



CAT

Ingenieurbüro
M. Zipperer GmbH



Once our experience becomes your success

Liquid Handling

Ingenieurbüro **CAT**

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Fraction Collector *Third Arm*™

Features:

- Detachable XY-Arm
- Freely programmable
- Vertically adjustable arm: Dynamic adaptation to the height of the rack
- Fractionation according to time, volume or external signals
- Small dimensions
- 4 preset rack types
- User defined racks very easily programmable
- External In- and Outputs
- Collection in lines or meander like
- Integrated diverter valve (optional)
- RS232 Interface
- For normal or low pressure chromatography, HPLC, FPLC, leaching test
- For sampling of chemical reactions, dissolution tests, fermentations etc.

Ingenieurbüro CAT: For over 36 years your partner for innovation: Along with standard laboratory equipment we also manufacture high-quality liquid-handling products:

- ThirdArm
- HPLH laboratory pumps
- HPLH laboratory pumps "pulse free"
- Multi-channel pumps
- LiquidProcessor
- Contiburettes

Our quality management systems which comply to DIN EN 9001 and DIN EN 13485 ensure high quality products. Customer focus and service are our continuing strengths. In case of special applications, please contact us and our team will see what it can do for you.

The ThirdArm™ – a Fraction Collector for laboratory use and pilot plants.

ThirdArm™ Applications:

Fraction collection

- HPLC
- Flash Chromatography
- Leaching test
- General fraction collection
- In connection with a Ingenieurbüro CAT pump: Filling of test tubes, vials, microplates, etc.

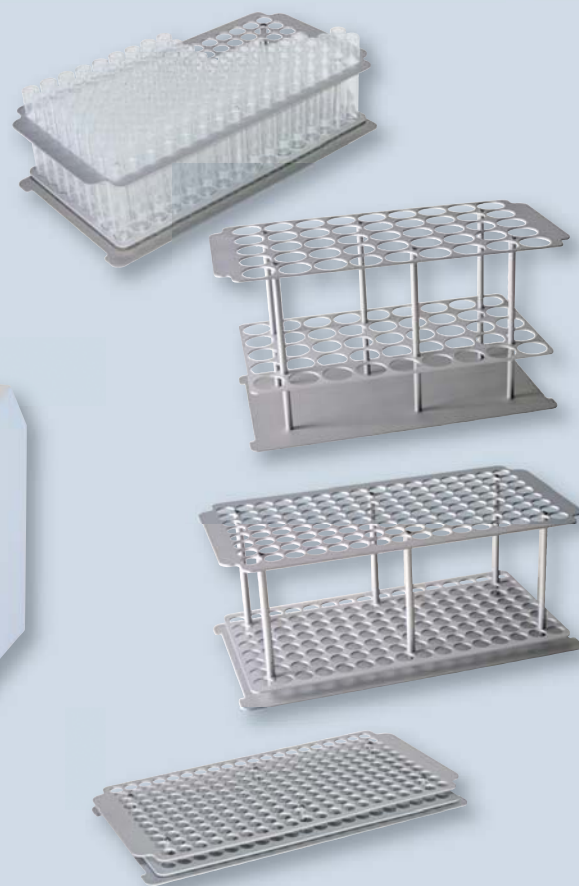
The ThirdArm™ has been developed as a stand-alone unit for simple operation using the integrated keypad. However it may also be connected to a PC via RS232 interface.

For control via an external HPLC-system the unit also features the necessary in- and outlets.

Besides the 5 pre-assigned standard racks the user has the option to easily program user specific rack and collection vessel positions. The collection of single fractions is either linear or meander-shaped.

The fractionation is carried out by time (1sec. – 9999 min), volume (0.01 ml – 9999 ml) or through external signals.

The ThirdArm™ may be optionally equipped with an integrated 3-way diverter valve (for flow through interruption and delay/waste function).



