ISMATEC® Laboratory Pumps

2009 Catalog

For Dispensing and Filling Applications • 0.4 µl/min to 13 liters/min

Featuring Tubing, Gear and Piston Pumps for:

Analytics
Sampling
Biotechnology
Process Control

ISMATEC®

IDEX HEALTH & SCIENCE

ISMATEC, established in 1964

Precision engineered pumps

The high accuracy and long service-life of ISMATEC® pumps are well known worldwide. For more than 40 years, ISMATEC has worked closely with laboratory and production customers to develop state-of-the-art pumping solutions for applications from highly sensitive cellular analyses to industrial dispensing and filling. You can count on ISMATEC to provide individual consultation to match the right pump to your application, and to provide the service you need after the sale.

As part of Micropump and the IDEX Health and Science, ISMATEC now offers an even broader array of industry-leading products and engineering expertise to meet your fluidic and gas management needs. To learn more, please contact us at the locations indicated below, or visit our website at www.idex-hs.com

ISMATEC®
IDEX Health & Science

Objectives for quality

By providing competent service and products of high quality we contribute to our customers' success.

ISO 9001:2000 and 14001 certified

www.ismatec.com
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Please ask also for our OEM pump brochure or contact us.

Our engineers welcome your ideas.

You can find your local ISMATEC sales representative at:
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Tubing Pumps for Multi-Purpose Use

Gear Pumps for Pulsefree Pumping

Rotary Piston Pumps for Corrosive Media

Miscellaneous

Select the pump type that meets your requirements

Selection criteria		Tubing Pumps	Gear Pumps	Rotary Piston Pumps
Flow rate min. to max.		<0.001 ml/min to 13 l/min	1 ml/min to 12 l/min	0.025 ml/min – 2.3 l/min
Number of channels		1 – 24	1	1
Differential pressure		max. 2.5 bar [3]	max. 5.6 bar	max. 6.9 bar
Suction lift (water)		7 to 8 m	<1 m	~5 m
Dead volume		practically none	5 to 45 ml	very small
Chemical resistance		depends on tubing material	high	very high
Accuracy and Repeatability		high	high [1]	very high
Self-priming		✔	possible [4]	possible
Sensitive to dry-running		no	yes	yes
Syphoning effect		no	yes	no
Pumping	gently = low shearing forces	✔	no	no
	under sterile conditions	✔	no	no
	in both directions	✔	no	✔
	pulse-free	[2]	✔	[2]
	contamination-free	✔	no	no
Media	containing particles	✔ very good	no	✔ max. 0.8 mm Ø
	viscous	✔ very good	possible	✔ good
	containing living cells	✔ very good	no	no
	foaming	✔	no	no
	corrosive / aggressive	[3]	✔ good	✔ very good
	gas	[3]	no	[4]

[1] Requires non-return valve
[2] Pumping with low pulsation possible; depends on the pump-head
[3] Depends on the tubing material
[4] Depends on the pump-head

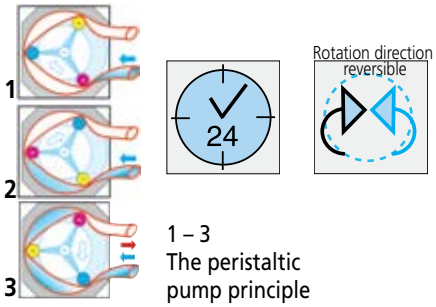
ISMATEC® pumps are well known for:

- Excellent quality standard
- A maximum of performance and reliability over many years of service
- Extremely low amortization costs

1

The multi-purpose tubing pump

Safe and easy to use



1 – 3
The peristaltic pump principle

Safe and easy to use

- Developed for continuous duty, 24 hrs./day, 7 days/week
- **No contamination of the fluid or the pump**
- **Immune to dry-running**
- No valves which clog, hang up or need servicing
- No seals which can leak
- No syphoning effect when the pump stops
- **No flushing and cleaning required**
- Immediately adaptable to new application
- New tubing = pump is ready for use
- **Fast filling and emptying thanks to a MAX key and reversible flow direction**

Application range of tubing pumps

Industries	Applications	Special media
– Beverage – Biotechnology – Chemical – Environmental – Food – Ink – Paint – Pharmaceutical – Plating – Printing	– Analytical – Fermentation – Filtration and separation – Galvanic process – Research and development – Water and waste water treatment	– Abrasives – Cell cultures – Corrosives – Paint and pigments – Printing inks – **Solid content up to 60%**

For a wide range of applications

The tubing pump is capable of pumping almost any media, e.g. highly viscous media or media containing a solid content of up to 60%, as well as corrosive or sterile media.

