the Manual-mode, „Manual“ is accentuated. To change into the Auto-mode press the + button.
- The display shows all relevant parameters: dosed volume, flowrate, pump direction. Are the settings correct, you can start the dosing with the “Start” button.
- With “Set value” and the + and – buttons you change the set volume. For continuously dosing set the value to zero, “Cont.” is then displayed.
- Pressing “Set value” again takes the value and the display changes to flowrate. To change use the + and – buttons. Is the flow direction correct, the dosing is started with the “Start” button. To change the flow direction press “Set value”. The flowrate is accepted and the display changes to “Direction”. Change with + and – buttons. Start dosing with “Start”.
- The dispensed volume is displayed top right. The pump runs till the set volume is dosed or the “Stop” button is pressed. When the Stop button is pressed once, the dosing cycle is interrupted and can be proceeded with “Start”. Another “Stop” aborts the dosing cycle finally.
- The dosed volume is set to zero with the “Back” button when the pump is not running.
- The flowrate can be varied with the + and – buttons while the pump runs Press simultaneously “Start” and + or -

6.5. Changing of Address, Baudrate, Protocol and FastAspirate

- Enter the Setup-Menu with „Set value“.
- „Select“ is blinking
- Select with + und – the desired parameter
- Change the parameter with „SetValue“ and + und - buttons.
- Save the setting with „SetValue“ and return to the main menu.
- The „Back“ button cancels the input and the old value remains.

7. The interface of the pump

7.1. RS232 / RS485 Protocol

The pump DP 200 has a RS485 interface. To connect the pump to a PC use level converter to transfer the RS 232 level from the PC to RS 485 level of the pump (and vice versa). Connect the converter to the right rear socket. You have the option to switch the software from RS 232 mode to RS 485 mode. In the RS 232 mode, the pump sends a handshake and the address “0” for all connected pumps is available. In the RS 485 mode, the pumps do not send a handshake; the address “0” cannot be used.

The standard address of the pump is 1; the default baudrate is 9600 baud.

7.2. Commands

CMD. CODE	Explanation	Parameter list	Range	Example
RTY	Read Type and Version of device	1. Dummy parameter to initiate transfer -> Device sends in handshake: 1. name/type of device 2. Version number of software	1 text number	1,RTY,1
PON	Switch on Device	1. Security parameter 1234	1234	1,PON,1234
OFF	Switch off Device	1. Security parameter 1234	1234	1,OFF,1234
WON	Start / Stop Program	1. Start/Stop Program Start: 1 Stop: 0	0,1	1,WON,1
RON	Read Status of Pump	1. Dummy parameter to initiate transfer -> Device sends in handshake: 1. Device Status	0=Idle 1=Manual or ContRun 2=StepDose 3=Stoping 4=Calibration Modus 5=Pause Dose	1,RON,1
RDS	Read dispensed volume	1. Dummy parameter to initiate transfer -> Device sends in handshake: 1. Dispensed Volume in µl	1 -9999990...9999990	1,RDS,1
WRS	Display Reset	1. Dummy parameter to initiate transfer	1	1,WRS,1
WFR	Set Flowrate & Direction	1. Flowrate in µl/min 2. Direction	DP 20: 20...2000 DP 200: 200...20000 DP 300: 400...40000 1=normal, 0=reverse	1,WFR,1000,0
RFR	Read Flowrate & Direction	1. Dummy parameter to initiate transfer -> Device sends in handshake: 1. Flowrate in µl/min 2. Direction	1 200...20000 1=normal, 0=reverse	1,RFR,1
WVO	Set DoseVolume	1. Dose in µl Continuous dosing: 0µl	DP 20: 0, 1...50000 DP 200: 0, 10...500000 DP 300: 0, 20...750000	1,WVO,1000
RVO	Read DoseVolume	1. Dummy parameter to initiate transfer -> Device sends in handshake: 1. Dosevolume in µl	1 0, 10...500000	1,RDV,1
WFA	Write FastAspirate	1. FastAspirate ON/OFF (0-> Off, 1-> On)	0/1	1,WFA,1
WSA	Set RS485 slave-address, + renumber slaves	1. New slave-address of device	1...255	1,WSA,3
WGA	Set Global Adress	1. New global slave address of device (address 0 = global address off)	0, 1...255	1,WGA,20
WCP	Set Communication Protokoll	1. Number of Communication Protokoll	0=RS485, 1=RS232	1,WCP,1
WBD	Set RS485 Baudrate	1. New baudrate of device	0...3 (0 = 1200 baud, 1 = 2400 baud 2 = 4800 baud 3 = 9600 baud)	1,WBD,3