Contiburette
µ 10D



DP 200

Specifications ThirdArm™

Dimensions: W x d x H:	320 mm x 270 mm x 400 mm	
Accuracy of positioning:	±0,3 mm	
Rack Dimensions:	320 mm x 170 mm	
Standard Racks:		
for 45 tubes:	Ø30 mm x 200 mm	62756-00
for 128 tubes:	Ø16 mm x 150 mm	62755-00
for 128 tubes:	Ø16 mm x 100 mm	62754-00
for 220 tubes:	Ø12 mm x 32 mm	62753-00
for 2:	microtiterplates 96 well	62757-00
Valve:	3-way magnetic diverter valve, media-separated, ¼" 28 UNF connectors, case PEEK, gaskets PTFE/Kalrez 62759-00	
Power Supply:	9 VDC 2A	
Weight:	4 kg	
Inlets:	3 x TTL, 1 x RS 232	
Outlets:	2 x TTL, 1 x RS 232	
Part No.	62750-00	

Laboratory Pump DP 200

Top-quality micrometering pump with digital flowrate control embedded in a case only 72 mm wide. This handy laboratory pump is available with either 20µl, 200µl or 350µl stroke volume. The pump heads, made of oxide ceramics, are embedded in a stainless steel case or fluoride plastics coated. Versions with or without piston rinse-ports are available. All setting data such as volume, flowrate and flow direction may be easily entered via the membrane key-pad. All set and programmed values and parameters are EEPROM stored. Pump control also via interface as well as direct control through ThirdArm. User calibration may be carried out through the integrated adjustment and calibration function.

Technical Details DP 200

Pump head type	20 T 20 TCS 20 V 20 VCS	200 T 200 TCS 200 V 200 VCS	300 TCS 300 VCS
Flowrate ml/min	0,02 - 2	0,2 - 20	0,4 - 40
Stroke volume µl	20	200	350
Min. step volume µl	1	10	20
Max. pressure	up to 6 bar, depending on e.g. viscosity, flowrate		
Dimensions HxWxD mm (without pump head)	163x72x111	163x72x111	163x72x111
Voltage	24 V DC	24 V DC	24 V DC
Interface	RS 485	RS 485	RS 485
Part Numbers			
Typ T	61760-00	61764-00	-
Typ TCS	61761-00	61765-00	61768-00
Typ V	61762-00	61766-00	-
Typ VCS	61763-00	61767-00	61769-00

T = Ceramics embedded in PVDF, without rinse port
 V = Pump head in stainless steel casing, without rinse port
 TCS = Ceramics embedded in PVDF, in ceramics integrated rinse port
 VCS = Pump head in stainless steel casing, in ceramics integrated rinse port

Further information upon request.

HPLH 200 V



HPLH 20 V



HPLH 300 VCS



HPLH 200 VCS



Ingenieurbüro CAT Laboratory Pump HPLH

The successful Ingenieurbüro CAT pump series with dialogue programmable microprocessor control unit. The system consists of a desk-like pump housing and a detachable microprocessor controlled programming and operating keypad. All relevant parameters, e.g. volume, flow-rate, flow direction, are entered via the key-pad in the control unit, which can be used remotely from the pump. All set and programmed values and parameters are EEPROM stored. The operating elements also allow for an interactive access and changes even when the pump is already under operation. As standard there is an RS232 interface (1200-4800,8N,1) which allows for remote control and programming of all dosing functions via a PC. This can also be used to link several instruments for control from one PC, plus, each pump can have an assigned sub-address (1 - 255) allowing daisy chain configurations using only 1 port on the computer.

Connection to the analogue input allows the pre-programmed flow-rate to be overridden by a voltage signal (0-5 V). The analogue output (0-10 V and 0-24 mA) can then be used to record and readout the actual flow-rate. Via the TTL inlet single dosing steps can be triggered. (E.g. Hand-switch, foot-switch, TTL-signal.)

Each pump stroke is electronically divided into 20 equal volume increments which gives a smallest pump of 1 µl/step. The pumps are embedded in a coated stainless steel case, the pump head cases are made of stainless steel. All wetted parts are Al₂O₃ and PVDF, ETFE or PEEK.

Applications such as:

- STANDARD DISPENSE - dosing a preset volume
- DILUTOR - dilution of a solvent
- PIPETTE - simulation of a pipette
- DELAYED DISPENSE - an electronic dropping funnel

The incorporated software is suitable for the following applications:

- precise dosing of a pre-set volume
- manual dispensing
- time-controlled dispensing
- volume flow dosing
- titrating of solvents
- pipetting of fluids
- diluting
- sampling with and without an air-segment
- regulated drop-dispensing

Pump heads for stroke volumes of 20 µl, 200 µl, 300 µl and 1000 µl are available, also with/without piston rinse ports. With the "VCS" versions the rinse port is integrated into the ceramic hence a piston gasket is not necessary. There are also versions with integrated rinse pumps for piston rinsing.