- More than 10 different tubing materials are available.
- Multi-channel pumps (max. 24 channels) **delivers independently yet simultaneously** various media at **different flow rates**
- Self-priming from a depth of up to 8 m
- Reversible rotation direction
- **Almost pulsefree pumping with 12 roller-pumpheads**
- Extremely accurate dispensing with calibrateable, microprocessor controlled drives

When it comes to versatility, there are no other pump systems which can compete with ISMATEC® tubing pumps.

Inexpensive to maintain

- **Practically no maintenance costs**
- The pumps are almost maintenance-free
- The tubing is the only part to wear
- No expensive seals, valves or diaphragms
- Easy to use
- Simply change the tubing and the pump is ready again

High quality and precision guarantee an optimum performance even after many years of intensive use

The tubing cassettes, an ISMATEC invention, have been continuously refined.

The result:
Click'n'go – the cassette with the automatic pressure setting.

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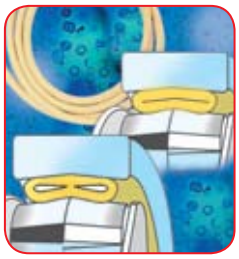
ISMATEC

Unique!

ISMATEC® pumps feature:



Convex rollers
- Treat the liquid gently (e.g. living cells)
- Improve the delivery stability
- Increase the repeatability
- Guarantee optimum tube centering

The tube is progressively closed, starting from the center outwards.

Changing the tube within 5 seconds
- The Flowmaster pump-head (see Page 28), with flow rates up to 13 l/min
- Disassembling the pump-head in less than 1 minute

Carrying out programs independently of a PC!
- Create the application profile in the PC (with Prog*Edit software*, Page 61)
- Download the file data into the pump memory
- Disconnect the pump from the PC
- **Carry out your application on the spot, using the pump as a stand-alone unit**

Unique coupling system
The MCP and BVP drives enable the user to mount a wide range of different pump-heads
- **The pump-heads are interchangeable within seconds without using a tool**
- More than 14 peristaltic pump-heads are available (1 with PTFE tubing)

UNIQUE!
Convex rollers and concave tub-bed.
- Pump-heads with this sign are ideal for cell and media sensitive pumping.

Note

All microprocessor controlled drives are LabVIEW compatible and can easily be integrated into process control systems.

Selection by flow rate and model

This mark indicates dispensing functions

(You'll find tubing dispensing pumps on Pages 6, 8, 17, 19)

- Pumping by speed or flow rate
- Dispensing by volume or time
- Interval dispensing with a pause
- Dispensing a volume within a pre-set time
- Interval dispensing with a pre-set number of dispensing cycles
- ***Calibrating*** the flow rate and dispensing volume
- Roller back-steps for ***drip-free dispensing***
- Factory-set tube sizes

1

IPC / IP and IPC-N / IP-N

Lowest pulsation, highest accuracy

Ideal for analytical applications

- Very high repeatability on all channels
- Planetary drive

Tablet dissolution

Dispensing and calibrating function see Page 5

IPC (and IP)
0.002–44 ml/min (per channel)

IPC-N (and IP-N)
0.4 µl/min–11 ml/min (per channel)

- 4, 8, 12, 16 or 24 channels
- 8 actively driven stainless steel rollers
- Laquered stainless steel housing
- Membrane key-pad and LED display
- Click'n'go cassettes with automatic pressure setting
- Each channel can take various tubing sizes
- 2-stop tubing
- Differential pressure 1.0 bar depending on tubing material. Tubing with small i.d.'s and/or cassettes with pressure lever (Page 60) may enable higher pressures.

IPC, IPC-N
with dispensing functions
- Microprocessor controlled
- Very accurate pumping
- With stand-by mode (prevents the tubing system from drying out, e.g. over night)

IP and IP-N
without dispensing functions
- Microprocessor controlled
- Very accurate pumping
- Flow rates as IPC and IPC-N

Ordering information

Model IPC / IPC-N	Order No. IPC / IPC-N	Model IP/IP-N	Order No. IP / IP-N	Flow rates ml/min per channel	Channels	Speed rpm
IPC 4	**ISM 930**	IP 4	**ISM 940**	0.002 – 44	4	0.4 – 45
IPC 8	**ISM 931**	IP 8	**ISM 941**	0.002 – 44	8	0.4 – 45
IPC 12	**ISM 932**	IP 12	**ISM 942**	0.002 – 44	12	0.4 – 45
IPC 16	**ISM 933**	IP 16	**ISM 943**	0.002 – 44	16	0.4 – 45
IPC 24	**ISM 934**	IP 24	**ISM 944**	0.002 – 44	24	0.4 – 45
IPC-N 4	**ISM 935**	IP-N 4	**ISM 945**	0.0004 – 11	4	0.11 – 11.25
IPC-N 8	**ISM 936**	IP-N 8	**ISM 946**	0.0004 – 11	8	0.11 – 11.25
IPC-N 12	**ISM 937**	IP-N 12	**ISM 947**	0.0004 – 11	12	0.11 – 11.25
IPC-N 16	**ISM 938**	IP-N 16	**ISM 948**	0.0004 – 11	16	0.11 – 11.25
IPC-N 24	**ISM 939**	IP-N 24	**ISM 949**	0.0004 – 11	24	0.11 – 11.25

Foot switch for IPC / IPC-N and IP / IP-N	Order No. **IS 10039** see Page 61
CA spare cassettes and adaptors	Order No. see Page 60
LabVIEW driver	download for free www.ismatec.com

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Studies and simulation of the environmental influences of rain water in free-land plants.

