






TSE Programmable Syringe Pumps



Specifications subject to change without notice

Programmable Syringe Pumps

60/61/62 Series

			
Model	540060/ 540060-HP¹⁾	540061	540062
Operating mode	Infusion/ Withdrawal	Infusion/ Withdrawal	Infusion/ Withdrawal
Syringe sizes	0.5 µl up to 60 ml	for 6 syringes 0.5 µl up to 60 ml for 4 syringes 0.5 µl up to 140 ml	0.5 µl up to 10 ml
Max. syringe number	1	6	8
Maximum flow rate	2100 ml/h with a 60 ml syringe	1385 ml/h with a 60 ml syringe	392 ml/h with a 10 ml syringe
Minimum flow rate	0.001 µl/h with a 0.5 µl syringe	0.001 µl/h with a 0.5 µl syringe	0.001 µl/h with a 0.5 µl syringe
Selectable rate units	µl/h, µl/min, ml/h, ml/min	µl/h, µl/min, ml/h, ml/min	µl/h, µl/min, ml/h, ml/min
Syringe inside diameter range	0.100 to 50.00 mm	0.100 to 50.00 mm	0.100 to 50.00 mm
Motor type	Step motor	Step motor	Step motor
Motor steps per revolution	400	200	200
Motor to drive screw ratio	15/28	5/1	5/1
Maximum speed	5.10 cm/min	3.33 cm/min	3.33 cm/min
Minimum speed	0.004205 cm/h	0.0262 cm/h	0.0262 cm/h
Maximum force to all syringes	15.9 kgs at minimum speed, 8.2 kgs at maximum speed	72.7 kgs at minimum speed, 13.6 kgs at maximum speed	72.7 kgs at minimum speed, 13.6 kgs at maximum speed
RS-232 pump network	100 pumps maximum	100 pumps maximum	100 pumps maximum
RS-232 selectable baud rates	300, 1200, 2400, 9600, 19200	300, 1200, 2400, 9600, 19200	300, 1200, 2400, 9600, 19200
Programmable phases	41	41	41
Interface	RS-232 Interface Bi-Directional TTL Logic Control Interface	RS-232 Interface Bi-Directional TTL Logic Control Interface	RS-232 Interface Bi-Directional TTL Logic Control Interface
Accuracy	+/- < 1 %	+/- < 1 %	+/- < 1 %
Reproducibility	+/- 0.1 %	+/- 0.1 %	+/- 0.1 %
Dimensions	Approx. 23 cm x 15 cm x 11 cm	Approx. 26 cm x 38 cm x 13 cm	Approx. 26 cm x 38 cm x 13 cm
Weight	1.63 kg	4.6 kg	4.6 kg

¹⁾ High Pressure Version: 15 lbs of linear force at top speed and about 35 lbs at slow speeds.



200 Series

Model No.	540200	540210	540220	540230
Operating mode	Infusion	Infusion, Withdrawal, Inf/With, With/Inf, continuously	Infusion	Infusion, Withdrawal, Inf/With, With/Inf, continuously
Max. syringe number	2	2	10	10
Syringe size	10 µl ... 140 ml	10 µl ... 140 ml	4 x 10 µl ... 140 ml 6 x 10 µl ... 60 ml 10 x 10 µl ... 10 ml	4 x 10 µl ... 140 ml 6 x 10 µl ... 60 ml 10 x 10 µl ... 10 ml
Min. flow (10µl)	0.001 µl/h	0.001 µl/h	0.001 µl/h	0.001 µl/h
Max. flow **	147 ml/min (140ml)	147 ml/min (140ml)	147 ml/min (140ml)	147 ml/min (140ml)
Audible alarm ***	x	x	x	x
Audible & visual alarm ***	x	x	x	x
Programmable***	x	x	x	x
RS232 interface	x	x	x	x
TTL interface	x	x	x	x
Linear force (kg)	18	18	18	18
Advance per microstep (1/16 step)	0.165 µm	0.165 µm	0.165 µm	0.165 µm
Min. stepping rate	1 step/30 sec.	1 step/30 sec.	1 step/30 sec	1 step/30 sec
Max. stepping rate (1/2 step)	1600	1600	1600	1600
Accuracy	± < 1 %	± < 1 %	± < 1 %	± < 1 %
Reproducibility	± 0.1 %	± 0.1 %	± 0.1 %	± 0.1 %
Dimensions (cm)	28x23x14	28x23x14	28x30x14	28x30x14
Weight (kg)	4	4	4.3	4.3

