

# Precise

## Dosing and Dispensing



... **good** to the  
last **drop**

## While you concentrate on research, we'll look after your support needs

As we want you to have more time to thoroughly concentrate on research, the whole Heidolph team enthusiastically provides you with extensive support and helps to reduce your workload

- 24 hour service for all inquiries
- Individual application support
- Short delivery time for standard items
- After sales service provided by your local dealer
- More than 80 distributors worldwide
- Priority technical service
- Long-lasting service life of all products due to corrosion-resistant electronics and maintenance-free motors
- 3 year warranty

## Precise Dosing and Dispensing



- ➔ Flow rates starting at 0.005 ml/min
- ➔ Doesn't crush organic cell cultures
- ➔ Single and multiple channel operations

**Control  
every drop**

### Summary:

Your advantages of the PD Series	Page 4-5
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# Technical specifications - Peristaltic Pumps

Model	PD 5001	PD 5006	PD 5101	PD 5106	PD 5201	PD 5206
P/N (230 V)	523-50010-00	523-50060-00	523-51010-00	523-51060-00	523-52010-00	523-52060-00
P/N (230 V)						
incl. multi-channel adaptor	523-50013-00	-	523-51013-00	-	523-52013-00	-
Flow rates						
single-channel pumps (ml)	0.8 - 790	3.6 - 3,900	0.3 - 790	1.3 - 3,900	0.3 - 790	1.3 - 3,900
Flow rates						
multi-channel pumps (ml)	0.005 - 320	-	0.005 - 320	-	0.005 - 320	-
Flow rate accuracy *	(%) ± 5	(%) ± 5	(%) ± 3.5	(%) ± 3.5	(%) ± 1	(%) ± 2
Speed range (rpm)	10 - 120	50 - 600	5 - 120	24 - 600	5 - 120	24 - 600
Speed setting	scale	scale	scale	scale	digital	digital
Electronic speed control	analog	analog	digital	digital	digital	digital
Control accuracy motor (%)	± 2	± 2	± 0.5	± 0.5	± 0.5	± 0.5
Select direction of rotation	CW / CCW	CW / CCW	CW / CCW	CW / CCW	CW / CCW	CW / CCW
Motor power (W)	71	71	100	100	100	100
Supply power (W)	150	150	140	140	140	140
Analog interface	-	-	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop
Digital interface	-	-	-	-	RS 232	RS 232
Flow rate indicator	-	-	-	-	digital	digital
Volume dosing ** (ml)	-	-	-	-	0.1 - 9,999	0.1 - 9,999
Interval dosing ** (ml)	-	-	-	-	0.1 - 9,999 in breaks 0.1 sec - 750 h	0.1 - 9,999 in breaks 0.1 sec - 750 h
Smooth start	-	-	-	-	yes	yes
Electronic brake	-	-	-	-	yes	yes
Foot pedal connection	-	-	yes	yes	yes	yes
Operation time (per day)	24 hr	24 hr	24 hr	24 hr	24 hr	24 hr
Safety feature	overheat protection	overheat protection	electr. current limiter and overheat protection	electr. current limiter and overheat protection	electr. current limiter and overheat protection	electr. current limiter and overheat protection
Weight (kg)	6.8	6.2	8.2	7.6	8.3	7.7
Protection class (DIN EN 60529)	IP 30	IP 30	IP 55	IP 55	IP 55	IP 55
Permissible ambient temperature (°C)	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity
Dimensions (wxdxh) (mm)	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225
Supply voltage ***	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz

\* Flow rate accuracy pertains to water without counter pressure

\*\* Tubing size 0.2; 0.5; 0.9 pertains to µl measurement, not ml

\*\*\* Standard 230 V / 50/60 Hz: others upon request, please specify for order

## Precise Dosing and Dispensing

Are you in need of a system that provides the most accurate pumping and dosing of aggressive, corrosive or even sterile media without any compromise to precision?

The versatile PD Series can offer you all these options with flow rates ranging from 0.005 to 3,900 ml per minute depending on configuration.

If you are looking for standard pumping or highly accurate interval dosing and pause setting capabilities to meter into wells, the **PD Series has it all**



The pumped media remains in the tubing and never comes in contact with you – keeping **you and your application safe**

Your application media never comes in contact with the pump head – **eliminating cross-contamination** and the need to clean the unit between projects

Choose from 6 different pump drives, 3 pump heads for single-channel use, and 3 additional pump heads for multi-channel use that can accommodate up to 12 cassettes

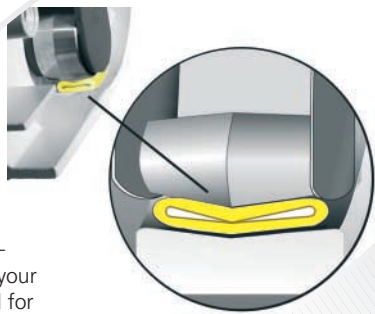
The PD Series is **self-priming** and **comes without any valves** providing care-free operation

## Pump Heads

Are you engaged in a highly specialized application such as cell biology and need to transfer the cells without causing damage?

The PD Series offers you solutions for standard applications and highly sophisticated challenges that require added control.

Choose quickly and easily – a software configuration program selects those components which **meet your application requirements best**



For the use in cell biology, choose a pump head which features convex rollers that **do not squeeze** the tubing compared to conventional rollers

A wide range of tubing material is available – choose the **most appropriate material** for your research whether it is FDA approved material for food analysis or material for aggressive media such as acids – you find it right here

Consequently, organic cell cultures **are not crushed** and your samples are transported safely

## Your advantages – our Hei-lights

### For your safety

- Important for continuous unattended operation: The motor will be switched off if a high thermal load situation occurs to increase safety in your lab and to **prevent accidents**
- Additional safety is provided by sparkless motors which **reduce incidents such as fires in volatile environments**
- All models feature a smooth start operation which **prevents spills and splashing of media**. The speed will ramp up slowly until your set rpm has been reached
- Protection class IP 55 for PD 5100 and 5200 models protects your unit from highly aggressive vapors or liquids – and thus **eliminates accidents, short-cuts and failures**
- Use an optional foot pedal remote control via cable to start and stop your pump drive outside a **closed fume hood increasing your personal safety**
- The pumped media remains in the tubing and never comes in contact with you – keeping you and **your application safe**