Applications

- Toxicological in-vitro use
- Perfusion of animal tissue slices
- Sampling from tablet dissolution systems

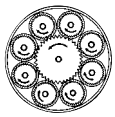
Interfaces

IPC, IPC-N
PC-controllable
Analog: same as IP, IP-N

IP, IP-N
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V or 0–11 kHz)
- Start/Stop
- Rotation direction
- Autostart

Flow rates and tubing

Model Channels Rollers		IPC / IP 4 / 8 / 12 / 16 / 24 8		IPC-N / IP-N 4 / 8 / 12 / 16 / 24 8	
Speed rpm		0.4	44.0	0.11	11.25
Tygon®ST R-3603/R-3607 Order No.	Tubing i.d. (mm)	ml/min per channel min.	ml/min per channel max.	ml/min per channel min.	ml/min per channel max.
SC0188	0.13	0.002	0.15	0.0004	0.039
SC0002	0.25	0.005	0.41	0.001	0.10
SC0005	0.51	0.015	1.5	0.004	0.38
SC0008	0.76	0.032	3.2	0.009	0.81
SC0011	1.02	0.057	5.7	0.014	1.4
SC0014	1.22	0.079	7.9	0.020	2.0
SC0017	1.52	0.12	12	0.030	3.0
SC0020	1.85	0.17	17	0.043	4.3
SC0023	2.54	0.30	30	0.075	7.5
SC0222	3.17	0.44	44	0.11	11
Approx. values:		determined with water, at 22°C, no differential pressure, Tygon tubing.			



With the planetary drive system each roller is directly driven by the sun wheel. This prevents axial push-pull friction on the tubing. Result: increased service-life of the tubing, lower pulsation, high repeatability.

Ask for our Pump Tubing Selection Guide.
(see also Pages 30 to 39)

4 channels | 8 channels | 12 channels | 16 channels | 24 channels

Specifications IPC and IPC-N

Motor type		DC motor
Speed	IPC	0.4–44 rpm
	IPC-N	0.11–11.25 rpm
Speed setting		1–100 %, resolution 0.1%
Flow rate setting		µl/min or ml/min
Power consumption		30 W
Mains connection		$230V_{AC}$/50Hz,$115V_{AC}$/60Hz adjustable
Protection rating		IP 30

Specifications IP and IP-N

Motor type		DC motor
Speed	IP	0.4–44 rpm
	IP-N	0.11–11.25 rpm
Speed setting		1–100 %, resolution 0.1%
	IP	rpm, resolution 0.1 rpm
	IP-N	rpm, resolution 0.03 rpm
Power consumption		30 W
Mains connection		$230V_{AC}$/50Hz,$115V_{AC}$/60Hz adjustable
Protection rating		IP 30

Dimensions / Weight

4 channels	
Depth/Width/Height (mm)	180x175x130
Weight (kg)	4.6
8 channels	
Depth/Width/Height (mm)	220x175x130
Weight (kg)	5.1
12 channels	
Depth/Width/Height (mm)	260x175x130
Weight (kg)	5.8
16 channels	
Depth/Width/Height (mm)	300x175x130
Weight (kg)	6.5
24 channels	
Depth/Width/Height (mm)	380x175x130
Weight (kg)	7.9

1

REGLO *Analog / Digital*

The smallest calibrateable dispensing pump

Footprint only 178x100 mm!

- Very low pulsation (model with 12 rollers)
- High repeatability
- 10 cm wide, 13.5 cm high

Dispensing and calibrating function see Page 5

REGLO *Digital*
with dispensing functions
0.001–68 ml/min (per channel)
– Microprocessor controlled

REGLO *Analog*
without dispensing functions
0.002–68 ml/min (per channel)
– Variable speed drive

REGLO *Analog / Digital*

– 2 or 4 channels
– Choice of 6, 8 or 12 rollers
– Click'n'go cassettes with automatic pressure mechanism (each channel can take various tubing sizes)
– 3-stop tubing
– Differential pressure 1.0 bar depending on tubing material. Tubing with small i.d.'s and/or cassettes with pressure lever (Page 60) may enable higher pressures.