Model No.	540250	540260	540270
Operating mode	Infusion	Infusion and Withdrawal simultaneously	Infusion, Withdrawal, Inf/With, With/Inf, continuously; Infusion and Withdrawal simultaneously; Continuous Flow with optional valve/tubing set*
Max. syringe number	4	2+2	2+2
Syringe size	10 µl ... 10 ml (simultaneous use of differently sized syringes!)	10 µl ... 60 ml	10 µl ... 140 ml
Min. flow (10µl)	0.001 µl/h	0.001 µl/h	0.001 µl/h
Max. flow **	20.91 ml/min (10ml)	70.57 ml/min (60ml)	147 ml/min (140ml)
Audible alarm ***	x	x	x
Audible & visual alarm ***	x	x	x
Programmable***	x	x	x
RS232 interface	x	x	x
TTL interface	x	x	x
Linear force (kg)	18	18	18
Advance per microstep (1/16 step)	0.165 µm	0.165 µm	0.165 µm
Min. stepping rate	1 step/30 sec	1 step/30 sec	1 step/30 sec.
Max. stepping rate (1/2 step)	1600	1600	1600
Accuracy	± < 1 %	± < 1 %	± < 1 %
Reproducibility	± 0.1 %	± 0.1 %	± 0.1 %
Dimensions (cm)	28x23x15	28x23x14	28x23x14
Weight (kg)	4	4.3	4

* Accessory: Valve/tubing set for continuous flow

** Syringe size in brackets

*** Optional

Other accessories: Data cable 540000-DK

100/300 Series

Model No.	540100	540101	540120	540310
Operating mode	Infusion	Infusion	Infusion and Withdrawal simultaneously	Infusion and Withdrawal Nanoliter Pump
Max. syringe number	1	2	1+1	1
Syringe size	10µl ... 60ml	1 x 10 µl ... 60 ml 2 x 10 µl ... 10 ml	10µl ... 10 ml	1 µl ... 100 µl
Min. flow (10µl)	0.21 µl/h	0.001 µl/min	0.21 µl/h	0.01 µl/min
Max. flow*	426 ml/h (60ml)	1.175 ml/min (60 ml)	125 ml/h (10ml)	127.4µl/min
Audible alarm**	x	x	x	---
Audible and visual alarm**	x	x	x	---
Linear force (kg)	9	18	9	9
Advance per micro- step (1/2 step)	0.529 µm	0.066 µm	0.529 µm	0.635 µm
Min. stepping rate	1 step/30 sec.	1 step/30 sec.	1 step/30 sec.	1 step/30 sec.
Max. stepping rate (1/2 step)	400	400	400	400
Accuracy	±<1%	±<1%	±<1%	±<1%
Reproducibility	±0.1%	±0.1%	±0.1%	±0.1%
Dimensions (cm)	23x15x14	23x15x14	23x15x14	23x15x14
Weight (kg)	2	2.3	2.3	2

* Syringe size in brackets

** Optional



Partial List of Users

- ACTELION Pharmaceuticals AG, Allschwil, Switzerland
- Albert-Ludwigs-Universität Freiburg, Germany
- Alfred-Wegener-Inst. für Polar- & Meeresforschung, Bremerhaven, Germany
- Altana Pharma AG, Konstanz, Germany
- Austrian Academy of Sciences, Basovizza-Trieste, Italy
- BASF AG, Ludwigshafen, Germany
- Bayer HealthCare AG, Wuppertal, Germany
- Bayerische Julius-Maximilians-Universität Würzburg, Germany
- Bayer Schering Pharma AG, Berlin, Germany
- Beiersdorf AG, Hamburg, Germany
- BIASEP Scientific Research Cetner, Moscow, Russia
- Boehringer-Ingelheim GmbH & Co. KG, Biberach, Germany
- Boehringer Ingelheim Pharma GmbH & Co. KG, Biberach, Germany
- Boehringer Ingelheim Pharma GmbH & Co. KG, Ingelheim, Germany
- Cerebricon Ltd., Kuopio, Finland
- Charité - Universitätsmedizin Berlin, Germany
- Christian-Albrechts-Universität zu Kiel, Germany
- CSIC-Consejo de Superior de Investig. Científicas, Burjassot - Valencia, Spain
- Deutsches Kunststoff Institut – DKI, Darmstadt, Germany
- DeveloGen AG, Göttingen, Germany
- Ecole Polytechnique Federale de Lausanne – EPFL, Lausanne, Switzerland
- Ecole Supérieure de Physique & Chimie Industrielle, Paris, France
- Epiq Electronic Assembly Ltd., Botevgrad, Bulgaria
- Ernst Moritz Arndt Universität Greifswald, Germany
- ETH Zürich, Switzerland
- Ferring Pharmaceuticals A/S, Copenhagen S, Denmark
- Firmenich SA, La Plaine-Genève, Switzerland
- Forschungszentrum Karlsruhe GmbH, Eggenstein-Leopoldshafen, Germany
- Fraunhofer Gesellschaft, Sankt Augustin, Germany
- Fraunhofer Institut, Leipzig, Germany
- Fraunhofer Institut f. Chemische Technologie – ICT, Pfinztal (Berghausen), Germany
- Gambro Dialysatoren GmbH, Hechingen, Germany
- Georg-August-Universität, Göttingen, Germany
- Grünenthal GmbH, Aachen, Germany
- Haukeland University Hospital, Bergen, Norway
- Heinrich-Heine-Universität, Düsseldorf, Germany
- hte AG, Heidelberg, Germany
- IDEA AG, München, Germany
- Imperial College, London, Great Britain
- Institute for Analytical Sciences, Dortmund, Germany
- Instituto de Agroquímica y Tecnol. de Alimentos, Burjassot - Valencia, Spain
- Janssen Pharmaceutica NV, Beerse, Belgium
- Johannes Gutenberg-Universität Mainz, Germany