8. Checking the volume

In line with ISO 9000 "Monitoring of Testing Apparatus" and GLP or when using a medium with different density and viscosity other than distilled water there is a possibility to calibrate the pumps. For a description of the adjustment of the unit please see the Service instructions.

8.1. Procedure of checking

1. Fill the pump with distilled water, using the buttons "manual" and "+", dispense the water into a separate vessel until there are any bubbles are in the dispensing tube left.
2. Dispense 5 ml into a vessel.
3. Weigh the dispensed quantity with a precision balance.
4. Calculate the volume, taking the temperature into account.
5. Repeat step 2-5 at least 10 times.
6. Calculate the accuracy A% and coefficient of variation CV% by means of the formulas of the statistical computation.

Calculations:

Mean value $\bar{m} = \frac{\sum m_i}{n}$ m_i : results of weighing, n : number of weighing

Mean $\bar{V} - Z$ Z : Correction factor

Accuracy $A \% = \frac{\bar{V} - V_0}{V_0}$ V_0 : Nominal volume

Coefficient of variation $CV \% = \frac{100 s}{\bar{V}}$ s : Standard deviation of the results of weighing m_i

A detailed description of this test procedure you find e.g. in DIN EN ISO 8655-6.

Table 1: Correction factors Z (µl/mg at 1013 hPa, abstract of EN ISO 8655-6)

Temperature °C	Correction factor Z		Temperature °C	Correction factor Z
15,0	1,00090		23,0	1,00247
15,5	1,00098		23,5	1,00259
16,0	1,00106		24,0	1,00272
16,5	1,00114		24,5	1,00284
17,0	1,00123		25,0	1,00297
17,5	1,00132		25,5	1,00310
18,0	1,00141		26,0	1,00323
18,5	1,00150		26,5	1,00336
19,0	1,00160		27,0	1,00350
19,5	1,00170		27,5	1,00364
20,0	1,00180		28,0	1,00378
20,5	1,00190		28,5	1,00393
21,0	1,00201		29,0	1,00408
21,5	1,00212		29,5	1,00422
22,0	1,00223		30,0	1,00437
22,5	1,00236			

Important:

The DP 200 is a measuring instrument and designed to provide high accuracy. To maintain this accuracy we recommend that this instrument be tested at regular intervals, especially after any mishandling (such as hitting or dropping) of the instrument. Testing of the instrument is provided by the manufacturer for a small fee. Under §4 of the Weights and Measuring Standards of 12.08.88 Germany, it is required that regular testing and inspections be performed when the DP 200 is used as a medical instrument.

9. Cleaning and Maintenance


Surface and operating elements may be cleaned with a mild dishwashing detergent (water and a standard dishwashing detergent) and a soft, non-fuzzing moist cloth. Do not use a wet cloth. Use only a small amount of dishwashing detergent. Do not use chlorine bleach or other chlorine-based cleaning products with metallic components under any circumstances. These will damage the surface of the instrument. If you use any other cleaning method please make sure that the intended method does not cause any damage to the instrument.

The pumpheads must be cleaned as follows to assure proper functioning and continued accuracy.

- **immediately**, if the motor becomes sticky or jammed.
- **daily, after use of these liquids**
 - Solutions prone to crystallisation
 - Alkaline solutions, aromatics, chlorinated hydrocarbons scintillation liquids
 - inorganic solutions such as buret reagents
- **periodically**, to increase the lifetime of the instrument
- **always** after long term storage

Attention: the ceramic parts are subject to binding or freezing if stored after improper cleaning.