Specifications REGLO *Analog*

Motor type	DC motor	
Speed	2-channel	3.2 – 160 rpm
	4-channel	2.0 – 100 rpm
Speed setting	2–99%, resolution 1% 2-digit potentiometer	
Power consumption	20 W	
Mains connection	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable	
Protection rating	IP 30	
Depth/Width/Height	2-channel	178x100x143 mm
	4-channel	190x100x143 mm
Weight	2-channel	2.0 kg
	4-channel	2.1 kg

Specifications REGLO *Digital*

Motor type	DC motor	
Speed	2-channel	1.6 – 160 rpm
	4-channel	1.0 – 100 rpm
Speed setting Flow rate setting	rpm, resolution 0.1 rpm µl/min or ml/min	
Power consumption	75 W	
Mains connection	100–230V_{AC}/50–60Hz	
Protection rating	IP 30	
Depth/Width/Height	2-channel	178x100x135 mm
	4-channel	190x100x135 mm
Weight	2-channel	2.0 kg
	4-channel	2.1 kg

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REGLO *Analog*
2-digit potentiometer
2–99%, resolution 1% (for speed setting)

REGLO *Digital*
6-button membrane key-pad, LED-display
Flow rate setting in µl/min and ml/min

Interfaces

REGLO *Analog*
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output 2-channel: 0–8 kHz 4-channel: 0–5 kHz
- Start/Stop
- Rotation direction

REGLO *Digital*
PC-controllable
Analog: only speed output (see Reglo *Analog*), start/stop and autostart

Flow rates and tubing

Model	REGLO *Analog+Digital*		REGLO *Analog+Digital*		REGLO *Analog+Digital*		REGLO *Analog+Digital*		REGLO *Analog+Digital*		REGLO *Analog+Digital*	
Channels	2		2		2		4		4		4	
Rollers	6		8		12		6		8		12	
Speed rpm	1.6[1]	160	1.6[1]	160	1.6[1]	160	1.0[1]	100	1.0[1]	100	1.0[1]	100
Tygon® ST R-3603/R-3607	Tubing i.d. (mm)	ml/min per channel		ml/min per channel		ml/min per channel		ml/min per channel		ml/min per channel		ml/min per channel	
Order No.		min.[1]	max.	min.[1]	max.	min.[1]	max.	min.[1]	max.	min.[1]	max.	min.[1]	max.
SC0189	0.13	0.003	0.22	0.002	0.17	0.002	0.15	0.002	0.14	0.002	0.11	0.001	0.093
SC0050	0.25	0.008	0.76	0.007	0.65	0.007	0.61	0.005	0.48	0.005	0.41	0.004	0.38
SC0053	0.51	0.031	3.1	0.027	2.7	0.025	2.5	0.019	1.9	0.017	1.7	0.016	1.6
SC0056	0.76	0.067	6.7	0.058	5.8	0.053	5.3	0.042	4.2	0.036	3.6	0.033	3.3
SC0059	1.02	0.012	12	0.10	10	0.090	9.0	0.073	7.3	0.063	6.3	0.056	5.6
SC0062	1.22	0.16	16	0.14	14	0.12	12	0.10	10	0.088	8.8	0.075	7.5
SC0065	1.52	0.24	24	0.20	20	0.17	17	0.15	15	0.13	13	0.10	10
SC0068	1.85	0.34	34	0.28	28	0.21	21	0.21	21	0.17	17	0.13	13
SC0071	2.54	0.53	53	0.44	44	0.31	31	0.33	33	0.27	27	0.19	19
SC0224	3.17	0.68	68	0.57	57	0.38	38	0.43	43	0.35	35	0.24	24

Approx. values: determined with water, at 22°C, no differential pressure, Tygon tubing.

[1] Min. flow rate for REGLO *Analog* = 2 % of max. flow rate

Ask for our Pump Tubing Selection Guide (see also Pages 30 to 39).

Spare cassettes MS/CA
(see Page 60)

Ordering information (values in brackets are for REGLO *Digital*)

Model	Order No. REGLO *Analog*	Order No. REGLO *Digital*	Flow rates ml/min per channel	Channels	Rollers	Speed rpm
MS-2/06	ISM 830	ISM 831	0.005 (0.003) – 68	2	6	1.6 (3.2)–160
MS-2/08	ISM 829	ISM 832	0.004 (0.002) – 57	2	8	1.6 (3.2)–160
MS-2/12	ISM 795	ISM 596	0.003 (0.002) – 38	2	12	1.6 (3.2)–160
MS-4/06	ISM 828	ISM 833	0.003 (0.002) – 43	4	6	1.0 (2.0)–100
MS-4/08	ISM 827	ISM 834	0.003 (0.002) – 35	4	8	1.0 (2.0)–100
MS-4/12	ISM 796	ISM 597	0.002 (0.001) – 24	4	12	1.0 (2.0)–100
Foot switch	ISM 891	ISM 894	see Page 61			

Spare cassettes MS/CA . . . see Page 60

LabVIEW driver for Reglo *Digital* download for free: www.ismatec.com

Applications

- Addition of a reagent to a reactor and simultaneous removal of the reaction product from the upper fraction. Ramp control combined with a thermostat to maintain the ΔT during the reaction.
- Simultaneous addition of both components of a 2-component adhesive in ratio 1:10 with two different tubing sizes.

