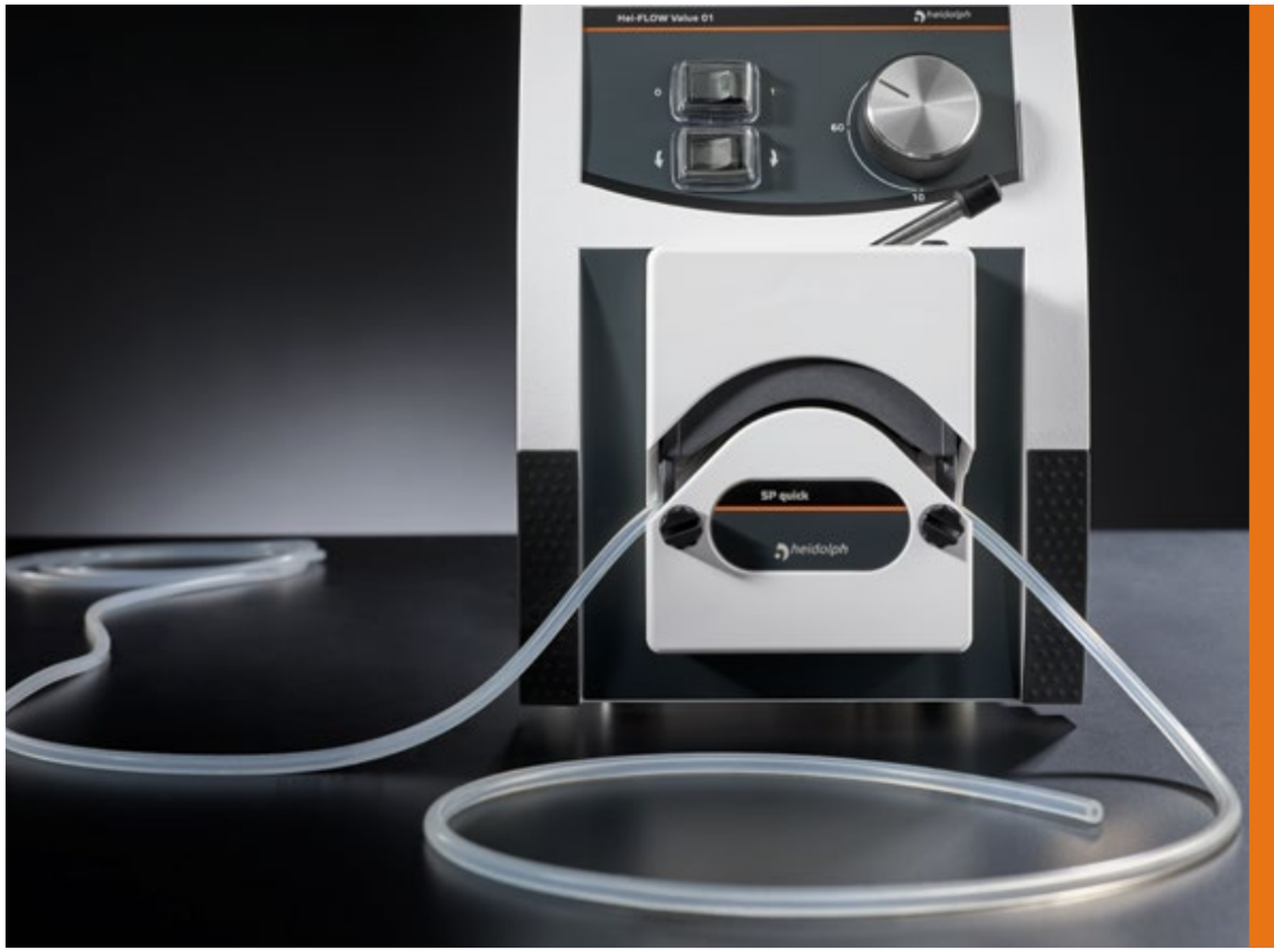
Hei-FLOW Peristaltic Pumps

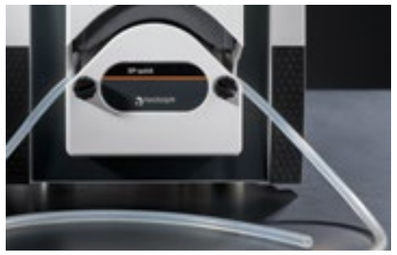
Continuous pumping, precise dosing

Whether simple pumping or precise dosing. Even in interval mode, with pauses for filling small vessels – the Hei-FLOW series meets all your requirements. Thanks to the large selection of pump heads, the peristaltic pumps can be customized.



