

# Precise

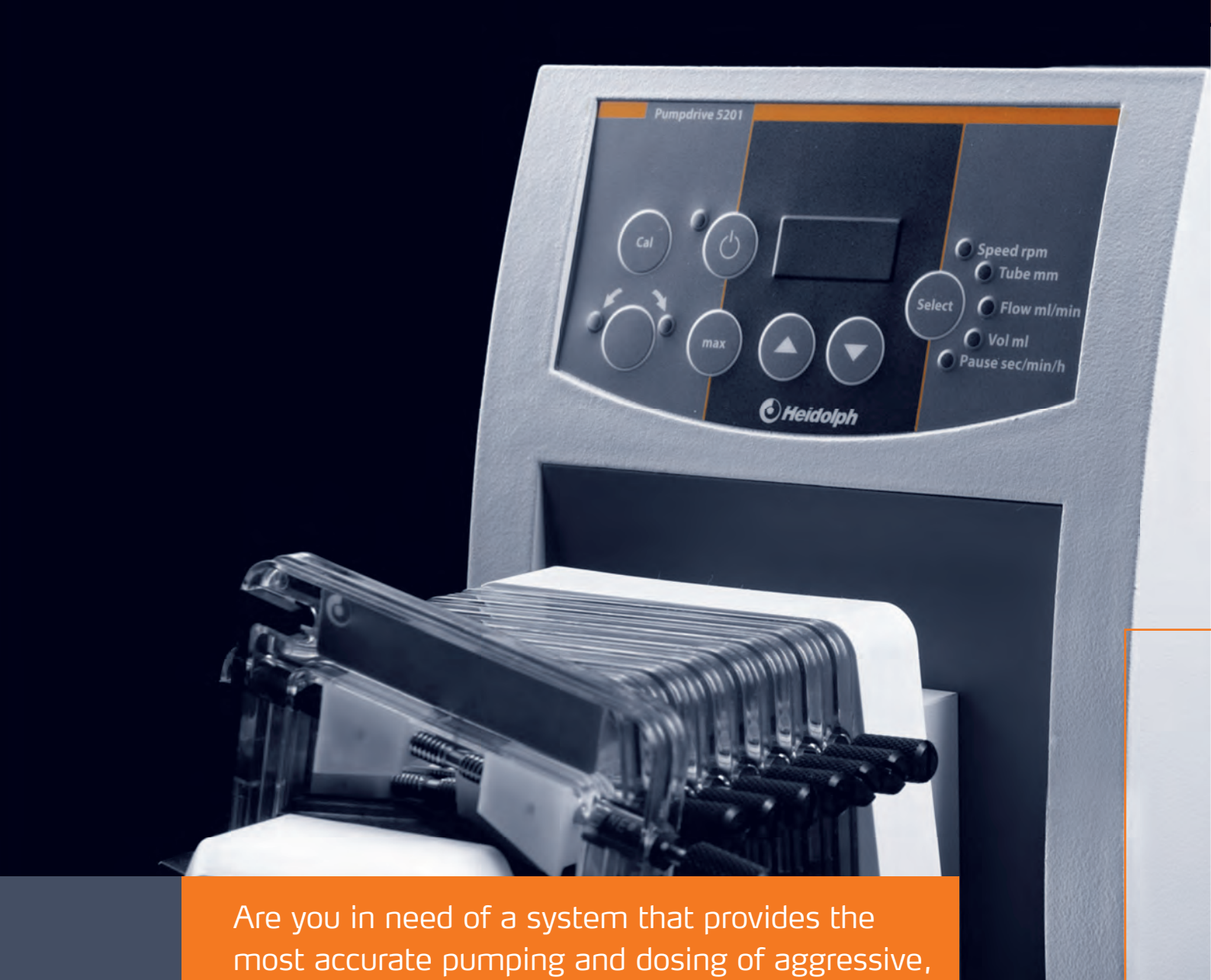
Dosing and Dispensing



Leading Safety Standards

Superior Ease of Use

Reduced Cost of Ownership



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?

## Precise Dosing and Dispensing

The versatile PD Series can offer you all these options with flow rates ranging from 0.005 to 4,151 ml per minute depending on configuration!