1

REGLO *Quick*™

Very fast tubing change-over

Unique, very user-friendly pump-head with fast tubing change-over

REGLO *Quick*
2.1–230 ml/min

CE

- Variable speed
- Standard tubing
- 10 cm wide, 14.3 cm high

REGLO *Quick*

- 1 channel / 4 rollers
- Easily accessible tube-bed, with wide opening angle
- Transparent protection cover
- Standard tubing 1.6 mm wall thickness
- Differential pressure 1.5 bar
  Depends on tubing material. Tubing with small i.d.'s may enable higher pressures.
- Higher max. flow rate than REGLO *Analog/Digital*
- "Start/stop", "speed" and "direction" functions

Easily accessible tube-bed thanks to wide opening angle.

Specifications

Motor type	DC motor
Speed	3.2 – 160 rpm
Speed setting	1–99 %, resolution 1% 2-digit potentiometer
Power consumption	30 W
Mains connection	$230V_{AC}$/50Hz,$115V_{AC}$/60Hz adjustable
Protection rating	IP 30

Dimensions

Model	Depth/Width/Height
REGLO *Quick*	178 x 100 x 143 mm (pump-head closed)
Weight REGLO *Quick*	 2.2 kg

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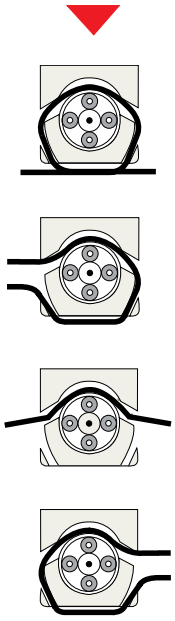
ISMATEC

2-digit potentiometer
1–99%, resolution 1%(for speed setting)

Interfaces

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–8 kHz)
- Start/Stop
- Rotation direction

Insert the tubing appropriate to your application.



Flow rates and tubing

			Model/ Type Channels Rollers	REGLO *Quick* 1 4
			Speed rpm	3.2	160
Tygon® ST R-3603/R-3607 Order No.	Wall (mm)	Tubing i.d. (mm)	ml/min min.	ml/min max.
MF0030	1.6	3.2	2.1	103
SC0379	1.6	4.8	4.6	230
Approx. values: determined with water, at 22°C, no differential pressure, Tygon® tubing.				

Recommended standard tubing

- Tygon® LFL
- Tygon® ST
- Tygon® HC
- Pharmed®
- Silicone peroxide

Do not use other tubing formulations.

Ordering information

Model	Order No.	Flow rates ml/min per channel	Channels max.	Rollers	Speed rpm
REGLO *Quick*	ISM 897	2.1 – 230	1	4	3.2 – 160
Foot switch	ISM 891	see Page 61			

Applications

Single-channel delivery processes with variable flow rates where frequent tubing change-over is required e.g.:

- Addition of dye stuffs with tubing exchange after each dispensing process
- Flushing cylinder heads of HPLC pumps

1

Ecoline

Economical and powerful

Stackable pumps for dispensing and filling applications with variable flow rates

- Robust stainless steel housing (stackable)
- 2-digit potentiometer adjustable in 1% steps

Ecoline VC-MS/CA8-6

0.005–150 ml/min

8 channels

6 rollers

Ecoline VC-MS/CA4–12

0.003–83 ml/min

4 channels

12 rollers (low pulsation)

- Click'n'go cassettes with automatic pressure setting
- 3-stop tubing
- Differential pressure 1.0 bar [1]

[1] Possible with appropriate tubing material; tubing with small i.d.'s and/or cassettes with the pressure lever (see Page 60) may enable higher pressures.

Ecoline VC-Easy-Load®

0.23–1600 ml/min

1 channel

3 rollers

- Easily accessible pump-head
- Allows rapid tube change-over
- Pump-head PSF housing (Polysulfone)
- Standard tubing 1.6 mm WT
- Differential pressure 1.5 bar [1]

[1] Differential pressure depends on tubing material; tubing with small i.d.'s may enable higher pressures.

Ecoline VC-360

0.25–1300 ml/min

1 channel

3 convex rollers treat the liquid and tubing gently

- Hinged tube-bed for easy and **rapid tube change-over**
- Standard tubing 1.6 mm WT
- Differential pressure 1.5 bar [1]

[1] Differential pressure depends on tubing material; tubing with small i.d.'s may enable higher pressures.