Leading Safety Standards

- Motors with soft start reliably protect against spraying medium: The speed is slowly increased to the set speed
- The spark-free motors guarantee additional safety
- High resistance to corrosive vapors and liquids due to protection class IP 55. Short-circuits, failures and accidents are prevented
- Additional safety during unattended continuous operation: To prevent overheating, the motor is switched off in the event of permanent overload
- With the optional foot switch, selected models can also be controlled in a closed fume hood
- The medium to be pumped is only in contact with the inside of the tubing and not with the pump itself

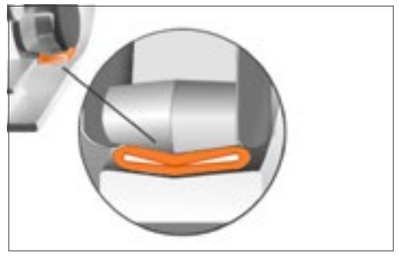


Superior Ease of Use

- The pumps of the Hei-FLOW series are self-priming and do not require seals or valves
- Analog and digital interfaces, for example for connecting the remote control for easier operation
- Thanks to the high precision, minimum volumes of only 0.005 ml/min can be pumped
- The drive for a standard pump head can be converted to a multi-channel system in minutes
- The clearly arranged control panel is self-explanatory and makes everyday use easier
- Efficient use of valuable laboratory space: The pumps can be stacked two-fold
- Basically, the pump heads do not have to be cleaned as they pump contamination-free – this saves cleaning between two applications
- There are 3 pump types, each with two different gear ratios – fast or powerful

Reduced Cost of Ownership

- The sealed housing reliably protects the pump against corrosion and increases the operational lifespan to more than 10 years. Maintenance and repair costs are reduced at the same time
- Complete packages with pump head and tubing spare from searching for compatible components and are available at an attractive price
- Maintenance-free motors avoid downtimes and repair costs
- The matching tubing for every application – from certified materials for food (FDA) and pharmaceuticals to materials for organic media – everything is included in the large range of accessories



A pump head with convex shaped rollers that does not pinch the tubing in the conventional way is suitable for cell research.

MADE IN GERMANY

All Benefits at a Glance

3-year warranty on all devices and an average operational lifespan of more than 10 years

Precise Dosing and Dispensing

Motors with soft start reliably protect against spraying medium: The speed is slowly increased to the set speed

All models meet the high protection class IP 55. Corrosion and short circuits are avoided

Highest precision even at minimum flow rates of 0.005 ml/min

The use of an optional foot switch allows operation behind closed fume hoods and facilitates filling operations; your hands are free for other activities

Additional safety during unattended continuous operation: To prevent overheating from the outset, the motor is switched off in the event of permanent overload.

For applications in biology: The pump head with convex shaped rollers enables cell-protecting pumping

Hei-FLOW Value

The intuitive companion for simple pumping tasks

Value 01

For standard applications in the low speed range and powerful with higher torque with single-channel pump heads from 0.85 to 861 ml/min

Value 06

For single channel standard applications in the high speed range and flow rates from 4.0 to 4,151 ml/min*

- Analog control of pumping speed:
  Type 01: from 10 to 120 rpm;
  Type 06: from 50 to 600 rpm
- Constant speed even under changing loads
- Pumping with an accuracy of ± 5 %
- Change of flow direction in clockwise or counter-clockwise direction possible

* with single-channel pump head

Value 01 Multi

Incl. adapter for multi-channel pump heads for flow rates from 0.005 to 364 ml/min

**Multi-channel pump heads achieve flow rates between 0.005 and 364 ml/min.
Easy to retrofit with adapter attachment and corresponding pump head.**

Model		P/N
Hei-FLOW Value 01		523-50010-00
Hei-FLOW Value 01 Multi	incl. adapter for multi-channel pump heads	523-50013-00
Hei-FLOW Value 06		523-50060-00

Hei-FLOW Advantage

For reproducible pumping tasks

With analogue interface for controlling speed and direction of rotation as well as on/off function.

Advantage 01

With low speed range and powerful with higher torque from 0.38 to 813 ml/min

Advantage 06

With high speed range for flow rates with single-channel pump heads from 2.0 to 4,056 ml/min

- Analog control of pumping speed:
  Type 01: from 5–120 rpm
  Type 06: from 24–600 rpm
- Constant speed even under changing loads by means of electronic speed control
- Pumping with an accuracy of ± 3.5 %
- Maximum speed button accelerates filling and emptying of the tubes
- Change of flow direction in clockwise or counter-clockwise direction possible
- With the optional foot switch, can also be controlled in a closed fume hood

Advantage 01 Multi

For even higher precision with adapters for multi-channel pump heads. For flow rates of 0.005 to 329 ml/min

Multi-channel cassette in three sizes for flow rates of 0.005 to 364 ml/min
(see page 59)

Model		P/N
Hei-FLOW Advantage 01		523-51010-00
Hei-FLOW Advantage 01 Multi	incl. adapter for multi-channel pump heads	523-51013-00
Hei-FLOW Advantage 06		523-51060-00

Hei-FLOW Precision

For highest demands – the precise pump for exact dosing

With digital display and analogue and digital interface. Individual calibration of flow rate and volume possible.