9.1. Cleaning the pumphead


	▲WARNING Be careful to avoid any personal injury from used chemicals. While and even after dispensing liquids, the instrument, the filling and the discharge tubes contain the used reagent. Make sure, that during cleaning and maintenance you avoid splashing chemicals. Wear face screens, protective gloves and protective clothes.
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- 1 Hold the discharge tube over any designated dispensing receptacle and dispense the remaining reagent (Select "*Manual*", set a flowrate and press "*Start*").
- 2 Put the suction tube into cleaning solution designated for that purpose
- 3 Clean the instrument by pumping. We recommend pumping a minimum volume of 50 times the amount of the strokevolume through the pump for a good cleaning.
- 4 Insert the suction tube into distilled water (or other liquids for sterilisation) for rinsing.

type	strokevolume	min. cleaning volume
20	20 µl	1 ml
200	200 µl	10 ml
300	350 µl	20 ml

10. Dismantling and Disposal

10.1. Dismantling

	▲WARNING Pumpheads and tubing may contain reagents, which endanger persons and material. Make sure of cleaning pumphead and tubing according Chapter 7 before removing tubing.
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1. Switch the instrument off.
2. Disconnect the instrument from the mains.
3. Disconnect the tubing
4. Now the instrument may be removed from the working area.


10.2. Disposal



Please dispose used instruments and defective components at your local recycling collection point. Prior to disposal, sort according to materials: metal, glass, plastic, etc. Also be sure to dispose of the packing material in an environmental-friendly manner.

11. Transport and Storage

11.1. Transport/Storage

	▲WARNING Pumpheads and tubing may contain reagents, which endanger persons and material. Make sure of cleaning pumphead and tubing according Chapter 7 before removing tubing.
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Prior to transport:

Switch the instrument off and unplug the power supply.

Remove tubing and cables

Do not subject the instrument to mechanical shocks or vibration during transporting.

Place the instrument and its parts in its original packaging or another suitable container to protect it during transport. Close the packaging with adhesive tape.

In case you do not use the original packaging please mark the box with the following notes:


- Glass symbol (handle with care, fragile)
- Umbrella (keep dry)
- Content (list of content)

Store the instrument in a dry environment. Please observe the specified conditions of the ambient:

Ambient temperature: 5-40°C

Max. relative air humidity:80%

11.2. Return for repair or calibration

	<p>▲WARNING For a maximum of protection from health hazards caused by contaminated instruments clean and decontaminate the instrument carefully before returning.</p>
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We intend to give our staff a maximum of protection from health hazards caused by contaminated instruments. We therefore ask for your understanding that we cannot carry out any calibration / repair unless the

Declaration on the Absence of Health Hazards

is submitted completed and signed.

Please copy the declaration in the appendix and attach it completed and signed to the instrument when returned to your distributor or to the manufacturer.

Please provide us with the following supplementary information:

- Detected defect
- Media, which the instrument has been used with

12. Warranty and Liability



The manufacturer agrees to correct for the original user of this product, either by repair, or at the manufacturer's discretion, by replacement, any defects in material or workmanship which develop within 24 months after delivery of this product to the original user. In the event of replacement, the replacement unit will be warranted for the remainder of the original twelve (24) months period of ninety (90) days, whichever is longer.

If this product should require service, contact your distributor or manufacturer for necessary instructions.


This warranty shall not apply if the defect or malfunction was caused by accident, neglect, unreasonable use, improper service, or other causes not arising out of defects in material or workmanship.

There are no warranties, expressed or implied, including, but not limited to, those of merchantability or fitness for a particular purpose, which extended beyond the description and period set forth herein.

The manufacturer's sole obligation under this warranty is limited to the repair or replacement of a defective product and the manufacturer shall not, in any event, be liable for any incidental or consequential damages of any kind resulting from improper use or misuse or possession of the product.

	▲WARNING In case of malfunction do not try to carry out any repair works. The instrument does not consist of any part which may be serviced or maintained by the user. Any attempt by the user to repair the unit will cancel the warranty.
	▲WARNING Do not open the instrument. Knowledgeable and trained personnel should only do any work on the electronics of the unit.