## Leading Safety Standards

- 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 that **prevents spilling and splashing of media**. The speed will ramp up slowly until your set rpm has been reached
- Protection class IP 55 protects your unit from highly aggressive vapors or liquids – and thus **eliminates accidents, short-circuits 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**

## Superior Ease of Use

- The PD Series is **self-priming** and **comes without any valves**, thus providing care-free operation
- Analog and digital interfaces **facilitate operation**, e.g. by connecting the optional foot-pedal or PC software program
- Use your valuable lab space efficiently and stack one pump on top of the other to build a space-saving **two-layer system**
- Use a single-channel pump head and **upgrade your model** to multi-channel operation in just minutes with a different pump head
- 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** starting from 0.005 ml/min

## Reduced Cost of Ownership

- 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 while reducing maintenance and repair cost
- Complete packages including pump drive, head and compatible tubing reduce your selection process and give you a **reduced package price**
- Maintenance-free motors **eliminate repairs and down times** to ensure years of continuous operation

# Precise

## Dosing and Dispensing



Leading Safety Standards

Superior Ease of Use

Reduced Cost of Ownership

The average operational **lifespan of 10 years** is backed by a **3 year warranty** and makes your purchase a worthwhile investment.

Safety for continuous operation: the motor will be switched off if a high thermal load situation occurs to **prevent accidents**



**High precision** even for flow rates starting at 0.005 ml/min

Optional foot-pedal remote control via cable to operate pump drive **outside a closed fume hood** facilitate operation

All models feature a smooth start operation which **prevents spills and splashing media**. The speed will ramp up slowly until your set rpm has been reached

For the use in cell biology just use a pump head which features convex rollers and **does not squeeze** the tubing as conventional rollers

### 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 offers you all these options - with flow rates ranging from 0.005 to 4,151 ml per minute depending on configuration



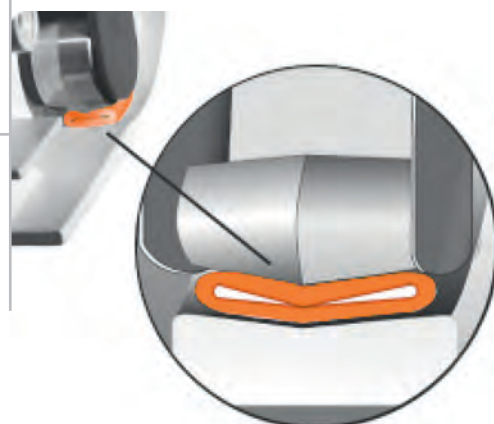
#### YOUR ADVANTAGES

- If you are looking for standard pumping or highly accurate interval dosing and interval operation allowing for standstills and filling of flasks, the PD Series has it all
- Your application media never comes in contact with the pump head – eliminating cross-contamination and the need to clean the unit between projects
- The pumped media remains in the tubing and never comes in contact with you – keeping you and your application safe
- The versatile PD Series offers you all these options - with flow rates ranging from 0.005 to 4,151 ml per minute depending on configuration
- Choose from 6 different pump drives, 3 pump heads for single-channel use, and 4 additional pump heads for multi-channel use that can accommodate up to 12 cassettes

### Pump heads

Are you engaged in a highly specialized application such as cell biology and do you 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!



#### YOUR ADVANTAGES

- For the use in cell biology, choose a pump head which features convex rollers that do not squeeze the tubing, as would conventional rollers
- Consequently, organic cell cultures are not crushed and your samples are safely transported
- A wide range of tubing material is available – choose the most appropriate material for your research: whether FDA-approved material for food analysis or material for aggressive media such as acids – you find it right here



## ➤ Pump Drive PD 5001 / PD 5006

### For standard applications and liquid transfer

Pumps include leading safety standards and features for superior ease of use and reduced cost of ownership, plus:

- Adjust the variable speed from 10 - 600 rpm on the analog control knob. **Your speed is held constant** even under changing loads
- These models feature electronic speed control at an **accuracy rate of  $\pm 2\%$**
- At the press of a button the pump operates **clockwise or counter-clockwise**



#### PD 5001

Flow rates of 0.65 - 861 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 - 364 ml/min
- Upgrade your PD 5001 for multi-channel operation in just minutes with a pump head adaptor: P/N 526-16000-00

**PD 5001**  
P/N 523-50010-00

#### PD 5006

Flow rates of 3.0 - 4,151 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

## ➤ Pump Drive PD 5101 / PD 5106

### For reproducible results and liquid transfer

Pumps include leading safety standards and features for superior ease of use and reduced cost of ownership, plus:

- Control speed (rpm), direction and On/Off function via **analog interface** for 0 - 10 V or 4 - 20 mA
- Adjust the variable speed from 5 - 600 rpm on the analog control knob. **Your speed is held constant** even under changing loads
- These models feature electronic speed control at an **accuracy of  $\pm 0.5\%$**
- These models connect 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 and superior ease of use in multiple sample fills
- A press of the max button **accelerates** the **filling and draining** of your tube
- At the press of a button the pump operates **clockwise or counter-clockwise**



#### PD 5101

Flow rates of 0.36 - 813 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 - 329 ml/min
- Upgrade your PD 5101 for multi-channel operation in just minutes with a pump head adaptor: P/N 526-16000-00

**PD 5101**  
P/N 523-51010-00

#### PD 5106

Flow rates of 1.0 - 4,056 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

## ➤ Pump Drive PD 5201 / PD 5206

### Reproducibility - pumping and dosing

Pumps include leading safety standards and features for superior ease of use and reduced cost of ownership, plus:

- Control speed (rpm), direction and On/Off function via **analog interface** for 0 – 10 V or 4 – 20 mA or digital **RS 232 interface**
- 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 control buttons
- These models connect 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 and superior ease of use in multiple sample fills
- These models feature electronic speed control at an **accuracy of  $\pm 0.5\%$**
- A press of the max button **accelerates the filling and draining** of your tube
- At the press of a button the pump operates **clockwise or counter-clockwise**
- Calibrate** your flow volume and flow rate individually



### PD 5201

Flow rates of 0.36 - 813 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 - 329 ml/min
- Upgrade your PD 5201 for multi-channel operation in just minutes with a pump head adaptor: P/N 526-16000-00

PD 5201  
P/N 523-52010-00

### PD 5206

Flow rates of 1.0 - 4,056 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

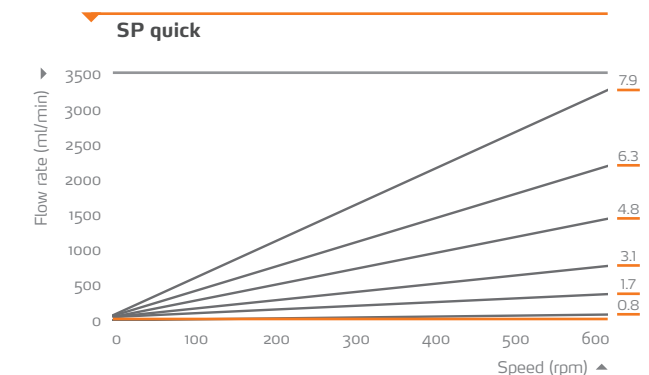
## ➤ Single-Channel Pump Heads

### 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, flow rate ranges from 0.38 to 3,436 ml per minute



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



### SP standard

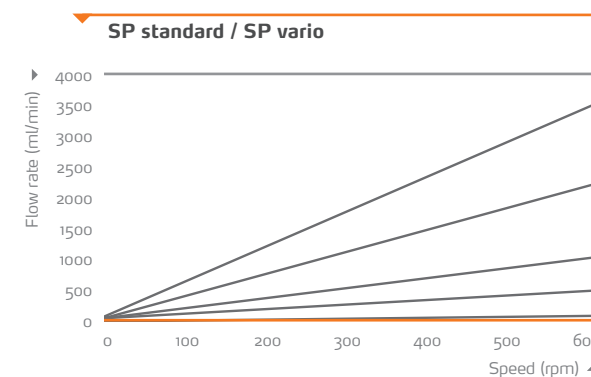
- Recommended for standard applications
- Convex rollers do not squeeze or crush organic cell cultures
- Pump head features ball bearings
- Rollers made of stainless steel and polyamide
- For tubes with a 1.6-mm or 2.5-mm wall thickness (wt)
- Depending on drive and tubing, the flow rate ranges from 2.0 to 4,151 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  
P/N 523-45110-00



### 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 2.0 to 4,151 ml per minute



+



+



= Single-channel pump

➤ **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.
PD 5106 / 5206	(ml/min)			11	257	43	1,017	105	2,549	167	4,056
PD 5006	(ml/min)			22	249	93	1,037	228	2,613	364	4,151
PD 5101 / 5201	(ml/min)			2	55	9	221	21	530	33	813
PD 5001	(ml/min)			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) not suitable for pump drive PD 5006	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) not suitable for pump drive PD 5006	525-85000-00	525-89000-00	-