- Control of speed, direction of rotation and on/off function via analog interface for 0 to 10 V, 4 to 20 mA DC or digital via the integrated RS 232 interface
- Easy calibration of pumping volume and flow rate
- Pumping characteristics of the pump heads are stored in the program, digital indication in the display
- With change of flow direction in clockwise or counter-clockwise direction
- Process parameters are freely adjustable: Speed, tube diameter, dosing volume, interval dosing and pause times
- Pumping accuracy of ± 1% with Precision 01 and ± 2 % with Precision 06, guarantees constant speeds even under load changes
- With button for maximum speed. Accelerates filling and emptying of the tubes

Precision 01

For higher precision in the low speed range for flow rates from 0.38 to 813 ml/min

Precision 06

With high speed range for flow rates with single-channel pump heads from 2.0 to 4,056 ml/min

Precision 01 Multi

Incl. adapter for multi-channel pumps for maximum precision at flow rates from 0.005 to 364 ml/min

Starting and stopping the dosing process with the optionally available foot switch – your hands are free for other tasks
(see page 48)

Model		P/N
Hei-FLOW Precision 01		523-51010-00
Hei-FLOW Precision 01 Multi	incl. adapter for multi-channel pump heads	523-51013-00
Hei-FLOW Precision 06		523-51060-00

Packages with Multi-Channel Pump Heads

Hei-FLOW Peristaltic Pumps

Hei-FLOW SILVER 1

- Hei-FLOW Value 01
- SP quick 1.6
- 1 m each Tygon and silicone tube (inside Ø 3.1 mm)

P/N 523-50019-00

Hei-FLOW SILVER 2

- Hei-FLOW Value 06
- SP standard 2.5
- 1 m each Tygon and silicone tube (inside Ø 6.4 mm)

P/N 523-50068-00

Hei-FLOW GOLD

- Hei-FLOW Advantage 01
- SP quick 1.6
- 1 m each Tygon and silicone tube (inside Ø 0.8 mm)

P/N 523-51019-00

Hei-FLOW PLATINUM

- Hei-FLOW Precision 01
- SP quick 1.6
- 1 m each Tygon and silicone tube (inside Ø 0.8 mm)

P/N 523-52019-00

Accessories

Foot Switch

For starting and stopping the pumping and dosing process for: Hei-FLOW Advantage 01/06 and Hei-FLOW Precision 01/06

P/N 526-14100-00

Adaptor for multi-channel pump heads

For Hei-FLOW Value 01/Advantage 01/Precision 01. Connection between pump drive and multi-channel pump head

P/N 526-16000-00

Tubing Connector

For tubing sizes 0.2 – 2.8 mm

P/N 526-22000-00

RS 232 Cable

For connecting Hei-FLOW Precision pumps to a PC via the digital interface (RS 232)

P/N 14-007-040-68

Technical Specifications

Hei-FLOW Value

Model		Hei-FLOW Value 01	Hei-FLOW Value 06
Flow rates single-channel pumps		0.85–861 ml/min	4.0–4,151 ml/min
Flow rates multi-channel pumps		0.005–364 ml/min	–
Flow rate accuracy*		±5 %	±5 %
Speed range		10–120 rpm	50–600 rpm
Speed setting		scale	scale
Electronic speed control		digital	digital
Control accuracy motor		±0.5 %	±0.5 %
Select direction of rotation		CW/CCW	CW/CCW
Motor power		100 W	100 W
Supply power		100 W	100 W
Analog interface		–	–
Digital interface		–	–
Flow rate indicator		–	–
Volume dosing		–	–
Interval dosing		–	–
Smooth start		–	–
Electronic brake		–	–
Foot-pedal connection		–	–
Continuous operation	**hours/days**	24/7	24/7
Safety feature		overheat protection	overheat protection
Weight		7.6 kg	7.1 kg
Dimensions	**w/d/h**	166 × 256 × 225 mm	166 × 256 × 225 mm
Permissible ambient conditions		5 – 31 °C at 80 % rel. humidity, 32 – 40 °C decreasing linearly up to max. 50 % rel. humidity	5 – 31 °C at 80 % rel. humidity, 32 – 40 °C decreasing linearly up to max. 50 % rel. humidity
Protection class	**DIN EN 60529**	IP 55	IP 55

Standard supply voltage: 230 V. Other voltages upon request, please specify for order.