### For your ease of use

- The PD Series is **self-priming** and **comes without any valves** providing care-free operation
- Analog and digital interfaces **facilitate operation** for example by connecting the optional foot pedal or PC software program
- Use your valuable lab space efficiently and stack one pump drive on top of the other to build a **two-layer system** that saves you space
- Use a single-channel pump head and **upgrade your model** to multi-channel operation in just minutes with a different pump head
- Our standard single-channel models can take up to 2 pump heads at a time **doubling your throughput**
- Our clear and **self-explanatory front panel** layout is for your ease of operation
- Make your life easier and rely on the **accurate liquid delivery** as low as 0.005 ml/min

### Sustainable economic benefits - increased efficiency

- Reduce your maintenance costs: The sealed housing protects your pump from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an increased **lifespan of 10 years** on average at a reduced maintenance and repair cost
- The two-pump head per drive system allows to **reduce your investment** greatly while **increasing your throughput** by 100 %
- Maintenance free motors **eliminate repairs and down times** to ensure years of continuous operation
- Complete packages including pump drive, head and compatible tubing reduce your selection process and gives you a **reduced package price**

# For standard applications – liquid transfer

## Pump drive PD 5001 / PD 5006

Pump includes all standard features for safety, ease of use and increased efficiency plus:



### PD 5001

Flow rates of 0.8 - 790 ml/min with single-channel pump heads

- Low speed range from 10 - 120 rpm
- This pump drive is suitable for multi-channel operation
- Multi-channel flow rates from 0.005 - 320 ml/min
- Upgrade your PD 5001 for multi-channel operation in just minutes with a pump head adaptor: P/N 523-50013-00

PD 5001  
P/N 523-50010-00

### PD 5006

Flow rates of 3.6 - 3,900 ml/min with single-channel pump heads

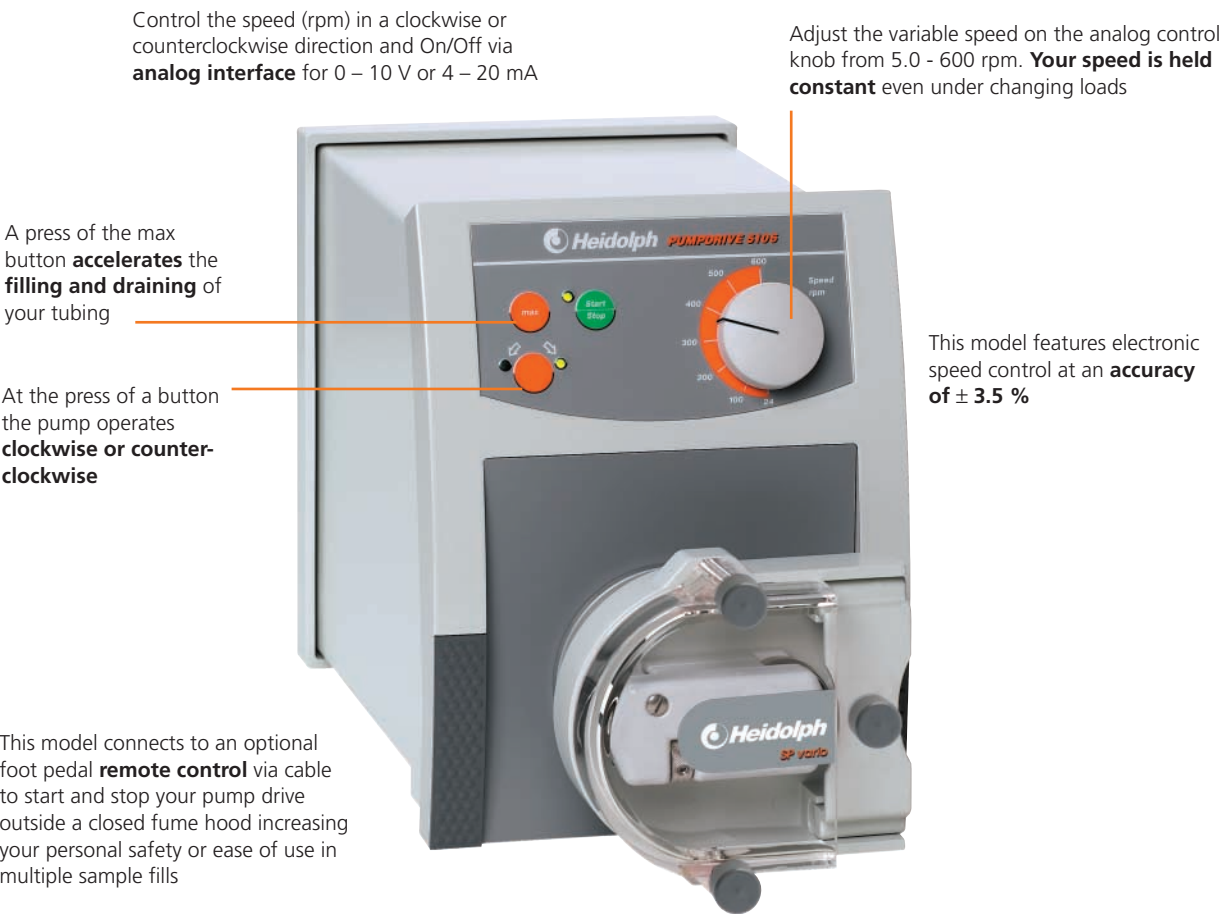
- High speed range from 50 - 600 rpm
- This pump drive is not suitable for multi-channel operation

PD 5006  
P/N 523-50060-00

# For reproducible results – liquid transfer

## Pump drive PD 5101 / PD 5106

Pump includes all standard features for safety, ease of use and increased efficiency plus:



### PD 5101

Flow rates of 0.3 - 790 ml/min with single-channel pump heads

- Low speed range from 5 - 120 rpm
- This pump drive is suitable for multi-channel operation
- Multi-channel flow rates from 0.005 - 320 ml/min
- Upgrade your PD 5101 for multi-channel operation in just minutes with a pump head adaptor: P/N 523-51013-00