Specifications

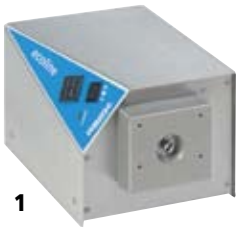
Motor type	DC motor
Speed	3.5 to 350 rpm
Speed setting	1–99%, resolution 1% 2-digit potentiometer
Power consumption	100 W
Mains connection	$230V_{AC}$/50Hz, $115V_{AC}$/60Hz adjustable
Protection rating	IP 30

Size

Model	Depth/Width/Height
Ecoline VC-280	256 x 169 x 138 mm
Ecoline VC-380	256 x 169 x 138 mm
Ecoline VC-360	238 x 169 x 138 mm
Ecoline VC-Easy-Load®	285 x 169 x 138 mm
Ecoline VC-MS/CA8-6	313 x 169 x 138 mm
Ecoline VC-MS/CA4-12	281 x 169 x 138 mm

Weight

Model	Weight
Ecoline VC-280	5.2 kg
Ecoline VC-380	5.3 kg
Ecoline VC-360	4.9 kg
Ecoline VC-Easy-Load®	5.2 kg
Ecoline VC-MS/CA8-6	5.5 kg
Ecoline VC-MS/CA4-12	5.4 kg



1

2

3

1 Available without pump-head: ISM 1077

2 Easy stackable

3 These pump-heads are also available as OEM versions. Ask for the detailed data sheet.

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ISMATEC

Easily exchangeable rotor

WT 1.6 mm, 2 or 3 rollers
VC-280 or VC-380

WT 2.4 mm, 2 or 3 rollers
VC-281 or VC-381

Ecoline VC-280
1.7–5400 ml/min

Ecoline VC-380
1.6–5000 ml/min

1 channel

2 or 3 convex rollers treat the liquid and tubing gently

- With exchangeable rotor e.g. for lower pulsation, higher flow rates, or elevated differential pressures
- Standard tubing 1.6 mm wall thickness (WT)
- Differential pressure 1.5 bar [1]

[1] Differential pressure depends on tubing material; tubing with small i.d.'s may enable higher pressures.

Interfaces

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Start/Stop, rotation direction

Flow rates / Tubing

Model Type Channels Rollers			Ecoline VC-280 1 2		Ecoline VC-380 1 3		Ecoline VC-360 1 3		Ecoline VC-Easy-Load® 1 3	
Speed rpm			3.5	350	3.5	350	3.5	350	3.5	350
Tygon® ST R-3603/R-3607			ml/min per channel		ml/min per channel		ml/min per channel		ml/min per channel	
Order No.	WT (mm)	Tubing i.d.(mm)	min.	max.	min.	max.	min.	max.	min.	max.
MF0001	1.6	0.8					0.25	25	0.23	23
MF0028	1.6	1.6	1.7	170	1.6	160	0.9	90	0.86	86
MF0030	1.6	3.2	6.6	660	5.9	590	3.5	350	3.2	320
SC0379	1.6	4.8	51	1500	13	1300	7.7	770	6.5	650
MF0031	1.6	6.4	25	2500	23	2300	13	1300	11	1060
MF0032	1.6	8.0	37	3700	34	3400			16	1600
SC0383	1.6	9.5	48	4800	44	4400				
SC0384	1.6	11.1	54	5400	50	5000				

Approx. values: determined with water at 22°C, no differential pressure, Tygon ST tubing.

Flow rates / Tubing

Model Type Channels Rollers		Ecoline VC-MS/CA8-6 8 6		Ecoline VC-MS/CA4-12 4 12	
Speed rpm		3.5	350	3.5	350
Tygon ST R-3603/R-3607		ml/min per channel		ml/min per channel	
Order No.	Tubing i.d.(mm)	min.	max.	min.	max.
SC0189	0.13	0.005	0.49	0.003	0.32
SC0050	0.25	0.017	1.7	0.013	1.3
SC0053	0.51	0.067	6.7	0.055	5.5
SC0056	0.76	0.15	15	0.12	12
SC0059	1.02	0.26	26	0.20	20
SC0062	1.22	0.36	36	0.26	26
SC0065	1.52	0.53	53	0.36	36
SC0068	1.85	0.73	73	0.47	47
SC0071	2.54	1.2	120	0.68	68
SC0224	3.17	1.5	150	0.83	83

Approx. values: determined with water at 22°C,
no differential pressure, Tygon® ST tubing.