- Johann Wolfgang Goethe-Universität, Frankfurt am Main, Germany
- Kemijski Institut, Ljubljana, Slovenia
- Leopold-Franzens-Universität, Innsbruck, Austria
- Lilly Forschung GmbH, Hamburg, Germany
- Little Things Factory GmbH, Ilmenau, Germany
- Ludwig-Maximilians-Universität, München, Germany
- Mahidol University, Bangkok, Thailand
- Max-Delbrück-Centrum für Molekulare Medizin – MDC, Berlin - Buch, Germany
- Max-Planck-Inst. für Molekulare Pflanzenphysiologie, Golm, Germany
- Max-Planck-Institut für Infektionsbiologie, Berlin, Germany
- Max-Planck-Institut für Neurobiologie, Martinsried, Germany
- Max-Planck-Institut für Psychiatrie, München, Germany
- Medizinische Hochschule Hannover, Germany
- Medizinische Universität, Graz, Austria
- Memobead Technologies NV, Boom, Belgium
- Merck KGaA, Darmstadt, Germany
- Nanofilm Technologie GmbH, Göttingen, Germany
- National Environmental Research Institute – NERI, Silkeborg, Denmark
- Nestec S.A., Lausanne, Switzerland
- NOVARTIS PHARMA AG, Basel, Switzerland
- OptoQ AB, Linköping, Sweden
- PEUS-Systems GmbH, Gaggenau, Germany
- Phenos GmbH, Hannover, Germany
- Philip Morris Research Laboratories GmbH, Köln, Germany
- Philipps-Universität Marburg, Germany
- Philips Research, Drachten, The Netherlands
- Physikalisch-Technische Bundesanstalt, Berlin, Germany
- Polish Academy of Sciences, Krakow, Poland
- ProtoLife srl, Marghera, Venezia, Italy
- Rijksuniversiteit Groningen, The Netherlands
- Royal Institute of Technology, Stockholm, Sweden
- Ruprechts-Karls-Universität Heidelberg – Mannheim, Germany
- Russian Academy of Sciences, St. Petersburg, Russia
- Sanofi-Aventis Deutschland GmbH, Frankfurt am Main, Germany
- Sensor-Nite Industrial Ltd., Botevgrad, Bulgaria
- Sigma Aldrich GmbH, Buchs SG, Switzerland
- Solvias AG, Basel, Switzerland
- Technical University of Denmark, Lyngby, Denmark
- Technische Universität Berlin, Germany
- Technische Universität Braunschweig, Germany
- Technische Universität Chemnitz, Germany
- Technische Universität Dresden, Germany
- Technische Universität Ilmenau, Germany



- Technische Universität – TU Garching, Germany
- Università degli Studi di Ferrara, Italy
- Université de Lausanne, Dorigny, Switzerland
- Université Louis Pasteur, Illkirch Cedex, France
- Universitetet i Oslo, Norway
- Universität des Saarlandes, Homburg/Saar, Germany
- Universität des Saarlandes, Saarbrücken, Germany
- Universität Dortmund, Germany
- Universität Karlsruhe (TH), Germany
- Universität Konstanz, Germany
- Universität Leipzig, Germany
- Universität Regensburg, Germany
- Universität Rostock, Germany
- Universitätsklinikum Münster, Steinfurt, Germany
- Universität Ulm, Germany
- Universität Zürich, Switzerland
- Universität zu Köln, Germany
- University of Belgrade, Yugoslavia
- University of Fribourg, Switzerland
- University of Helsinki, Finland
- University of London, Great Britain
- University of Szeged, Hungary
- Westfälische Wilhelms-Universität Münster, Germany

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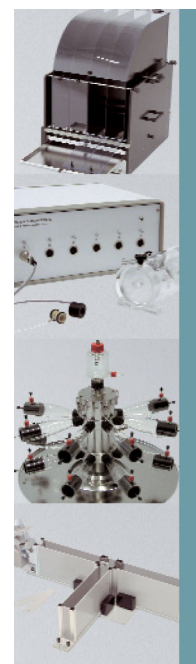
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