* Flow-rate accuracy pertains to water without counter pressure

Technical Specifications

Hei-FLOW Advantage

Model	Hei-FLOW Advantage 01	Hei-FLOW Advantage 06
Flow rates single-channel pumps	0.38–813 ml/min	2.0–4,056 ml/min
Flow rates multi-channel pumps	0.005–329 ml/min	–
Flow rate accuracy*	±3.5 %	±3.5 %
Speed range	5–120 rpm	24–600 rpm
Speed setting	scale	scale
Electronic speed control	digital	digital
Control accuracy motor	±0.5 %	±0.5 %
Select direction of rotation	CW/CCW	CW/CCW
Motor power	100 W	100 W
Supply power	100 W	100 W
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
Digital interface	–	–
Flow rate indicator	–	–
Volume dosing	–	–
Interval dosing	–	–
Smooth start	–	–
Electronic brake	–	–
Foot-pedal connection	yes	yes
Continuous operation hours/days	24/7	24/7
Safety feature	electronic current limiter and overheat protection	electronic current limiter and overheat protection
Weight	7.6 kg	7.3 kg
Dimensions w/d/h	166×256×225 mm	166×256×225 mm
Permissible ambient conditions	5–31 °C at 80 % rel. humidity, 32–40 °C decreasing linearly up to max. 50 % rel. humidity	5–31 °C at 80 % rel. humidity, 32–40 °C decreasing linearly up to max. 50 % rel. humidity
Protection class DIN EN 60529	IP 55	IP 55

Standard supply voltage: 230 V. Other voltages upon request, please specify for order.

* Flow-rate accuracy pertains to water without counter pressure

Technical Specifications

Hei-FLOW Precision

Model	Hei-FLOW Precision 01	Hei-FLOW Precision 06
Flow rates single-channel pumps	0.38– 813 ml/min	2.0–4,056 ml/min
Flow rates multi-channel pumps	0.005–329 ml/min	–
Flow rate accuracy*	±1 %	±2 %
Speed range	5–120 rpm	24–600 rpm
Speed setting	digital	digital
Electronic speed control	digital	digital
Control accuracy motor	±0.5 %	±0.5 %
Select direction of rotation	CW / CCW	CW / CCW
Motor power	100 W	100 W
Supply power	100 W	100 W
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
Digital interface	RS 232	RS 232
Flow rate indicator	digital	digital
Volume dosing	0.001–9,999 ml	0.001–9,999 ml
Interval dosing	0.001–9,999 ml in breaks 0.1 sec–750 h	0.001–9,999 ml in breaks 0.1 sec–750 h
Smooth start	yes	yes
Electronic brake	yes	yes
Foot-pedal connection	yes	yes
Continuous operation hours/days	24/7	24/7
Safety feature	electronic current limiter and overheat protection	electronic current limiter and overheat protection
Weight	7.7 kg	7.3 kg
Dimensions w/d/h	166×256×225 mm	166×256×225 mm
Permissible ambient conditions	5–31 °C at 80 % rel. humidity, 32–40 °C decreasing linearly up to max. 50 % rel. humidity	5–31 °C at 80 % rel. humidity, 32–40 °C decreasing linearly up to max. 50 % rel. humidity
Protection class DIN EN 60529	IP 55	IP 55

Standard supply voltage: 230 V. Other voltages upon request, please specify for order.

* Flow-rate accuracy pertains to water without counter pressure

Single-Channel Pump Heads

Customizing Hei-FLOW models

Pumping and dosing for all types of applications, also in special fields such as the transfer of cell cultures. The sealed ball bearings protect against corrosion and ensure reliable continuous operation. With the versatile selection of pump heads for single-channel operation, the right solution can be configured for every application.

A pump head with convex shaped rollers is recommended for cell research. These rollers do not pinch the tubing and the cell cultures are protected.

SP quick

For quick and easy tubing change by means of a practical lever

- Low pulsation due to five rollers
- Sealed ball bearings
- Stainless steel rollers and roller supports
- Flow rates from 0.38 to 3,436 ml/min depending on drive and tubing used

For tubing wall thickness 1.6 mm
P/N 527-11100-00

For tubing wall thickness 2.5 mm
P/N 527-11300-00

SP standard

All-purpose for simple pumping tasks

- Convex rollers to prevent damaging the cell cultures
- Sealed ball bearings
- Stainless steel rollers, polyamide roller supports
- Depending on the drive and tubing used, flow rates from 2.0 to 4,151 ml/min can be achieved

For tubing wall thickness 1.6 mm
P/N 523-43010-00

For tubing wall thickness 2.5 mm
P/N 523-43030-00

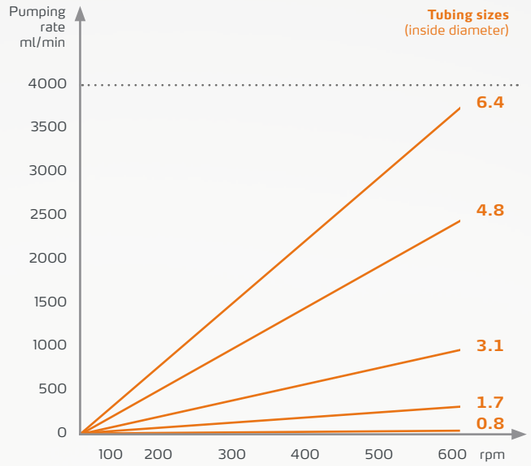
SP vario

Flexible for versatile use

- Rotor with adjustable roller distance, for adaptation to the tubing wall thickness
- Convex rollers to prevent damaging the cell cultures
- Sealed ball bearings
- Stainless steel rollers, coated aluminum roller supports
- Flow rates from 2.0 to 4,151 ml/min depending on drive and tubing used