PD 5101  
P/N 523-51010-00

### PD 5106

Flow rates of 1.3 - 3,900 ml/min with single-channel pump heads

- High speed range from 24 - 600 rpm
- This pump drive is not suitable for multi-channel operation

PD 5106  
P/N 523-51060-00



# Reproducibility - pumping and dosing

## Pump drive PD 5201 / PD 5206

Pump includes all standard features for safety, ease of use and increased efficiency plus:

Control the speed (rpm) in clockwise or counterclockwise direction and On/Off via **analog interface** for 0 – 10 V or 4 – 20 mA or **digital RS 232 interface**

**Calibrate** your flow volume and flow rate individually

At the press of a button the pump operates **clockwise or counterclockwise**

A press of the max button **accelerates the filling and draining** of your tube

This model features electronic speed control and an **accuracy of  $\pm 0.5\%$**

**Flow characteristic** of pump heads in combination with various tubing diameters is **pre-programmed** for accurate flow rate numbers

**Digital read-out of:**

- Speed (rpm)
- Tubing diameter
- Flow rate in ml/min
- Dosing volume
- Interval dosing
- Pause function

**Easily change** all process parameters via these buttons

This model connects to an optional foot pedal **remote control** via cable to start and stop your pump drive outside a closed fume hood increasing your personal safety or easy use in multiple sample fills

### PD 5201

**Flow rates of 0.3 - 790 ml/min with single-channel pump heads**

- Low speed range from 5 - 120 rpm
- This pump drive is suitable for multi-channel operation
- Multi-channel flow rates from 0.005 - 320 ml/min
- Upgrade your PD 5201 for multi-channel operation in just minutes with a pump head adaptor: P/N 523-52013-00

**PD 5201**  
P/N 523-52010-00

### PD 5206

**Flow rates of 1.3 - 3,900 ml/min with single-channel pump heads**

- High speed range from 24 - 600 rpm
- This pump drive is not suitable for multi-channel operation

**PD 5206**  
P/N 523-52060-00

# Single-channel pump heads

## SP quick

- Fast and convenient tube changes
- Low pulsation due to 5 roller system
- Pump head features ball bearings
- Rollers made of stainless steel
- For tubes with a 1.6 mm or 2.5 mm wall thickness (wt)
- Depending on drive and tubing, the flow rate ranges from 0.4 to 3,300 ml per minute



### SP quick

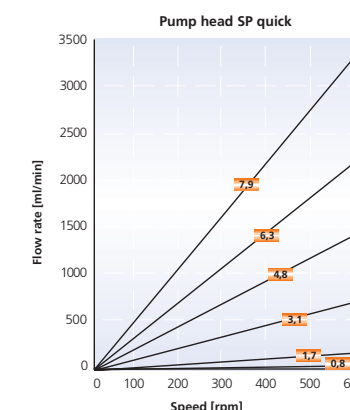
P/N 527-11100-00 (wt 1.6 mm)  
P/N 527-11300-00 (wt 2.5 mm)

### SP quick d (not shown)

P/N 527-11120-00 (wt 1.6 mm)  
P/N 527-11320-00 (wt 2.5 mm)

### SP quick d

- Choose SP quick in combination with SP quick d to attach two pump heads to one drive
- This combination is suitable for pump drives PD 5001/5101/5201 only



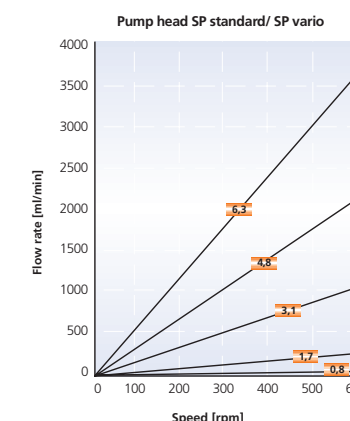
## SP standard

- Recommended for standard applications
- Convex rollers do not squeeze or crush organic cell cultures
- Pump head features ball bearings
- Rollers made of stainless steel and polyamide
- For tubes with a 1.6 mm or 2.5 mm wall thickness (wt)
- Depending on drive and tubing, the flow rate ranges from 0.3 to 3,900 ml per minute



### SP standard

P/N 523-43010-00 (wt 1.6 mm)  
P/N 523-43030-00 (wt 2.5 mm)



## SP vario






- Suitable for most Heidolph tubing due to adjustable roller spacing
- Convex rollers do not squeeze or crush organic cell cultures
- Pump head features ball bearings
- Rollers made of stainless steel and aluminum
- Depending on drive and tubing, the flow rate ranges from 0.3 to 3,900 ml per minute



**SP vario**  
P/N 523-45110-00



Tubing sizes for single-channel pumps




Tubing sizes						
Inner diameter	(mm)	0.8	1.7	3.1	4.8	6.3
Outer diameter	(mm)	4	4.9	6.3	8	9.5
Wall thickness (wt)	(mm)	1.6	1.6	1.6	1.6	1.6
Max. pressure (continuous / short time)	(bar)	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.5 / 1.5	0.5 / 1.5
Suction height	(mH <sub>2</sub> O)	8.8	8.8	8.8	8.8	6.7

Average flow rates in combination with pump head and pump drive:

SP quick		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
PD 5106 / 5206	(ml/min)	2	33	8	186	26	653	59	1,529	89	2,072
PD 5006	(ml/min)	4	35	17	197	57	695	123	1,494	186	1,765
PD 5101 / 5201	(ml/min)	0.38	9	2	40	5	126	12	233	17	409
PD 5001	(ml/min)	0.83	9	3	41	11	134	25	292	36	413
SP standard / SP vario		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
PD 5106 / 5206	(ml/min)	1	26	11	257	43	1,017	105	2,549	167	4,056
PD 5006	(ml/min)	3	33	22	249	93	1,037	228	2,613	364	4,151
PD 5101 / 5201	(ml/min)	0.36	9	2	55	9	221	21	530	33	813
PD 5001	(ml/min)	0.65	8	5	61	19	223	44	519	75	861

Tubing P/N (per meter):