Tubing for aggressive media see Page 35

Ordering information

Model	Order No.	Flow rates ml/min per channel	Channels max.	Rollers
Ecoline VC-280 WT 1.6	ISM 1078	1.7 to 5400	1	2
Ecoline VC-380 WT 1.6	ISM 1079	1.6 to 5000	1	3
Ecoline VC-281 **WT 2.4***	ISM 1085	13 to 4600	1	2
Ecoline VC-381 **WT 2.4***	ISM 1080	12 to 4200	1	3
Rotor with 2 rollers WT 1.6	IS 3762	1.7 to 5400	1	2
Rotor with 3 rollers WT 1.6	IS 3763	1.6 to 5000	1	3
Rotor with 2 rollers, WT 2.4	IS 3757	13 to 4600	1	2
Rotor with 3 rollers, WT 2.4	IS 3754	12 to 4200	1	3
Ecoline VC-360	ISM 1076	0.25 to 1300	1	3
Ecoline VC-Easy-Load®	ISM 1091	0.23 to 1600	1	3
Ecoline VC-MS/CA8-6	ISM 1089	0.005 to 150	8	6
Ecoline VC-MS/CA4–12	ISM 1090	0.003 to 83	4	12
Ecoline without pump-head	ISM 1077			
Foot switch	IS 3572	see Page 61		
Spare cassettes MS/CA	IS 3510	see Page 60		

*For standard tubing 2.4 mm wall thickness 4.8 – 9.5 mm (3/16 – 3/8") inner diameter

Applications

Ecoline VC-280
To apply protective lacquer to cartons

Ecoline VC-380
As recirculating pump for coolant in thermostat bath

Ecoline VC-360
Externally controlled spectrophotometer cuvette filling

Ecoline VC-MS/CA8-6
8-channel flushing of the tubing system of a digital fabric printing machine

Rotation direction reversible | 24 | 2 years warranty

Easy interchangeable pump-heads

Mount the pump-head without using a tool

The MCP and BVP drives enable the user to **choose individually** from a large variety of **different pump-heads.** These heads are **interchangeable** and **can be mounted** or exchanged **within seconds**.

BVP *Standard*

see page 16

Variable speed drive with closed loop control analog interface

BVP *Standard*, Order No. ISM 444

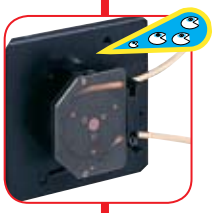
MCP *Standard*

see page 17

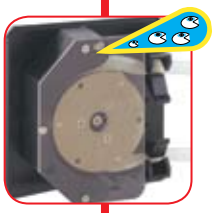
Microprocessor controlled dispensing drive **4 program memories for saving 4 different sets of operating parameters,** protection rating **IP 30,** RS232 and analog interface
MCP *Standard*, Order No. ISM 404

Interchangeable pump-head with bayonet coupling. Just insert and rotate.

Single-channel



0.072–530 ml/min
Type 360



0.44–2800 ml/min
Type 380

0.41–3600 ml/min
Type 380 AD

Single-channel

0.49–3700 ml/min
Type Pro-280
For 1.6 mm WT*

3.6–3100 ml/min
Type Pro-281
For 2.4 mm WT*

0.45–3400 ml/min
Type Pro-380
For 1.6 mm WT*

3.3–2900 ml/min
Type Pro-381
For 2.4 mm WT*

Single-channel

0.07–1100 ml/min
Type MF Easy-Load®

0.24–1000 ml/min
Type MF Easy-Load II
(with adjustable pressure setting)

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ISMATEC

4 drives and more than 14 pump-heads
An unique pump system

An investment for the future

For many years ISMATEC® pumps have been well known for being very robust, accurate and reliable, and consequently for offering a very long service life. These qualities make this unique type of pump system with 4 drives and more than 20 interchangeable pump-heads especially interesting. **Without high investments you can adapt the chosen pump system at a later date for new applications or different media.**

BVP *Process*

IP 65
dust-tight and protected against water jets

see page 18

Microprocessor controlled drive with digital LED display
Protection rating **IP 65**, analog interface
BVP *Process*, Order No. ISM 920

Stand-alone application

MCP *Process*

IP 65
dust-tight and protected against water jets

see page 19

Microprocessor controlled dispensing drive
4 program memories for PC programmed application profiles, protection rating **IP 65** RS232 and analog interface
MCP *Process*, Order No. ISM 915

Single-channel for corrosive media

0.07 – 15 ml/min
PTFE tubing 2 mm i.d.

0.19 – 45 ml/min
PTFE tubing 4 mm i.d.

Multi-channel

1.1–1100 ml/min
2 channels, Type SB2V

0.09–530 ml/min
3 channels, Type SB3V

Multi-channel

0.002–230 ml/min
4–12 channels
Type CA 4, CA 8 and CA 12

0.001–57 ml/min
4–16 channels
Type MS/CA 4–12
(Option: 3 extension blocks of 4 channels each)

0.002–100 ml/min
8–24 channels
Type MS/CA 8-6
(Option: 2 extension blocks of 8 channels each)

Pump-head + Tubing + Drive (MCP or BVP)
= Complete Pump System

1

BVP *Standard*

Economical

Interfaces

- Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
- Speed output (0–10 V_{DC} or 0–12 kHz)
- Start/Stop, rotation direction