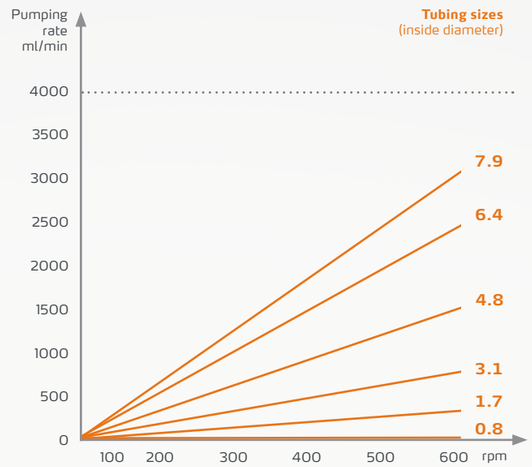
P/N 523-45110-00

Flow rates for single-channel pump heads



SP standard
SP vario

SP quick



Tubing sizes for single-channel pump heads

Tubing sizes					
Inside diameter	mm	0.8	1.7	3.1	4.8
Outside diameter	mm	4	4.9	6.3	8
Tubing wall thickness (WT)	mm	1.6	1.6	1.6	1.6
Max. operating pressure (duration/short-term)	bar	0.7/1.7	0.7/1.7	0.7/1.7	0.5/1.5
Suction lift	mH_2O	8.8	8.8	8.8	8.8

Tubing sizes					
Inside diameter	mm	6.4	4.8	6.4	7.9
Outside diameter	mm	9.5	9.8	11.3	12.9
Tubing wall thickness (WT)	mm	1.6	2.5	2.5	2.5
Max. operating pressure (duration/short-term)	bar	0.5/1.5	0.8/1.8	0.8/1.8	0.8/1.8
Suction lift	mH_2O	6.7	8.8	8.8	8.8

Mean value of the flow rate in combination with pump head and pump drive

SP quick		min.	max.	min.	max.	min.	max.	min.	max.
Hei-FLOW Advantage 06/Precision 06	ml/min	2	33	8	186	26	653	59	1,529
Hei-FLOW Value 06	ml/min	4	35	17	197	57	695	123	1,494
Hei-FLOW Advantage 01/Precision 01	ml/min	0.38	9	2	40	5	126	12	233
Hei-FLOW Value 01	ml/min	0.83	9	3	41	11	134	25	292

SP standard/SP vario		min.	max.	min.	max.	min.	max.
Hei-FLOW Advantage 06/Precision 06	ml/min	11	257	43	1,017	105	2,549
Hei-FLOW Value 06	ml/min	22	249	93	1,037	228	2,613
Hei-FLOW Advantage 01/Precision 01	ml/min	2	55	9	221	21	530
Hei-FLOW Value 01	ml/min	5	61	19	223	44	519

All flow rate data refer to Tygon® standard tubing and the medium water.

SP quick		min.	max.	min.	max.	min.	max.	min.	max.
Hei-FLOW Advantage 06/Precision 06	ml/min	89	2,072	58	1,527	85	2,248	113	3,174
Hei-FLOW Value 06	ml/min	186	1,765	123	1,580	180	2,411	257	3,436
Hei-FLOW Advantage 01/Precision 01	ml/min	17	409	12	299	18	435	25	630
Hei-FLOW Value 01	ml/min	36	413	26	299	38	454	50	636

SP standard/SP vario		min.	max.	min.	max.	min.	max.
Hei-FLOW Advantage 06/Precision 06	ml/min	167	4,056	92	2,390	139	3,821
Hei-FLOW Value 06	ml/min	364	4,151	203	2,426	313	3,782
Hei-FLOW Advantage 01/Precision 01	ml/min	33	813	15	491	28	769
Hei-FLOW Value 01	ml/min	75	861	42	493	68	773

All flow rate data refer to Tygon® standard tubing and the medium water.

Order numbers

Tubing (per meter)	P/N	P/N	P/N	P/N
Silicone	525-33000-00	525-34000-00	525-36000-00	525-30027-00
Viton®	525-53000-00	525-54000-00	525-56000-00	525-50027-00
PharMed®	525-23000-00	525-24000-00	525-26000-00	525-20027-00
Tygon® standard	525-63000-00	525-64000-00	525-66000-00	525-60027-00
Tygon® for hydrocarbons	525-73000-00	525-74000-00	525-76000-00	525-70027-00
Tygon® 2001 for food	525-83000-00	525-84000-00	525-86000-00	525-80027-00

Tubing (per meter)	P/N	P/N	P/N	P/N
Silicone	525-30028-00	525-35000-00	525-39000-00	525-32000-00
Viton®	525-50028-00	525-55000-00	525-59000-00	525-52000-00
PharMed®	525-20028-00	525-25000-00	525-29000-00	525-22000-00
Tygon® standard	525-60028-00	525-65000-00	525-69000-00	525-62000-00
Tygon® for hydrocarbons	525-70028-00	525-75000-00	525-79000-00	525-72000-00
Tygon® 2001 for food	525-80028-00	525-85000-00	525-89000-00	–

Multi-Channel Pumps

More efficiency, even more possibilities

With the easily exchangeable cassettes, the throughput of the Hei-FLOW multi-channel pump can be increased to up to 12 simultaneously operated channels.