Silicone	525-33000-00	525-34000-00	525-36000-00	525-30027-00	525-30028-00
Viton®	525-53000-00	525-54000-00	525-56000-00	525-50027-00	525-50028-00
PharMed®	525-23000-00	525-24000-00	525-26000-00	525-20027-00	525-20028-00
Tygon® (standard)	525-63000-00	525-64000-00	525-66000-00	525-60027-00	525-60028-00
Tygon® (hydrocarbon)	525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 (food)	525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Tubing sizes				
Inner diameter	(mm)	4.8	6.3	7.9
Outer diameter	(mm)	9.8	11.3	12.9
Wall thickness (wt)	(mm)	2.5	2.5	2.5
Max. pressure (continuous / short time)	(bar)	0.8 / 1.8	0.8 / 1.8	0.8 / 1.8
Suction height	(mH <sub>2</sub> O)	8.8	8.8	8.8

Average flow rates in combination with pump head and pump drive:

SP quick		min.	max.	min.	max.	min.	max.
PD 5106 / 5206	(ml/min)	58	1,527	85	2,248	113	3,171
PD 5006	(ml/min)	123	1,580	180	2,411	257	3,436
PD 5101 / 5201	(ml/min)	12	299	18	435	25	630
PD 5001	(ml/min)	26	299	38	454	50	636
SP standard / SP vario		min.	max.	min.	max.		
PD 5106 / 5206	(ml/min)	92	2,390	139	3,821		
PD 5006	(ml/min)	203	2,426	313	3,782		
PD 5101 / 5201	(ml/min)	15	491	28	769		
PD 5001	(ml/min)	42	493	68	773		

Tubing P/N (per meter):

Silicone	525-35000-00	525-39000-00	525-32000-00
Viton®	525-55000-00	525-59000-00	525-52000-00
PharMed®	525-25000-00	525-29000-00	525-22000-00
Tygon® (standard)	525-65000-00	525-69000-00	525-62000-00
Tygon® (hydrocarbon)	525-75000-00	525-79000-00	525-72000-00
Tygon® 2001 (food)	525-85000-00	525-89000-00	-

Flow rates pertain to Tygon (standard) tubing and water

Multi-channel pumps

Pump includes all standard features for safety, ease of use and increased efficiency plus:

- These pump drives are able to be configured for multi-channel use: PD 5001, PD 5101 and PD 5201
- Increase your throughput by running up to 12 individual cassettes on one single pump drive and pump head system
- Separate metering into multiple vessels with different feed rates at the same time by using different tubing dimensions to adjust flow rates
- Save time: Tubing change is done in just seconds
- In addition to standard pump heads which feature a 4 roller system you can choose 8 roller pump heads for low pulsation
- Change your cassettes easily, even during operation – there are no restrictions
- Cassettes adjustments and changes are simple, just click in place
- No additional pump drive purchase needed: Upgrade your single channel pump drive with just an adaptor for multi-channel use and pick the head/cassette configuration that matches your application needs



PD 5101 + pump head C 4 + cassette small

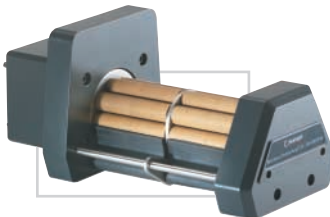
Multi-channel pump heads



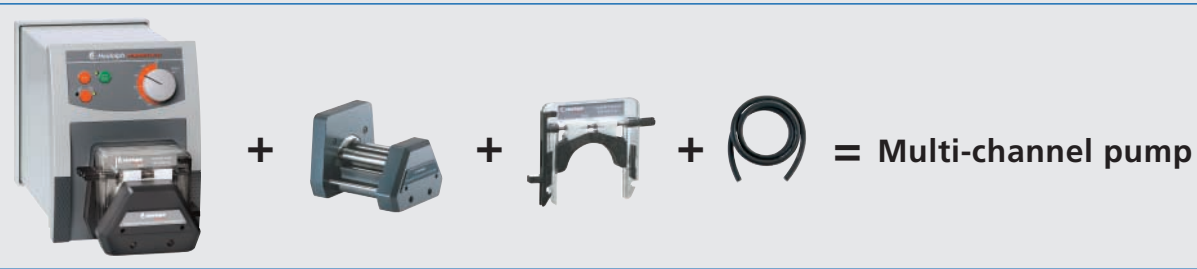
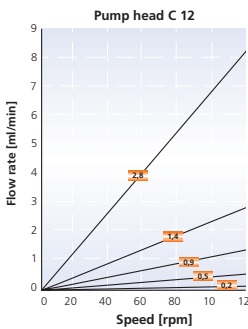
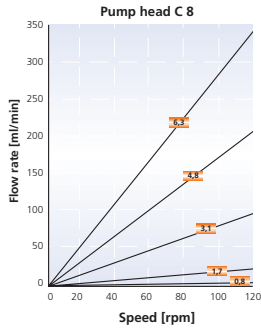
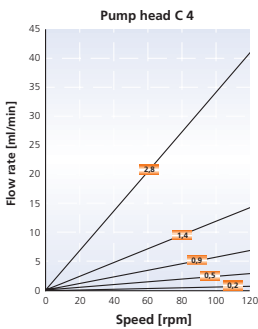
**Multi-channel pump head C 4**  
Accepts 4 cassettes small.  
8 rollers for low-pulsation.  
P/N 524-80420-00



**Multi-channel pump head C 8**  
Accepts 8 cassettes medium or 4 cassettes large. Medium and large size cassettes may be used together.  
4-roller design.  
P/N 524-40810-00



**Multi-channel pump head C 12**  
Accepts 12 cassettes small.  
Built-in reduction gear allows feeding of smallest quantities.  
8 rollers minimizing pulsation.  
P/N 524-81220-00



# Multi-channel cassettes

## General advantages

- Setting screws to adjust roller contact pressure
- Cassettes easily change even while pumping
- All cassettes accept different tube materials and sizes (refer to page 13)