HPLH 1000 VS


 HPLH 200 VCS
with integrated
rinse pump


Remote Controller

Technical Details HPLH Pumps

Model HPLH	20 V	20 VCS	200 V	200 VCS	300 VCS	1000 V	1000 VS
Piston diameter	4 mm	4 mm	6 mm	6 mm	8 mm	10 mm	10 mm
Maximum flowrate	10 ml/min	10 ml/min	100 ml/min	100 ml/min	200 ml/min	400 ml/min	400 ml/min
Minimum step volume	1 µl	1 µl	10 µl	10 µl	20 µl	50 µl	50 µl
Minimum continuous flowrate	1 µl/min	1 µl/min	5 µl/min	5 µl/min	10 µl/min	30 µl/min	30 µl/min
Maximum counter pressure*	5 bar	5 bar	5 bar	5 bar	3 bar	1 bar	1 bar
Piston rinse port							yes
Rinse port integrated into ceramic		yes		yes	yes		
Accuracy A %	< = 1	< = 1	< = 1	< = 1	< = 1	< = 1	< = 1
Precision CV %	< = 0,5	< = 0,5	< = 0,5	< = 0,5	< = 0,5	< = 0,5	< = 0,5
TTL inputs	yes	yes	yes	yes	yes	yes	yes
Serial interface RS 232	yes	yes	yes	yes	yes	yes	yes
Minimum flowrate in delay mode	1 µl/100h	1 µl/100h	10 µl/100h	10 µl/100h	20 µl/100h	50 µl/100h	50 µl/100h
Power supply	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Dimensions W x H x D (mm)	145 x 170 x 145	145 x 170 x 145	145 x 170 x 145	156 x 170 x 145	150 x 170 x 145	106 x 240 x 200	106 x 240 x 200
Part No.	70940-00	70947-00	70950-00	70957-00	70967-00	70970-00	70975-00
Order number for pump with integrated rinse pump		61772-00		61775-00	61777-00		61779-00

* depends on viscosity of the media and flowrate



HPLH 200PF

Pulse-free micro-metering system HPLH PF

A speciality of ours are the pulse-free pumps, an advancement of the HPLH pump series for applications where a pulsing delivery rate of a simple piston pump would be distracting. Through parallel circuit and electronic linkage of two HPLH pumps via a sophisticated velocity profile a pulse free volume flow is produced.

Pumping part and electronics are placed in two separate chambers.

This pulse-free pump features the same performance as the standard HPLH pumps.

Technical Details HPLH PF Pumps

Model HPLH	HPLH PF20	HPLH PF200
Piston diameter	4 mm	6 mm
Maximum flowrate	10 ml/min	100 ml/min
Minimum step volume	2 µl	20 µl
Minimum continuous flowrate	30 µl/min	0,3 ml/min
Accuracy A %	<= 1	<= 1
Precision CV %	<= 0,5	<= 0,5
Dimensions WxHxD	190 x 170 x 200	190 x 170 x 200
Part No.	70980-00	70985-00
Order number for pump with integrated rinse pump	61786-00	61788-00

Multichannel Pump "Tower II"

The multichannel pump type "Tower II" consists of 2 – 9 pumps in one case and is customer- designed.

- Each of the maximum 9 pumps can be operated completely independent from each other
- RS232 and RS485 communication link
- Fast communication between pump and process control system
- LED function indicators on each pump:
green LED for "pump in action"
red LED for "pump failure"
- Modular Approach for easy maintenance: Pump modules are easily interchangeable without specialist intervention
- Different pump head sizes with and without rinse port allow for flowrates from 1µl/min to 400 ml/min

Installed Programs:

- STANDARD DISPENSE - dosing of a predetermined volume
- DILUTOR - diluting of a solution
- PIPETTE - simulation of a pipette
- DELAYED DISPENSE - an electronic dropping funnel



8 channel pump

 Multi channel pump
„Tower II“


Each pump is operated either by the built-in control panel with alphanumeric display or by PC based systems. You can start all pumps simultaneously with individual preset pumping parameters. This gives great flexibility to the user, who can set up experiments quickly without having to program a pumping sequence first via PC based software. Once the pump parameters have been ascertained the user can easily set them in a program and run the system from a computer.

For all pump heads: wetted parts are PVDF and ceramic (Al_2O_3 99,7%) only.

Also upon request : Heated pump heads, OEM pump heads, other materials (e.g. ETFE or PEEK).