The following models are suitable for multi-channel operation:
Hei-FLOW Value 01 / Advantage 01 / Precision 01

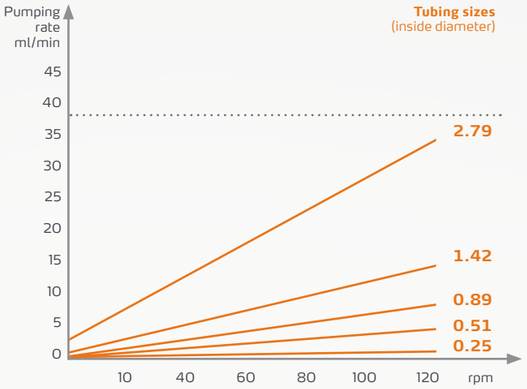
Simply select the appropriate Hei-FLOW model (drive of the 01 series) adapter and multi-channel pump head and equip with suitable cassettes and tubing.

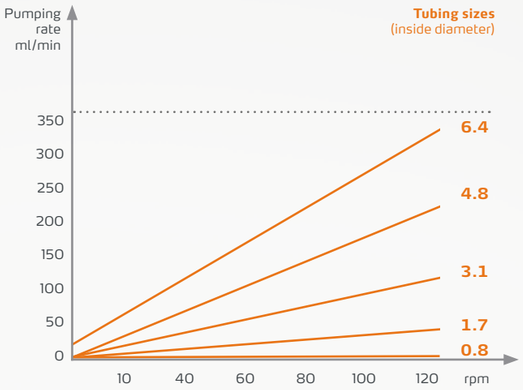
- When using tubing with different diameters per cassette, up to 12 individual pumping volumes can be processed in one operation
- The tubing can be changed easily and in a matter of seconds
- Pump heads with 8-roller system are also available to reduce pulsation
- A snap-action device makes inserting all cassettes child's play and even allows easy replacement during ongoing operation

Flow rates of individual tubing sizes for multi-channel pump heads

Multi-Channel Pump Head C 4

For Cassette small



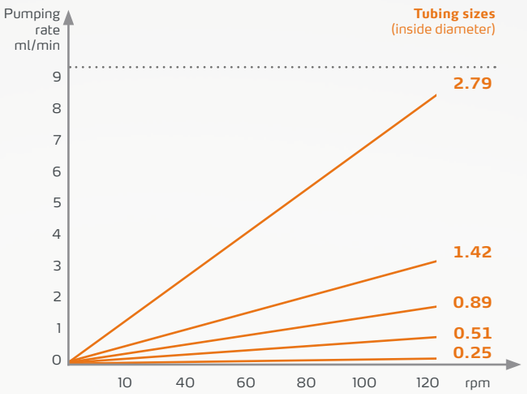


Multi-Channel Pump Head C 8

For Cassette medium or Cassette large

Multi-Channel Pump Head C 12

For Cassette small



Multi-Channel Pump Heads

Easy to configure or retrofit

All compatible models are also available as package "01 Multi" incl. adapter for the use with multi-channel pump heads.

Precise dosing or customized pumping

Low-pulsation pumping with the C 4 and C 12 multi-channel pump heads thanks to the 8-roller system and high-precision dosing depending on the tubing configuration. The C 12 model is optimally equipped for the smallest volumes thanks to an integrated gear support – for flow rates from 0.005 – 54 ml/min. For Cassette small (C 4 / C 12), Two-Stop tubing is required. For Cassette medium and Cassette large (C 8) tubing by the meter.

Multi-Channel Pump Head C 4

- Can be equipped with 4 x Cassette small
- 8 rollers for low-pulsation pumping

P/N 524-80420-00

Multi-Channel Pump Head C 8

- Can be equipped with 8 x Cassette medium or 4 x Cassette large
- 4-roller system

P/N 524-40810-00

Multi-Channel Pump Head C 12

- Can be equipped with 12 x Cassette small
- Due to integrated gear reduction ideal for pumping smallest volumes
- 8 rollers for low-pulsation pumping

P/N 524-81220-00

Multi-Channel Cassettes

Easily exchangeable cassettes even during the pumping process. The roller contact pressure is adjusted by means of an adjusting screw. Different tubing and sizes can be used in each cassette.