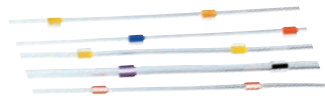


### Cassette small

- Flow rates from 0.005 to 37 ml/min
- Suitable for tubes with 0.9 mm wall thickness (wt)
- Tube diameters available: 0.2 / 0.5 / 0.9 / 1.4 and 2.8 mm
- Two-Stop-Tubing (40 cm) required to operate cassette small
- Stoppers secure tube in place
- Couplings and tube extensions allow extra hose length in 1 m increments
- Combinations:
  - C 4 multi-channel pump head: Max. 4 cassettes small
  - C 12 multi-channel pump head: Max. 12 cassettes small



Cassette small  
P/N 524-90022-00



Pic.: Two-Stop-Tubing

### Cassette medium

- Flow rates from 0.3 to 25 ml/min
- Suitable for tubes with 1.6 mm wall thickness (wt)
- Tube diameters available: 0.8 and 1.7 mm
- Tube available in requested sizes
- Combinations:
  - C 8 multi-channel pump head: Max. 8 cassettes medium



Cassette medium  
P/N 524-90021-00

### Cassette large

- Flow rates from 1 to 320 ml/min
- Suitable for tubes with 1.6 mm wall thickness (wt)
- Tube diameters available: 1.7 / 3.1 / 4.8 and 6.4 mm
- Tube available in requested sizes
- Combinations:
  - C 8 multi-channel pump head: Max. 4 cassettes large



Cassette large  
P/N 524-90010-00

Flow rates pertain to water

# Tubing sizes for multi-channel pumps

## Tubing sizes

		0.2	0.5	0.9	1.4	2.8
Inner diameter	(mm)	0.25	0.51	0.89	1.42	2.79
Outer diameter	(mm)	2.05	2.31	2.69	3.22	4.59
Wall thickness (wt)	(mm)	0.9	0.9	0.9	0.9	0.9
Max. pressure (continuous / short time)	(bar)	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5
Suction height	(mH <sub>2</sub> O)	7	7	7	7	7

## Average flow rates in combination with cassette, pump head and pump drive:

PD 5101 / PD 5201		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cassettes
Cassette small / pump head C 12	(ml/min)	0.005	0.11	0.01	0.54	0.03	1	0.10	3	0.29	9	12
Cassette small / pump head C 4	(ml/min)	0.02	0.49	0.08	2	0.24	6	0.60	14	2	36	4
PD 5001		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
Cassette small / pump head C 12	(ml/min)	0.005	0.11	0.02	0.42	0.10	1	0.23	3	0.69	8	12
Cassette small / pump head C 4	(ml/min)	0.04	0.53	0.17	2	0.57	6	1	15	4	37	4

## Tubing P/N:

Silicone	Two-Stop-Tubing for cassette small			525-30014-00	525-30015-00	525-30016-00
	Extension tube (per meter)			525-30024-00	525-30025-00	525-30026-00
Viton®	Two-Stop-Tubing for cassette small			525-50014-00	525-50015-00	525-50016-00
	Extension tube (per meter)			525-50024-00	525-50025-00	525-50026-00
PharMed®	Two-Stop-Tubing for cassette small	525-20012-00	525-20013-00	525-20014-00	525-20015-00	525-20016-00
	Extension tube (per meter)	525-20022-00	525-20023-00	525-20024-00	525-20025-00	525-20026-00
Tygon® (standard)	Two-Stop-Tubing for cassette small	525-60012-00	525-60013-00	525-60014-00	525-60015-00	525-60016-00
	Extension tube (per meter)	525-60022-00	525-60023-00	525-60024-00	525-60025-00	525-60026-00
Fittings for extension tubes (PTFE)		526-22000-00				

## Tubing sizes

		0.8	1.7	3.1	4.8	6.3
Inner diameter	(mm)	0.8	1.7	3.1	4.8	6.3
Outer diameter	(mm)	4	4.9	6.3	8	9.5
Wall thickness (wt)	(mm)	1.6	1.6	1.6	1.6	1.6
Max. pressure (continuous/short time)	(bar)	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.5 / 1.5
Suction height	(mH <sub>2</sub> O)	8.8	8.8	8.8	8.8	6.7

## Average flow rates in combination with cassette, pump head and pump drive:

PD 5101 / PD 5201		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cassettes
Cassette medium / pump head C 8	(ml/min)	0.24	7	1	26							8
Cassette large / pump head C 8	(ml/min)			1	27	4	90	8	192	11	329	4
PD 5001		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
Cassette medium / pump head C 8	(ml/min)	0.55	6.97	2.17	27							8
Cassette large / pump head C 8	(ml/min)			2	27	7	85	18	246	26	364	4

## Tubing P/N (per meter):

Silicone	525-33000-00	525-34000-00	525-36000-00	525-30027-00	525-30028-00
Viton®	525-53000-00	525-54000-00	525-56000-00	525-50027-00	525-50028-00
PharMed®	525-23000-00	525-24000-00	525-26000-00	525-20027-00	525-20028-00
Tygon® (standard)	525-63000-00	525-64000-00	525-66000-00	525-60027-00	525-60028-00
Tygon® (hydrocarbon)	525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 (food)	525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Flow rates pertain to Tygon (standard) tubing and water



# Tubing options

## Tygon® standard

- Application: For standard applications
- Features:
  - Non-toxic, non-oxidizing
  - Good resistance to acids, bases and inorganic media
  - Very low gas permeability, good performance life
- **Material:** Thermoplastic soft PVC, transparent
- **Complies with the standards:** FDA (21 CFR 177.2601) and GLP
- **Temperature range:** -50 to +75 °C
- **Sterilization:** Can be autoclaved for 30 min at 1 bar and 120 °C (material may change color) or with ethylene oxid
- **Restriction:** Segregation of plasticizers is possible



- Use with:
  - Acids: good
  - Lyes: good
  - Solvents: unsuitable
  - Pressure: good
  - Vacuum: good
  - Viscous media: excellent
  - Sterile media: conditional

## Tygon® 2001 for food

- Application: Food industry, well suited to products with high fat contents
- Features:
  - Extremely chemically resistant; e. g. appropriate for the use of polar solvents
  - Plasticizer and oil free
  - Superior flex life in peristaltic pumps
  - Translucent to ease visual inspection
  - Outstanding flexibility
- **Material:** Thermoplastic tube, transparent
- **Complies with the standards:** USP Class VI, FDA (21 CFR 177.2600) and GLP
- **Temperature range:** -78 to +71 °C
- **Sterilization:** Can be autoclaved for 30 min at 1 bar, sterilized by irradiation or with ethylene oxid
- **Restriction:** None