Flow rates pertain to Tygon® (standard) tubing and water

➤ **Multi-Channel Pumps**

These pump drives can 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 in a single operation by using different tubing dimensions to adjust flow rate
- 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
- Cassette adjustments and changes are simple, just click in place
- No additional purchase of a pump drive needed: upgrade your single-channel pump drive with just one adaptor for multi-channel use and pick the head/cassette configuration that matches your application needs



PD 5101 + adaptor + pump head C 4 + cassette small

**Multi-channel pump heads**



**Masterflex multi-channel pump head**

- Constructed with rugged anodized aluminum frames, stainless steel rotor assemblies and a precision machined aluminum occlusion bed for 4 channels
- This occlusion bed is designed to compress the tubing for optimum performance – no occlusion adjustment is required
- Thus, it is possible that several pump heads can operate parallel at the same time

P/N 524-60430-00

**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 pump head C 8**

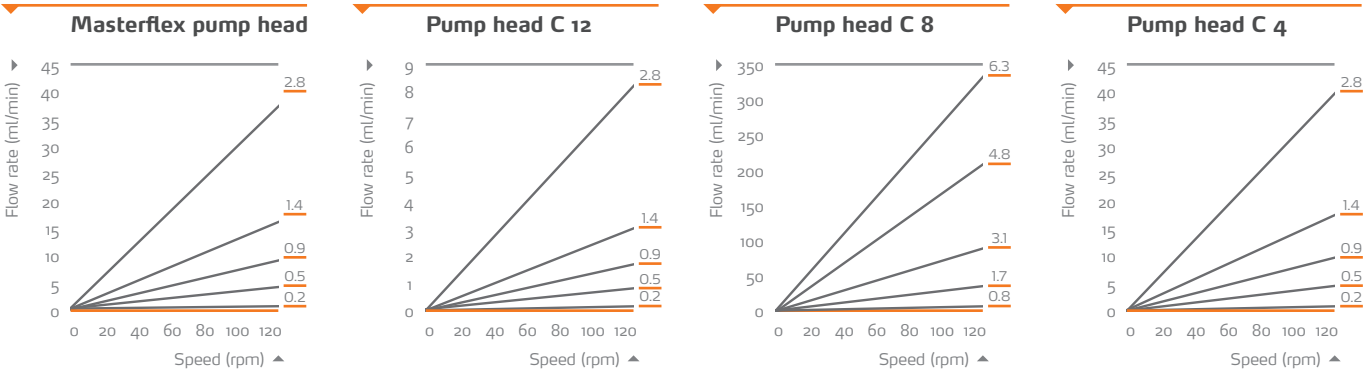
- Accepts 8 cassettes medium or 4 cassettes large
- Medium and large-size cassettes may be used together
- 4-roller design

P/N 524-40810-00

**Multi-channel pump head C 4**

- Accepts 4 cassettes small
- 8 rollers for low pulsation

P/N 524-80420-00





➤ Multi-Channel Cassettes

- Setting screws to adjust roller contact pressure
- Cassettes easily change even while pumping
- All cassettes accept different tube materials and sizes (refer to page 141)



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



Cassette medium

- Flow rates from 0.24 to 27 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 364 ml/min
- Suitable for tubes with 1.6-mm wall thickness (wt)
- Tube diameters available: 1.7 / 3.1 / 4.8 and 6.3 mm
- Tube available in requested sizes
- Combinations:
  - C 8 multi-channel pump head: Max. 4 cassettes large

Cassette large  
P/N 524-90010-00



➤ 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	526-22000-00	526-22000-00	526-22000-00	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 oxide
- **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 content
- **Features:**
  - Extremely chemical-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 oxide
- **Restriction:** Not suitable for pump drive PD 5006