Cassette small

- Flow rates from 0.005 – 37.0 ml/min
- Suitable for tubes with 0.9 mm tubing wall thickness
- Available tube diameters: 0.2 / 0.5 / 0.9 / 1.4 and 2.8 mm
- Special Two-Stop tubing (length 40 cm) required for insertion into the cassette
- The tube is fixed by tubing stoppers
- With tubing connectors and extension tubes, it is possible to extend the tubing length by the meter

Equipped with:

Multi-channel pump head C 4: max. 4 x Cassette small

Multi-channel pump head C 12: max. 12 x Cassette small

P/N 524-90022-00

Cassette medium

- Flow rates from 0.24 – 27.0 ml/min
- Suitable for tubes with 1.6 mm tubing wall thickness
- Available tube diameters: 0.8 and 1.7 mm
- Tubing available by the meter

Equipped with:

Multi-channel pump head C 8: max. 8 x Cassette medium

P/N 524-90021-00

Cassette large

- Flow rates from 1.0 – 364.0 ml/min
- Suitable for tubes with 1.6 mm tubing wall thickness
- Available tube diameters: 1.7 / 3.1 / 4.8 and 6.4 mm
- Tubing available by the meter

Equipped with:

Multi-channel pump head C 8: max. 4 x Cassette large

P/N 524-90010-00

Tubing sizes for multi-channel pump heads

Tubing sizes						
Inside diameter	**mm**	0.25	0.51	0.89	1.42	2.79
Outside diameter	**mm**	2.05	2.31	2.69	3.22	4.59
Tubing wall thickness (WT)	**mm**	0.9	0.9	0.9	0.9	0.9
Max. operating pressure (duration/short-term)	**bar**	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5
Suction lift	**mH_2O**	7	7	7	7	7

Tubing sizes						
Inside diameter	**mm**	0.8	1.7	3.1	4.8	6.4
Outside diameter	**mm**	4	4.9	6.3	8	9.5
Tubing wall thickness (WT)	**mm**	1.6	1.6	1.6	1.6	1.6
Max. operating pressure (duration/short-term)	**bar**	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.5 / 1.5
Suction lift	**mH_2O**	8.8	8.8	8.8	8.8	6.7

Mean value of the flow rate in combination with pump head and pump drive

Hei-FLOW Advantage 01 Hei-FLOW Precision 01		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cass.
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**

Hei-FLOW Value 01		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cass.
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**

All flow rate data refer to Tygon® standard tubing and the medium water.

Hei-FLOW Advantage 01 Hei-FLOW Precision 01		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cass.
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**

Hei-FLOW Value 01		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cass.
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**

All flow rate data refer to Tygon® standard tubing and the medium water.

Order numbers

Tubing	P/N	P/N	P/N	P/N	P/N
Silicone					
Two-Stop tubing for Cassette small			525-30014-00	525-30015-00	525-30016-00
Extension tubes (by the meter)			525-30024-00	525-30025-00	525-30026-00
Viton®					
Two-Stop tubing for Cassette small			525-00014-00	525-00015-00	525-50016-00
Extension tubes (by the meter)			525-00024-00	525-00025-00	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 tubes (by the 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 tubes (by the meter)	525-60022-00	525-60023-00	525-60024-00	525-60025-00	525-60026-00
Tubing connector (PTFE)	526-22000-00	526-22000-00	526-22000-00	526-22000-00	526-22000-00

Tubing	P/N	P/N	P/N	P/N	P/N
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® for hydrocarbon	525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 for food	525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Tubing Selection

Tygon® standard

General applications in the laboratory

- Non-toxic, non-oxidizing
- Good resistance to acids, lyes and inorganic media
- Very low gas permeability, long service life
- Thermoplastic soft PVC, transparent

Complies with the following standards:
FDA, USP Class VI, ISO 10993, 10/204/EU, does not contain chemicals listed in California Proposition 65

Temperature range:
–50 to +75 °C

Sterilization:
Autoclavable at 120 °C, 30 min. at 1 bar (assumes milky color) or with ethylene oxide

Restrictions:
Release of plasticizers possible

Tygon® 2001 for food

Ideal for products with a high fat content

- Extremely resistant to chemicals, e.g. suitable for the use of polar solvents
- Contains no plasticizers or oils
- Particularly long service life
- Transparent for improved visual inspection
- Extremely flexible
- Thermoplastic, transparent

Complies with the following standards:
FDA (21 CFR 177.2600), USP Class VI and GLP

Temperature range:
–78 to +71 °C

Sterilization:
Autoclavable, 30 min. at 1 bar, sterilizable by radiation or ethylene oxide

Tygon® for hydrocarbons

Especially for hydrocarbons, petroleum products and distillates

- Ideal for petrol, kerosene, fuels and lubricants, heating oil, cutting fluids and glycol-based coolants
- Ozone- and UV-resistant
- Thermoplastic soft PVC, yellow translucent

Complies with the following standards:
GLP

Temperature range:
–40 bis +75 °C

Sterilization:
Not recommended

Restrictions:
Not suitable for strong lyes and acids as well as food and pharmaceuticals

PharMed®

Ideal for medical, laboratory and research applications

- High flexural fatigue strength
- Non-toxic, biocompatible
- Very low gas permeability
- Well suited for acids and lyes
- Polypropylene-based thermoplastic elastomer with plasticizers, opaque beige

Complies with the following standards:
USP Class VI, GLP, USP and Ph. Eur.