- Use with:
  - Acids: excellent
  - Lyes: excellent
  - Solvents: good
  - Pressure: good
  - Vacuum: good
  - Viscous media: good
  - Sterile media: good

## Tygon® for hydrocarbons

- Application: Especially for hydrocarbons, mineral oil products and distillates
- Features:
  - Ideal for petrol, kerosene, heating oil, cutting solutions and coolants on a glycol base
  - Resistant to ozone and UV
- **Material:** Thermoplastic soft PVC, translucent yellow
- **Complies with the standards:** GLP conform
- **Temperature range:** -40 to +75 °C
- **Sterilization:** Sterilization is not recommended
- **Restriction:** Not suitable for concentrated acids, lyes, food and pharmaceuticals



- Use with:
  - Acids: good
  - Lyes: good
  - Solvents: conditional
  - Pressure: good
  - Vacuum: good
  - Viscous media: excellent
  - Sterile media: conditional

## PharMed®

- Application: Ideal for medical, lab and research uses
- Features:
  - High fatigue strength under repeated reversed bending stresses
  - Non-toxic, biocompatible
  - Very low gas permeability
  - Well suited to acids and bases
- **Material:** Thermoplastic elastomer on a polypropylene basis with plasticizers; excellent tensile strength; opaque
- **Complies with the standards:** FDA (21 CFR 177.2600), USP Class VI, GLP, Pharmacopoea and Europaea
- **Temperature range:** -60 to +135 °C
- **Sterilization:** Can be autoclaved or sterilized with ethylene oxide or sterilized by irradiation
- **Restriction:** Additives may migrate



- Use with:
  - Acids: good
  - Lyes: good
  - Solvents: unsuitable
  - Pressure: good
  - Vacuum: excellent
  - Viscous media: good
  - Sterile media: excellent

## Silicone

- Application: Platinum-coated silicone hose for use in pharmaceuticals and biology
- Features:
  - Extremely smooth interior prevents bacterial growth
  - Biocompatible, minimal adsorption and absorption
  - Best flow properties, high temperature stability
  - Absolutely inert, softener-free
- **Material:** Polydimethyl siloxane with siliceous earth and silicone additives; translucent white; excellent resistance to initial pressure
- **Complies with the standards:** USP Class VI, FDA, meets GLP and NSF
- **Temperature range:** -80 to +200 °C
- **Sterilization:** Can be autoclaved for 30 min at 1 bar or sterilized by irradiation
- **Restriction:** Not suitable for concentrated solvents, oils, acids or dilute caustic soda; relatively high permeability to gas



- Use with:
  - Acids: conditional
  - Lyes: conditional
  - Solvents: unsuitable
  - Pressure: satisfactory
  - Vacuum: good
  - Viscous media: satisfactory
  - Sterile media: excellent

## Viton®

- Application: Excellent acid resistance at high temperatures
- Features:
  - Low gas permeability
  - Resistant to solvents and corrosives at high temperatures
- **Material:** Fluorocarbon rubber, thermoformed Viton B (67% fluorinated); opaque black
- **Complies with the standards:** GLP conform
- **Temperature range:** -30 to +205 °C
- **Sterilization:** 16 hours at +250 °C with hot air circulation recommended
- **Restriction:** Limited performance life



- Use with:
  - Acids: excellent
  - Lyes: excellent
  - Solvents: varies; tests recommended
  - Pressure: good
  - Vacuum: good
  - Viscous media: good
  - Sterile media: satisfactory