13. Technical Data

	▲WARNING The user has to determine, if the instrument is suitable for his specific application. If there are any further questions, contact your local dealer or the manufacturer.
---	---

Min volume	Type 20 : 1µl Type 200: 10µl Type 300: 20µl
Max volume	Typ 20: 50 ml Typ 200 : 500 ml Typ 300 : 750 ml
Min flow-rate	Typ 20: 0,02 ml/min Typ 200: 0,2 ml/min Typ 300: 0,3 ml/min
Max flow-rate	Typ 20: 4 ml/min Typ 200: 40 ml/min Typ 300 : 60 ml/min
Precision	EV <= 1 %
Accuracy	CV <= 0.5 %
Counter pressure	up to 6 bar, depends on viscosity, max flow rate and pumphead type
Interface	RS 485 Data transfer rate: 1200, 2400, 4800, 9600 bd (Default:9600) Databits: 8 Bit Parity: no parity Stopbits: 1 Stopbit
Electrical power requirements	24V 1000 mA
Dimensions (W x H x D)	72 mm x 165 mm x 160 mm
Ambient temperature	5 - 40 °C
Max. air humidity	80 % relative humidity
Protection class (DIN 40050)	IP40
Protection class (DIN EN 61140)	Protection class I
Weight	1,6 kg

13.1. Chemical resistance:

The materials, which come into contact with the delivered medium, are either

Aluminium oxide (99,7% Al₂O₃) or

PVDF

These materials guarantee a high resistance against almost all aggressive media.

14. Declaration on the Absence of Health Hazards

Please copy this declaration and attach it completed and signed to the instrument

Device designation:.....

Serial No.:

The Undersigned hereby declares:

- ◆ That the instruments have been carefully cleaned and decontaminated before shipment.
- ◆ That the instruments pose no danger through bacteriological, chemical, radiological or viral contamination.
- ◆ To be authorised to make declarations on behalf of the Institution represented.
- ◆ That he / she is aware that shipment of contaminated instruments is a violation of law, and that he / she personally and the Institution represented may be held liable for any damages caused by contaminated instruments.
- ◆ For calibrating service only: minor repairs of a value up to € 30,--+ VAT will be carried out and invoiced without further queries (cross out if not applicable).

Sender:

Firm / Laboratory:

.....

.....
Position

Address:

.....

.....
Date, Signature

Tel. for enquiry:

.....

Name

- ◆ In case of Return for Repair, please provide us with the following supplementary information:

Detected defect:

.....

Media which the instrument has been used with:

.....



Ingenieurbüro CAT
M. Zipperer GmbH

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EG - Konformitätserklärung nach Niederspannungsrichtlinie 2014/35/EU
EG - Declaration of conformity in accordance with the EEC low voltage directive 2014/35/EU
appendix III
Déclaration de conformité EG selon Directive Européenne 2014/35/EU relative aux basse-
tension appendice III

Wir erklären in alleiniger Verantwortung, dass dieses Produkt (siehe Tabelle) den Bestimmungen der Richtlinien entspricht und mit den folgenden Normen oder normativen Dokumenten übereinstimmt:

We declare under our sole responsibility that this product (see table) corresponds to the regulations and conforms with the standards or standardized documents:

Nous déclarons sous notre propre responsabilité que ce produit est en conformité avec les normes ou documents normalisés suivant:

Folgende weitere EU-Richtlinien wurden angewandt :

The agreement with further valid guidelines/regulations following for the product is explained:

Les autres directives européennes suivantes ont été appliquées:

EMV – Richtlinie 2014/30/EG

Folgende harmonisierte Normen wurden angewandt :

Applied one harmonized standards in particular:

Les norms harmonisées suivantes ont été appliquées:

DIN EN 61326-1 :2013-07

DIN EN ISO 12100 :2011-03

DIN EN 61010-1:2011-07

Bei einer nicht mit uns abgestimmten Änderung des Gerätes verliert diese Erklärung ihre Gültigkeit und die Gewährleistung erlischt.

In the case of a modification of the unit which has not been agreed on with us, this declaration becomes null and void and the warranty expires.

Dans le cas d'une modification de l'appareil qui n'a pas été convenue avec nous, cette déclaration perd sa validité et la garantie expire.

Ingenieurbüro CAT
M. Zipperer GmbH

Alexander Schecklein
CE-Bevollmächtigter

79282 Ballrechten-Dottingen, den 10.03.2017

Type
Mikrodosierpumpen Typ DP 200