Technical Details Tower Pump

Pump head type*	stroke volume	min. flowrate	max. flowrate	inlet/outlet connection	rinse port connection
20 T 20 V	20 µl	1 µl/min	10 ml/min	UNF 1/4"-28	-
20 VCS 20 TCS	20 µl	1 µl/min	10 ml/min	UNF 1/4"-28	UNF 1/4"-28
200 T 200 V	200 µl	50 µl/min	100 ml/min	UNF 1/4"-28	-
200 VCS 200 TCS	200 µl	50 µl/min	100 ml/min	UNF 1/4"-28	UNF 1/4"-28
300 VCS 300 TCS	300 µl	100 µl/min	150 ml/min	M8	UNF 1/4"-28
1000 T 1000 V	1000 µl	250 µl/min	400 ml/min	M10	-
1000 VS	1000 µl	250 µl/min	400 ml/min	M10	UNF 1/4"-28

* Pump heads can be supplied in different types of material and different kind of execution:

- T = PVDF, without rinse port
- V = Pump head is integrated into stainless steel, without rinse port
- VS = Pump head is integrated into stainless steel, with rinse port
- TCS = PVDF, with rinse port integrated into ceramic
- VCS = Pump head is integrated into stainless steel with rinse port integrated into ceramic

Technical Details:	
Set-up:	1 – 9 pump heads
Control:	Independently for each pump
Operating:	Control Panel at pump or via PC
Minimum step volume:	1 µl
Flowrate:	1 µl/min up to 400 ml/min
Accuracy A:	< 1%
Precision CV %:	< 0.5 %
maximum counter pressure:	5 bar, depending on pump head, flowrate and media
Dimensions HxWxD:	47 x 22 x 30 cm
Weight (including 9 pumps):	10 kg
Power Supply:	100-240V AC, 50-60Hz, 160 W
Interfaces:	RS 232/RS 485
Inputs:	2 switching functions for "start/stop" and "forward/reverse"
Programs:	Dispense, Dilute, Pipette, delayed Dispense
Conditions of Ambient:	Temperature: 5 – 50°C Relative Humidity: 0 – 80%



LiquidProcessor

LiquidProcessor

The system consists of a dispensing unit which can be easily mounted directly onto a bottle by using various adapters and a detachable microprocessor controlled programming and operating key-pad enabling fast and uncomplicated data entry such as volume, flow rate and flow direction.

When detached from the dispensing unit the key pad may be used as a remote control. The standard RS232 interface (1200-4800,8,N,1) enables the remote control of all functions via a PC. In this configuration, a PC can access the LiquidProcessor exclusive address (daisy chain). This address is programmable for each unit.

For quick and easy programming a Windows® Software program is available as an optional extra, to give the user instant PC control.

Applications:

- Precise dosing of a pre-set volume
- Manual dispensing
- Time-controlled dispensing
- Titrating
- Diluting
- Pipetting
- Regulated drop-dispensing
- Sampling with and without an air-segment

Technical Details LiquidProcessor®

Subdivision	10 µl
Max. step volume	100 l
Min. delay time in delay mode	1 s
Max. delay time in delay mode	100 hours
Min. continuous flowrate	0.113 ml/min
Min. flowrate in delay mode	10 µl/100h
Max. flowrate	30 ml/min
Accuracy A*	<= 0.1%
Precision CV*	<= 0.1 %
Counter-pressure	Up to 3 bar, depends on flow-rate and viscosity
Time programming	1 s to 100 hours
Inputs	one digital input, TTL, one analogous input (0-5V)
Outputs	one digital output, TTL, one analogous output (0-5V)
Serial interface	RS 232 (1200-4800,8,N,1)
Power supply	12VDC 10W - stabilized
Permissible ambient temperature	5 - 40°C within operating area, e.g. fume cupboard
Permissible humidity	80% RH
Dimensions HxWxD (mm)	135x114 x60
Part No.	60294-00

* Error limits according to DIN EN ISO 8665-3 (Accuracy A, Coefficient of variation CV) in relation to the target volume or ± 1 subdivision, with instrument, distilled water and ambient temperature at 20°C. Ex 20°C.