- **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 base with plasticizers; excellent tensile strength; opaque
- **Complies with the standards:** FDA (21 CFR 177.2600), USP Class VI, GLP, Pharmacopoea and Europaea
- **Temperature range:** -40 to +75 °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:** Polydimethylsiloxane 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	P	S	T	TU	TK	V
A	Acetaldehyde	D	C	D	D	D	D
	Acetic acid, 10 % in W.	A	A	A	A	A	-
	Acetic acid, 100 %	B	D	D	D	-	-
	Acetic anhydride	A	A	D	D	A	D
	Acetone	D	C	D	D	C	D
	Acetonitrile	C	D	D	D	B	D
	Acetyl bromide	C	D	D	D	C	-
	Acetyl chloride	C	D	D	D	C	A
	Aliphatic hydrocarbons	D	D	D	B	D	-
	Aluminum chloride, 53 % in W.	A	A	A	A	A	A
	Aluminum sulfate, 50 % in W.	A	A	A	A	A	A
	Alums	A	A	A	A	A	-
	Ammonia, gas and liquid	A	D	B	B	B	D
	Ammonium acetate, 45 % in W.	A	A	A	A	A	-
	Ammonium carbonate, 20 % in W.	A	A	A	A	A	A
	Ammonium chloride	A	C	A	A	A	A
	Ammonium hydroxide, 30 % in W.	A	D	A	C	A	B
	Ammonium nitrate	A	C	A	A	A	-
	Ammonium phosphate	A	A	A	A	A	-
	Ammonium sulfate	B	A	A	A	A	D
	Amyl acetate	B	D	D	D	D	A
B	Amyl alcohol	D	D	D	A	A	A
	Amyl chloride	C	D	D	D	D	-
	Aniline	C	D	D	D	D	D
	Aniline hydrochloride	C	D	D	D	D	B
	Aqua regia (80 % HCl, 20 % HNO <sub>3</sub> )	D	D	D	D	A	-
	Aromatic hydrocarbons	A	D	D	D	D	-
	Arsenic salts	A	A	A	A	A	-
	Barium salts	A	A	A	A	A	-
	Benzaldehyde	D	C	D	D	C	D
	Benzene	D	D	D	D	-	-

	Chemical	P	S	T	TU	TK	V
C	Calcium oxide	A	A	A	A	A	-
	Carbon bisulfide	D	D	D	D	D	-
	Carbon tetrachloride	D	D	D	D	D	A
	Chlorine, wet	D	D	B	B	C	B
	Chloracetic acid, 20 % in W.	B	A	A	D	A	D
	Chlorobenzene	D	D	D	D	C	A
	Chloroform	D	D	D	D	C	A
	Chlorobromomethane	B	D	D	D	-	A
	Chromic acid, 20 % in W.	A	D	B	C	B	A
	Chromic acid, 50 % in W.	C	D	C	D	-	-
D	Copper salts	A	A	A	A	A	-
	Cyclohexane	D	D	D	C	D	A
	Cyclohexanone	D	D	D	D	C	D
	Chlorosulfonic acid	D	D	D	D	D	D
	Diesel	D	D	D	B	-	-
	Dimethyl formamide	B	B	D	D	A	D
	Ethanol (ethyl alcohol)	A	B	D	B	A	A
	Ether	C	D	D	C	D	-
	Ethyl acetate	B	D	D	D	D	D
	Ethyl bromide	D	D	D	D	C	-
E	Ethyl chloride	C	D	D	D	D	A
	Ethylamine	D	C	D	D	B	-
	Ethylene chlorhydrin	A	B	D	B	A	A
	Ethylene dichloride	C	D	D	D	D	B
	Ethylene glycol	A	A	A	A	A	A
	Ethylene oxide	A	D	A	A	A	D
	Fatty acids	C	B	B	C	C	C
	Ferric chloride 40 % in W.	A	A	A	A	A	B
	Ferric sulfate 5 % in W.	A	A	A	A	A	A
	Ferrous chloride 43 % in W.	A	A	A	A	A	-
F	Ferrous sulfate 5 % in W.	A	A	A	A	A	-
	Fluoboric acid, 10 % in W.	D	D	A	A	A	-
	Fluoroborate salts	A	-	A	A	A	-
	Fluosilicic acid	C	B	D	B	A	-
	Formaldehyde, 37 % in W.	D	C	D	D	C	D
	Formic acid, 25 % in W.	A	A	A	C	A	D
	Freon 11	A	A	A	A	-	-
	Fruit juice	A	A	A	A	A	A
	Gasoline, high-aromatic	D	D	D	B	D	A
	Gasoline, non-aromatic	D	D	D	B	D	A
G	Glycerin	A	A	A	A	A	A