Tubing compatibility

Chemical							Chemical							Chemical							Chemical						
	P	S	T	TU	TK	V		P	S	T	TU	TK	V		P	S	T	TU	TK	V		P	S	T	TU	TK	V
<b>A</b> Acetaldehyde	D	C	D	D	D	D	<b>C</b> Calcium oxide	A	A	A	A	A	-	<b>H/I</b> Hydrobromic acid, 20 - 50 %	D	D	A	A	A	A	<b>P</b> Potassium hydroxide, <10 % in W.	A	A	A	D	-	B
Acetic acid, 10 % in W.	A	A	A	A	A	-	Carbon bisulfide	D	D	D	D	D	-	Hydrochloric acid, 10 % in W.	A	A	A	A	A	A	Potassium iodide, 56 % in W.	A	A	A	A	A	-
Acetic acid, 100 %	B	D	D	D	-	-	Carbon tetrachloride	D	D	D	D	D	A	Hydrochloric acid, 37 % in W.	B	D	A	D	A	B	Propanol (propyl alcohol)	C	A	D	D	A	B
Acetic anhydride	A	A	D	D	A	D	Chlorine, wet	D	D	B	B	C	B	Hydrocyanic acid	A	A	A	A	A	A	Pyridine	C	D	D	D	C	D
Acetone	D	C	D	D	C	D	Chloracetic acid, 20 % in W.	B	A	A	D	A	D	Hydrofluoric acid, 10 % in W.	D	D	A	A	A	B	<b>S</b> Silicone oils	C	D	B	A	B	A
Acetonitrile	D	D	D	D	B	D	Chlorobenzene	D	D	D	D	C	A	Hydrofluoric acid, 50 %	D	D	B	D	A	A	Silver nitrate, 55 % in W.	A	A	A	A	A	A
Acetyl bromide	C	D	D	D	C	-	Chloroform	D	D	D	D	C	A	Hydrogen peroxide, 10 % in W.	A	A	A	A	A	A	Soap solutions	B	A	A	A	A	A
Acetyl chloride	C	D	D	D	C	A	Chlorobromomethane	B	D	D	D	-	A	Hydrogen peroxide, 90 % in W.	B	C	D	D	B	-	Sodium bicarbonate, 7 % in W.	A	A	A	A	A	A
Aliphatic hydrocarbons	D	D	D	B	D	-	Chromic acid, 20 % in W.	A	D	B	C	B	A	Hydroiodic acid	B	B	A	A	A	-	Sodium bisulfate	A	-	A	A	A	-
Aluminium chloride, 53 % in W.	A	A	A	A	A	A	Chromic acid, 50 % in W.	C	D	C	D	-	-	Hypochlorous acid, 25 % in W	A	A	A	A	A	A	Sodium borate	A	A	A	A	A	A
Aluminium sulfate, 50 % in W.	A	A	A	A	A	A	Copper salts	A	A	A	A	A	-	Iodine solutions	A	C	A	A	A	-	Sodium carbonate	A	A	A	A	A	B
Alums	A	A	A	A	A	-	Cyclohexane	D	D	D	C	C	A	<b>K/L</b> Ketones	D	D	D	D	C	-	Sodium ferrocyanide	A	A	A	D	-	-
Ammonia, gas and liquid	A	D	B	B	B	D	Cyclohexanone	D	D	D	D	C	D	Lactic acid, 10 % in W.	A	A	A	A	A	-	Sodium hydrosulfite	A	-	A	A	A	-
Ammonium acetate, 45 % in W.	A	A	A	A	A	-	Chlorosulfonic acid	D	D	D	D	D	D	Lactic acid, 85 % in W.	B	D	D	D	-	-	Sodium hydroxide, 10 - 15 % in W.	A	A	A	D	A	B
Ammonium carbonate, 20 % in W.	A	A	A	A	A	-	<b>D</b> Diesel	D	D	-	B	-	-	Lead acetate, 35 % in W.	A	A	A	A	A	-	Sodium hydroxide, 30 - 40 % in W.	A	C	A	D	A	B
Ammonium chloride	A	C	A	A	A	A	Dimethyl formamide	B	A	D	D	A	D	<b>M</b> Manganese salts	A	A	A	A	A	-	Sodium nitrate, 3.5 % in W.	A	A	A	A	A	-
Ammonium hydroxide, 30 % in W.	A	D	A	C	A	A	<b>E</b> Ethanol (ethyl alcohol)	A	B	D	B	A	A	Magnesium chloride, 35 % in W.	A	A	A	A	A	A	Sodium sulfate, 3.6 % in W.	A	A	A	A	-	A
Ammonium nitrate	A	C	A	A	A	-	Ether	C	D	D	C	D	-	Magnesium sulfate, 25 % in W.	A	A	A	A	A	-	Sodium sulfide, 13 % in W.	A	A	A	A	A	-
Ammonium phosphate	A	A	A	A	A	-	Ethyl acetate	B	D	D	D	D	D	Mercury salts	A	A	A	A	A	-	Stearic acid, 5 % in Alc.	C	D	D	B	B	-
Ammonium sulfate	A	A	A	A	A	A	Ethyl bromide	D	D	D	D	C	-	Methane	A	-	A	A	A	A	Sulfuric acid, 10 % in W.	A	A	A	B	A	A
Amyl acetate	B	D	D	D	D	D	Ethyl chloride	C	D	D	D	D	A	Methanol	A	B	D	B	A	D	Sulfuric acid, 30 % in W.	A	B	A	B	A	A
Amyl alcohol	D	D	D	A	A	A	Ethylamine	D	C	D	D	B	-	Methyl Ethyl Ketone	D	D	D	D	C	D	Sulfuric acid, 95 - 98 % in W.	D	D	D	D	C	A
Amyl chloride	C	D	D	D	D	-	Ethylene chlorhydrin	A	B	D	B	A	A	Monoethanolamine	C	D	D	D	D	D	Sulfurous acid	A	A	A	A	A	A
Aniline	C	D	D	D	D	-	Ethylene dichloride	C	D	D	D	D	B	<b>N</b> Naphtha	D	D	D	D	D	A	<b>T</b> Tannic acid, 75 % in W.	B	A	B	D	A	-
Aniline hydrochloride	C	D	D	D	D	D	Ethylene glycol	A	A	A	A	A	A	Nickel salts	A	A	A	A	A	-	Tartaric acid, 56 % in W.	A	A	A	A	A	A
Aqua regia (80 % HCl, 20 % HNO <sub>3</sub> )	D	D	D	D	A	-	Ethylene oxide	A	A	A	A	A	D	Nitric acid, 10 % in W.	A	C	A	D	A	A	Tin salts	A	A	A	A	A	-
Aromatic hydrocarbons	D	D	D	D	D	-	<b>F</b> Fatty acids	C	C	C	C	C	C	Nitric acid, 35 % in W.	A	D	A	D	A	A	Toluene (toluol)	D	D	D	D	C	A
Arsenic salts	A	A	A	A	A	-	Ferric chloride 40 % in W.	A	A	A	A	A	B	Nitric acid, 68 - 71 % in W.	D	D	D	D	A	-	Trichloroacetic acid, 90 % in W.	B	A	A	D	A	C
<b>B</b> Barium salts	A	A	A	A	A	-	Ferric sulfate 5 % in W.	A	A	A	A	A	A	Nitrobenzene	D	D	D	D	C	-	Trichlorethylene	C	D	D	D	C	A
Benzaldehyde	D	C	D	D	C	D	Ferrous chloride 43 % in W.	A	A	A	A	A	-	Nitrous acid, 10 % in W.	A	B	A	C	A	-	Trisodium phosphate	A	A	A	A	A	A
Benzene	D	D	D	D	-	-	Ferrous sulfate 5 % in W.	A	A	A	A	A	-	<b>O</b> Oils, animal	C	A	D	A	B	-	Turpentine	D	D	D	B	A	A
Benzenesulfonic acid	D	D	D	D	D	A	Fluoboric acid, 10 % in W.	D	D	A	A	A	-	Oils, mineral	D	D	C	A	D	A	Urea, 20 % in W.	A	A	A	A	A	-
Boric acid, 4 % in W.	A	A	A	A	A	A	Fluoroborate salts	A	-	A	A	A	-	Oleic acid	C	B	D	B	D	B	Uric acid	A	A	A	C	A	-
Bromine	D	D	D	D	D	A	Fluosilicic acid	C	B	D	B	A	-	<b>P</b> Perchloric acid, 67 % in W.	A	D	C	D	A	A	<b>W/Z</b> Xylene	D	D	D	D	C	B
Butane	A	A	A	A	B	A	Formaldehyde, 37 % in W.	D	C	D	D	C	D	Perchlorethylene	C	D	D	D	D	A	Zinc chloride, 80 % in W.	A	A	A	A	A	A
Butanol (butyl alcohol)	D	D	D	A	A	A	Formic acid, 25 % in W.	A	A	A	C	A	D	Phenol, 91 % in W.	A	B	D	C	A	-							
Butyl acetate	B	D	D	D	D	D	Freon 11	A	A	A	A	-	-	Phosphoric acid 25 % in W.	A	D	A	A	A	A							
Butyric acid	B	D	D	C	D	-	Fruit juice	A	A	A	A	A	A	Phthalic acid, 9 % in Alc.	A	B	D	C	B	-							
							<b>G</b> Gasoline, high-aromatic	D	D	D	B	D	A	Potassium carbonate, 55 % in W.	A	A	A	A	A	-							
							Gasoline, non-aromatic	D	D	D	B	D	A	Potassium cyanide, 33 % in W.	A	A	A	A	-	-							
							Glycerin	A	A	A	A	A	A														