 Contiburette μ 10H (μ 20H)

- **High precision**
Precise titration within the error limits for class A for glass burettes
- **Smooth**
For carefully measured drop-by-drop titration
- **Compact design**
Light and stable
- **Easy handling**
Continuous operation, no "filling" required


 Contiburette μ 1D, μ 10D, μ 20D

- Housing rotates freely on the bottle
- New electronics with titration mode and dosing mode
- Individual calibration
- Permanently stored factory calibration
- Valve-free dosing system
- Drying tube connection

Ingenieurbüro CAT Contiburettes

These electronic digital burettes measure the conveyed amount of liquid and show it on the display. The smallest dosing amount is 10 μ l for the Contiburettes μ 10H and μ 10D. The amount is 1 μ l for type Contiburette μ 1D and 20 μ l for types Contiburette μ 20H and μ 20D.

These burettes operate without valves and can be mounted to rotate freely on any bottle using different thread adapters.

The materials used feature excellent chemical resistance, allowing dosing of virtually any liquid used in the laboratory. The conveyed medium only comes into contact with Al₂O₃ 99.7% (sapphire-hard, sintered, crystalline aluminium oxide, highly mechanically resistant even to abrasive materials), ETFE and FEP.

The Contiburettes feature a calibration and adjusting function to compensate for the accuracy differences caused by the use of a liquid with significantly different density.

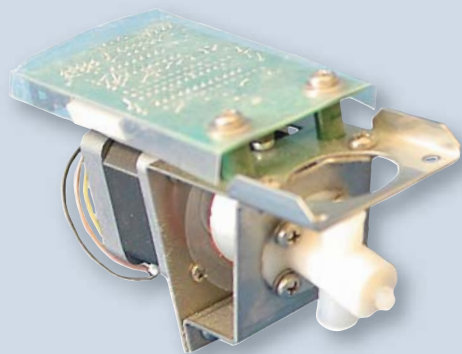
Two 1.5 Volt AA batteries drive the electronic measuring system of the manually operated versions for around 500 h.

Models with motor drive also allow dosing volume and dosing speed to be set, making them suitable for use as burettes and as dispensers. The DR variants are equipped with an integrated piston flushing device.

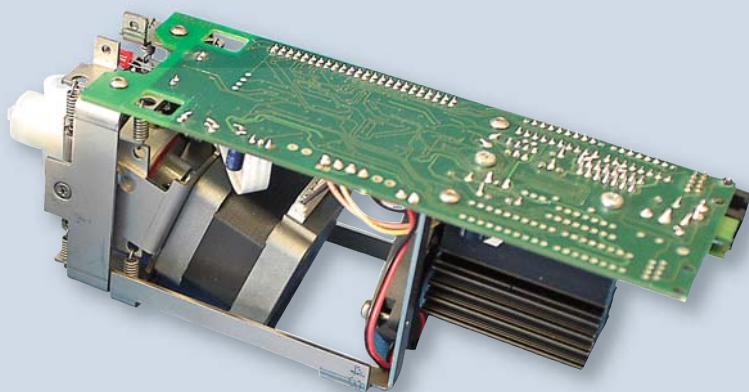
Different bottle adapters and other accessories are available.

Technical Details Contiburettes

	μ 1D	μ 10D	μ 10DR	μ 20D	μ 20DR	μ 10H	μ 20H
Subdivision	1 μ l	10 μ l	10 μ l	20 μ l	20 μ l	10 μ l	20 μ l
Drive takes place via	motor	motor	motor	motor	motor	hand	hand
Flowrate	0,02 - 2,0 ml/min	0,2 - 20 ml/min	0,2 - 20 ml/min	0,3 - 30 ml/min	0,3 - 30 ml/min	ca. 12 ml/min	ca. 20 ml/min
Calibration function	yes	yes	yes	yes	yes	yes	yes
Interface RS 485	yes	yes	yes	yes	yes		
Integrated rinsing system			yes		yes		
Temperature range	10° - 40°C	10° - 40°C	10° - 40°C	10° - 40°C	10° - 40°C	10° - 40°C	10° - 40°C
Power supply	9 V DC	9 V DC	9 V DC	9 V DC	9 V DC	2 Batteries Typ AA	2 Batteries Typ AA
Dimensions HxWxD (mm)	175 x 112 x 60	175 x 112 x 60	175 x 120 x 60	175 x 112 x 60	175 x 120 x 60	175 x 93 x 60	175 x 93 x 60
Part No.	62730-00	62732-00	62733-00	62734-00	62735-00	62723-00	62724-00