	Chemical	P	S	T	TU	TK	V
H/J	Hydrobromic acid, 20 - 50 %	D	D	A	A	A	A
	Hydrochloric acid, 10 % in W.	A	D	A	A	A	A
	Hydrochloric acid, 37 % in W.	B	D	A	D	A	B
	Hydrocyanic acid	A	A	A	A	A	A
	Hydrofluoric acid, 10 % in W.	D	D	C	A	A	B
	Hydrofluoric acid, 50 %	D	D	D	D	A	A
	Hydrogen peroxide, 10 % in W.	A	A	A	A	A	A
	Hydrogen peroxide, 90 % in W.	B	C	D	D	B	-
	Hydroiodic acid	B	B	A	A	A	-
	Hypochlorous acid, 25 % in W	A	A	A	A	A	A
K/L	Iodine solutions	A	C	A	A	A	-
	Ketones	D	D	D	D	C	-
	Lactic acid, 10 % in W.	A	A	A	A	A	-
	Lactic acid, 85 % in W.	B	D	D	D	-	-
	Lead acetate, 35 % in W.	A	A	A	A	A	-
	Manganese salts	A	A	A	A	A	-
	Magnesium chloride, 35 % in W.	A	A	A	A	A	A
	Magnesium sulfate, 25 % in W.	A	A	A	A	A	-
	Mercury salts	A	A	A	A	A	-
	Methane	A	-	A	A	A	A
M	Methanol	A	B	D	B	A	D
	Methyl Ethyl Ketone	D	D	D	D	C	D
	Monoethanolamine	C	D	D	D	D	D
	Naphtha	D	D	D	D	D	A
	Nickel salts	A	A	A	A	A	-
	Nitric acid, 10 % in W.	A	C	A	D	A	A
	Nitric acid, 35 % in W.	A	D	A	D	A	A
	Nitric acid, 68 - 71 % in W.	D	D	D	D	D	-
	Nitrobenzene	D	D	D	D	C	-
	Nitrous acid, 10 % in W.	A	B	A	C	A	-
O	Oils, animal	C	A	D	A	B	-
	Oils, mineral	D	D	C	A	D	A
	Oleic acid	C	B	D	B	D	B
	Perchloric acid, 67 % in W.	A	D	C	D	A	A
	Perchlorethylene	C	D	D	D	D	A
	Phenol, 91 % in W.	A	D	D	C	A	-
	Phosphoric acid 25 % in W.	A	D	A	A	A	A
	Phthalic acid, 9 % in Alc.	A	B	D	C	B	-
	Potassium carbonate, 55 % in W.	A	A	A	A	A	-
	Potassium cyanide, 33 % in W.	A	A	A	A	-	-
P	Perchloric acid, 67 % in W.	A	D	C	D	A	A
	Perchlorethylene	C	D	D	D	D	A
	Phenol, 91 % in W.	A	D	D	C	A	-
	Phosphoric acid 25 % in W.	A	D	A	A	A	A
	Phthalic acid, 9 % in Alc.	A	B	D	C	B	-
	Potassium carbonate, 55 % in W.	A	A	A	A	A	-
	Potassium cyanide, 33 % in W.	A	A	A	A	-	-

**Tubing:**  
P = PharMed®  
S = Silicone  
T = Tygon® standard  
TU = Tygon® for hydrocarbons  
TK = Tygon® 2001 for food  
V = Viton®

**Resistance:**  
A = excellent  
B = good  
C = conditional  
D = unsuitable  
- = not tested

**Please note:**  
- All information provided here is not guaranteed to be correct  
- Recommended testing of tubing prior to application use

	Chemical	P	S	T	TU	TK	V
Q/S	Potassium hydroxide, <10 % in W.	A	A	A	D	-	B
	Potassium iodide, 56 % in W.	A	A	A	A	A	-
	Propanol (propyl alcohol)	C	A	D	D	A	B
	Pyridine	C	D	D	D	C	D
	Silicone oils	C	D	B	A	B	A
	Silver nitrate, 55 % in W.	A	A	A	A	A	A
	Soap solutions	B	A	A	A	A	A
	Sodium bicarbonate, 7 % in W.	A	A	A	A	A	A
	Sodium bisulfate	A	-	A	A	A	-
	Sodium borate	A	A	A	A	A	A
T	Sodium carbonate	A	A	A	A	A	B
	Sodium ferrocyanide	A	A	A	D	-	-
	Sodium hydrosulfite	A	-	A	A	A	-
	Sodium hydroxide, 10 - 15 % in W.	A	A	A	D	A	B
	Sodium hydroxide, 30 - 40 % in W.	A	C	C	D	A	B
	Sodium nitrate, 3.5 % in W.	A	A	A	A	A	-
	Sodium sulfate, 3.6 % in W.	A	A	A	A	-	A
	Sodium sulfide, 13 % in W.	A	A	A	A	A	-
	Stearic acid, 5 % in Alc.	C	D	D	B	B	-
	Sulfuric acid, 10 % in W.	A	A	A	B	A	A
W/Z	Sulfuric acid, 30 % in W.	A	B	A	B	A	A
	Sulfuric acid, 95 - 98 % in W.	D	D	D	D	C	A
	Sulfurous acid	A	A	A	A	A	A
	Tannic acid, 75 % in W.	B	A	B	D	A	-
	Tartaric acid, 56 % in W.	A	A	A	A	A	A
	Tin salts	A	A	A	A	A	-
	Toluene (toluol)	D	D	D	D	C	A
	Trichloroacetic acid, 90 % in W.	B	D	A	D	A	C
	Trichlorethylene	C	D	D	D	C	A
	Trisodium phosphate	A	A	A	A	A	A
X	Turpentine	D	D	D	B	A	A
	Urea, 20 % in W.	A	A	A	A	A	-
	Uric acid	A	A	A	C	A	-
	Xylene	D	D	D	D	C	B
	Zinc chloride, 80 % in W.	A	A	A	A	A	A