**Tubing:**

P = PharMed®

S = Silicone

T = Tygon® standard

TU = Tygon® hydrocarbon

TK = Tygon® 2001 food

V = Viton®

**Resistance:**

A = excellent

B = good

C = conditional

D = unsuitable

- = not tested

**Please note:**

- All information provided is not guaranteed

- Recommended testing of tubing prior to application use

# Complete Packages at a special price

## For standard applications

### Package PD 5001 SP quick

#### Flow rate from 11 to 130 ml per minute

- Pump drive PD 5001
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
- P/N 523-50019-00

### Package PD 5006 SP quick

#### Flow rate from 57 to 695 ml per minute

- Pump drive PD 5006
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
- P/N 523-50069-00

### Package PD 5006 SP standard

#### Flow rate from 313 to 3,800 ml per minute

- Pump drive PD 5006
  - Complete with pump head SP standard 2.5
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
- P/N 523-50068-00



Package PD 5001 SP quick  
P/N 523-50019-00



Package PD 5201 SP quick  
P/N 523-52019-00

Package PD 5206 SP quick  
P/N 523-52069-00

## For high requirements

### Package PD 5101 SP quick

#### Flow rate from 0.3 to 9.0 ml per minute

- Pump drive PD 5101
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 0.8 mm)
- P/N 523-51019-00

### Package PD 5106 SP quick

#### Flow rate from 26 to 650 ml per minute

- Pump drive PD 5106
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
- P/N 523-51069-00

### Package PD 5106 SP standard

#### Flow rate from 140 to 3,800 ml per minute

- Pump drive PD 5106
  - Complete with pump head SP standard 2.5
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
- P/N 523-51068-00



Package PD 5106 SP standard  
P/N 523-51068-00



Package PD 5201 MC C 4  
P/N 523-52017-00

## For highest requirements

### Package PD 5201 SP quick

#### Flow rate from 0.3 to 9.0 ml per minute

- Pump drive PD 5201
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 0.8 mm)
  - Min. dispensing volume: 0.1 ml
- P/N 523-52019-00

### Package PD 5201 SP quick

#### Flow rate from 5 to 127 ml per minute

- Pump drive PD 5201
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
  - Min. dispensing volume: 1.2 ml
- P/N 523-52019-10

### Package PD 5206 SP quick

#### Flow rate from 26 to 650 ml per minute

- Pump drive PD 5206
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
  - Min. dispensing volume: 5.9 ml
- P/N 523-52069-00

### Package PD 5206 SP quick

#### Flow rate from 90 to 2,100 ml per minute

- Pump drive PD 5206
  - Complete with pump head SP quick 1.6
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
  - Min. dispensing volume: 20.5 ml
- P/N 523-52069-20

### Package PD 5206 SP standard

#### Flow rate from 140 to 3,800 ml per minute

- Pump drive PD 5206
  - Complete with pump head SP standard 2.5
  - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
  - Min. dispensing volume: 33.4 ml
- P/N 523-52068-00

## For multi-channel operations

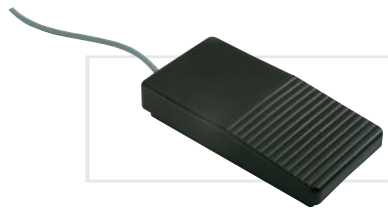
### Package PD 5201 MC C 4

#### Flow rate from 0.1 to 2.0 ml per minute

- Pump drive PD 5201 complete with adaptor
  - Multi-channel pump head C 4
  - 4 Cassette small
  - Tubing set:
    - 4 pcs. Two-Stop-Tubing Tygon (standard) (inner Ø 0.5 mm)
    - 2 m Extension Tube Tygon (standard) (inner Ø 0.5 mm)
    - 8 pcs. Fittings for Extension Tube
  - Min. dispensing volume: 23 µl
- P/N 523-52017-00



## Accessories



**Foot pedal**  
P/N 526-14100-00  
For start and stop  
(PD 5101 / PD 5106 and  
PD 5201 / PD 5206 only)



**Adaptor for multi-channel  
pump heads**  
P/N 526-16000-00  
To connect pump drive to  
multi-channel pump head



**Fitting for extension tubes**  
P/N 526-22000-00  
For tubing diameter 0.2 -2.8 mm

## Configuration Tool

### Choose the right peristaltic pump

Our Configuration Tool helps you to find the most appropriate configuration for your specific application.

This tool is designed to walk you through several questions and upon completion, the Configuration Tool shows you which items we would recommend to meet your requirements.

At [www.heidolph.com](http://www.heidolph.com) you have the possibility to use the tool online.



**Free Configuration Tool CD ROM**  
P/N 27-001-004-03


## Intelligent Evaporation?



## The Hei-VAP Series!

Heidolph offers you a complete system available from one manufacturer. All components are designed to function together perfectly – that guarantees smooth, safe and efficient operation.

This is what we mean by "Research made easy" – to help you concentrate on research, with your findings, your company and millions of people worldwide in mind.

 **Call us for a no obligation demo**





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