Temperature range:
–51 to +135 °C

Sterilization:
Autoclavable or sterilizable by ethylene oxide or radiation

Restrictions:
Release of additives possible

Silicone

For use in pharmacy and biology

- Extremely smooth inner surface (platinum plated) prevents possible bacterial growth
- Biocompatible, minimal adsorption and absorption
- Best flow properties, high temperature stability
- Absolutely inert, plasticizer-free
- Polydimethylsiloxane with silica and silicone additives, excellent contact pressure resistance, translucent white

Complies with the following standards:
USP Class VI, GLP and NSF

Temperature range:
–80 to +200 °C

Sterilization:
Autoclavable, 30 min at 1 bar or sterilizable with radiation

Restrictions:
Unsuitable for concentrated solvents, oils, acids or diluted caustic lye of soda, relatively high gas permeability

Viton®

Excellent acid resistance at high temperatures

- Low gas permeability
- Resistant to solvents and corrosive media
- Fluorocarbon rubber, thermoformed Viton B (67 % fluorinated), opaque black

Complies with the following standards:
GLP

Temperature range:
–30 to +205 °C

Sterilization:
16 h at +250 °C with hot air circulation recommended

Restrictions:
Restricted service life

Tubing Characteristics

Used with	Tygon® standard	Tygon® 2001 for food	Tygon® for hydrocarbons
Acids	good	excellent	**good**
Lyes	good	excellent	good
Solvents	**unsuitable**	**good**	conditional
Pressure	good	good	**good**
Vacuum	good	good	good
Viscous media	excellent	good	excellent
Sterile media	conditional	good	conditional

Used with	PharMed®	Silicone	Viton®
Acids	**good**	conditional	excellent
Lyes	good	conditional	excellent
Solvents	**unsuitable**	**unsuitable**	**varying, test recommended**
Pressure	good	satisfactory	good
Vacuum	excellent	good	good
Viscous media	good	satisfactory	good
Sterile media	excellent	excellent	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
	Aluminum salts	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
	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_3)	D	D	D	D	A	–
	Aromatic hydrocarbons	A	D	D	D	D	–
	Arsenic salts	A	A	A	A	A	–
B	Barium salts	A	A	A	A	A	–
	Benzaldehyde	D	C	D	D	C	D
	Benzene	D	D	D	D	–	–
	Benzenesulfonic acid	D	D	D	D	D	A
	Boric acid, 4% in W.	A	A	A	A	A	A
	Bromine	D	D	D	D	D	A
	Butane	A	A	A	A	B	A
	Butanol (butyl alcohol)	D	B	D	A	A	A
	Butyl acetate	B	D	D	D	D	–
	Butyric acid	B	D	D	C	D	D
C	Calcium oxide	A	A	A	A	A	–
	Carbon bisulfide	D	D	D	D	D	–
	Carbon tetrachloride	D	D	D	D	D	A

	Chemical	P	S	T	TU	TK	V
	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	–	–
	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
D	Diesel	D	D	D	B	–	–
	Dimethyl formamide	B	B	D	D	A	D
E	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	–
	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
F	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	–
	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
G	Gasoline, high-aromatic	D	D	D	B	D	A
	Gasoline, non-aromatic	D	D	D	B	D	A
	Glycerin	A	A	A	A	A	A
H	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

	Chemical	P	S	T	TU	TK	V
H	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
I	Iodine solutions	A	C	A	A	A	–
K	Ketones	D	D	D	D	C	–
L	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	–
M	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
	Methanol	A	B	D	B	A	D
	Methyl Ethyl Ketone	D	D	D	D	C	D
	Monoethanolamine	C	D	D	D	D	D
N	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
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	–	–
	Potassium hydroxide, <10 % in W.	A	A	A	D	–	B
	Potassium iodide, 56 % in W.	A	A	A	A	A	–

	Chemical	P	S	T	TU	TK	V
	Propanol (propyl alcohol)	C	A	D	D	A	B
	Pyridine	C	D	D	D	C	D
S	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
	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
	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
T	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
	Turpentine	D	D	D	B	A	A
U	Urea, 20 % in W.	A	A	A	A	A	–
	Uric acid	A	A	A	C	A	–
X	Xylene	D	D	D	D	C	B
Z	Zinc chloride, 80 % in W.	A	A	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 is provided without guarantee. The user must ensure that the tubing is suitable for the desired application; appropriate tests may have to be carried out.

in W.: in Water

WARNING
Important information for California residents regarding Prop 65.
Please visit **www.P65warnings.ca.gov** for more information.

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