➤ Accessories



Foot-pedal

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



Adaptor for multi-channel pump heads

To connect pump drive to  
multi-channel pump head  
P/N 526-16000-00



Fitting for extension tubes

For tubing diameter 0.2 - 2.8 mm  
P/N 526-22000-00

➤ PD Plug & Play Packages

For standard applications

PD Plug & Play 5001 SP quick

Flow rate from 11 to 134 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

PD Plug & Play 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

PD Plug & Play 5006 SP standard

Flow rate from 313 to 3,782 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

For high requirements

PD Plug & Play 5101 SP quick

Flow rate from 0.38 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

PD Plug & Play 5106 SP quick

Flow rate from 26 to 653 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

PD Plug & Play 5106 SP standard

Flow rate from 139 to 3,821 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

For highest requirements

PD Plug & Play 5201 SP quick

Flow rate from 0.38 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

PD Plug & Play 5206 SP quick

Flow rate from 26 to 653 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

PD Plug & Play 5201 SP quick 2

Flow rate from 5 to 126 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

PD Plug & Play 5206 SP standard

Flow rate from 139 to 3,821 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

PD Plug & Play 5206 SP quick 2

Flow rate from 89 to 2,072 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

For multi-channel operations

PD Plug & Play 5201 multi-channel C 4

Flow rate from 0.08 to 2.0 ml per minute

- Pump drive PD 5201 complete with adaptor
  - Multi-channel pump head C 4
  - 4 cassettes 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: 0.023 ml
- P/N 523-52017-00

Flow rates pertain to water

➤ 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/min)	0.65 – 861	3.0 – 4,151	0.36 – 813	1.0 – 4,056	0.36 – 813	1.0 – 4,056
Flow rates multi-channel pumps (ml/min)	0.005 – 364	–	0.005 – 329	–	0.005 – 329	–
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 direction of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direction of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direction of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direction of rotation start/stop
Digital interface	–	–	–	–	RS 232	RS 232
Flow rate indicator	–	–	–	–	digital	digital
Volume dosing (ml)	–	–	–	–	0.001 – 9,999	0.001 – 9,999
Interval dosing (ml)	–	–	–	–	0.001 – 9,999 in breaks 0.1 sec – 750 h	0.001 – 9,999 in breaks 0.1 sec – 750 h
Smooth start	–	–	–	–	yes	yes
Electronic brake	–	–	–	–	yes	yes
Foot-pedal connection	–	–	yes	yes	yes	yes
Continuous operation (hours/days)	24/7	24/7	24/7	24/7	24/7	24/7
Safety feature	overheat protection	overheat protection	electronic current limiter and overheat protection	electronic current limiter and overheat protection	electronic current limiter and overheat protection	electronic 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 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity
Dimensions (w x d x h) (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

\* Flow-rate accuracy pertains to water without counter pressure  
Standard supply voltage: 230 V - other voltages upon request, please specify for order



Certificate

To confirm the ability for  
continuous operation  
of the PD Series Peristaltic Pumps

The PD Series Peristaltic Pumps feature overtemperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore are designed for continuous operation.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, January 2013

*Jan Welzien*

i. V. Jan Welzien  
Technical Director

*S. Richter*

i. V. Stefan Richter  
Quality Control Director





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