Examples of
OEM-Pumps



OEM-Pump with PCON E

Accessories for Liquid Handling

	Description	Part No.
Power Supply	9 Volt, for Contiburette	60736-00
	12 Volt, for LiquidProcessor	60733-00
	24 Volt, for HPLH Pump	60732-00
Connecting Cables	PC-connecting cable for direct connection of the Contiburettes type D and DR to a serial interface	61703-00
	PC-connecting cable for direct connection of the LiquidProcessor to a serial interface	60728-00
	RS 232-extension cable (D-Sub cable) 1.8 m	60642-00
	Y-cable for connection of further units via RS 232	60729-00
Software	on request	
Electronics	PCON C	60762-00
	PCON E	60768-00
Operating Control	Operating control „RemCon“	60712-00
	Hand manipulator	60715-00

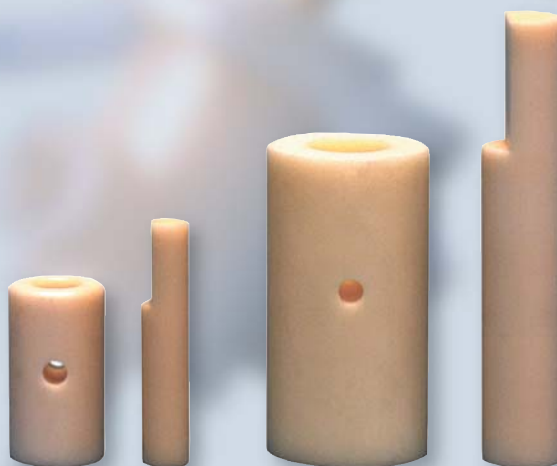
Remote control for HPLH pumps, control boards PCON C and PCON E, with LCD display and alphanumeric keypad to enter all relevant data

with mounting for LiquidProcessor

For the development and construction of custom designed batchers a variety of OEM solutions are available: E.g. ready assembled packages consisting of motor, ceramic pump and electronic controller with or without contactless pulse sensors and with or without pump rinse chambers optional in stainless steel cases. We also realize customer specific stroke volumes on short term notice.

To operate these pumps we offer a number of specially designed control boards. These boards provide easy control, programming and data entry and output.

Interested? Please contact our application department. They will do their best to recommend a solution which suits your needs.



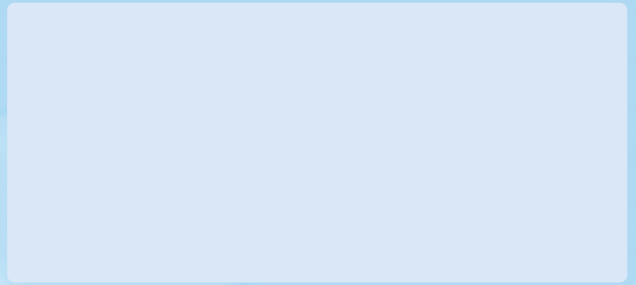
Accessories for Liquid Handling

	Description	Part No.
Tubing	made of PTFE	
	1 m, OD 3.2 mm, ID 1.6 mm, 1/8"	10758-01
	1 m, OD 1.56 mm, ID 0.96 mm, 1/16"	10758-02
	1 m, OD 5 mm, ID 4 mm, 1/16"	10291-03
	FEP	
	1 m, OD 3 mm, ID 2 mm	10291-19
	1 m, OD 5 mm, ID 4 mm	10758-03
	1 m, OD 6 mm, ID 4 mm	10291-23
Suction Tube	for Contiburette, made of PTFE, 300 mm long	60700-00
Ejection Tube	for Contiburette, made of EP, AD 3 mm, 1 m long	60701-00
Ejection Cannula	for Contiburette, made of FEP, bent, with fine tip	60702-00
Fittings for Pumpheads	for tube OD 3.2 mm (1/8"), UNF 1/4"-28	10721-03
	for tube OD 1.56 mm(1/16"), UNF 1/4"-28	10721-01
	for tube OD 3 mm, UNF 1/4"-28	10721-03
	Pump head connection M8 for HPLH 300 Versions	10721-05
	Pump head connection for M10 für HPLH 1000 Versions	10738-02
Thread adapter for Contiburette made of Polypropylene	A32-25	60703-00
	A32-28	60704-00
	A32-38	60705-00
	A32-40	60706-00
	A32-45	60707-00

Interested?

Please feel free to browse and visit our website www.cat-ing.de

No. 8LI.HA.E/A



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