- Robust, powerful drive
- Variable speed

BVP *Standard* drive
(pump-heads on Pages 20 to 25)

BVP *Standard*
without dispensing functions
- **3-digit potentiometer for speed setting**
- More than 14 pump-heads available
- Bayonet coupling system enables a system change without tools

Flow rates, channels, rollers and differential pressure depend on the mounted pump-head (see Pages 20 to 25)

Specifications

Motor type	DC motor
Speed	2.4 – 240 rpm
Speed setting	1–99.9%, resolution 0.1% 3-digit potentiometer
Power consumption	100 W
Mains connection	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	5.7 kg (without pump-head)

Ordering information

The complete pump system BVP *Standard* consists of:	
Drive	**ISM 444**
Pump-head	Pages 20 to 25
Tubing	Pages 30 to 39
Accessories	Page 61
Foot switch	**ISM 891**

Applications

With pump-head CA12
Addition of tablet coating solution during pharmaceutical production (pump controlled by external flow-through measuring system)

With pump-head 380
Cross-flow filtration of dyes and suspensions over a number of days for subsequent use of the filtrate in the dying industry

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MCP *Standard*

Multi-purpose

Saves individual application parameters!

- Robust, powerful drive
- Ideal for dispensing and filling

Interfaces

PC-controllable:
– RS232

– Speed control
(0–5 or 0–10V, 0–20 or 4–20mA)
– Speed output
(0–10 V_{DC} or 0–7.2 kHz)
– Start/Stop, Rotation direction, Autostart

MCP *Standard* drive
(pump-heads on Pages 20–25)

MCP *Standard*

– **Pre-programmed tube sizes and pump-heads allow you to work with flow rates**
– Membrane key-pad, LED display
– **4 program memories for saving individual application parameters**
– More than 20 pump-heads available
– Bayonet coupling system enables a system change without tools

Flow rates, channels, rollers and differential pressure depend on the pump-head mounted (see Pages 20 to 25)

Dispensing and calibrating function see Page 5

Specifications

Motor type	DC motor
Speed	1 – 240 rpm
Speed setting	rpm, resolution 0.1 rpm
Flow rate setting	µl/min, ml/min, l/min
Power consumption	100 W
Mains connections	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	6.4 kg (without pump-head)

Ordering information

The complete pump system MCP *Standard* consists of:	
Drive	**ISM 404**
Pump-head	Pages 20 to 25
Tubing	Pages 30 to 39
Accessories	Page 61
Foot switch	**IS 10039**

Applications

With pump-head 360
Filling of pharmaceutical solutions at small production scale (500 to 1000 units) in syrup bottles. Controlled via foot switch.

With PTFE-Tubing pump-head
Used as "trickle funnel", time-controlled addition of organic solvents during synthesis (small scale pilot plant)

1

BVP *Process*

Washdown

Protection rating of IP 65

Interfaces

- Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
- Speed output (0–10 V_{DC} or 0–7.2 kHz)
- Start/Stop, rotation direction, autostart

- Extremely robust drive
- Microprocessor controlled
- Ideal for applications in a dusty, humid or corrosive environment and in clean room areas (IP 65, dust-tight and protected against water jets)

BVP *Process* drive
(pump-heads on Pages 20 to 25)

BVP *Process*

without dispensing functions

Flow rates, channels, rollers and differential pressure depend on the mounted pump-head (see Pages 20 to 25)

- **Membrane key-pad for speed setting, LED display**
- **Stainless steel housing**
- More than 20 pump-heads available
- Bayonet coupling system enables a system change without tools

Specifications

Motor type	DC motor
Speed	1 – 240 rpm
Speed setting	rpm, resolution 0.1 rpm
Power consumption	120 W
Mains connection	85–264 V_{AC} / 47–60 Hz
Protection rating	IP 65
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	6.9 kg (without pump-head)

Ordering information

The complete pump system BVP *Process* consists of:	
Drive	ISM 920
Pump-head	Pages 20 to 25
Tubing	Pages 30 to 39
Accessories	Page 61
Foot switch	IS10039

Applications

With Easyload® II pump-head
Continuous addition of ink for roller based printing machine

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MCP *Process*

Programmable

Programs can be carried out on the spot independently of a PC!
Protection rating of IP 65

- Extremely robust drive, suitable for industries
- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment, and in clean room areas (IP 65, dust-tight and protected against water jets)

Interfaces

PC controllable:
– RS232

– Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
– Speed output (0–10 V_{DC} or 0–7.2 kHz)
– Start/Stop, Rotation direction, Autostart
– 2 universal inputs
– 2 universal outputs

MCP *Process* drive
(pump-heads on Pages 20 to 25)

MCP *Process*
– **Pre-programmed tube sizes and pump-heads allow you to work with flow rates**
– Stainless steel housing, membrane key-pad, LED display
– **4 program memories for saving individual application parameters or PC programmed command sequences**
– More than 20 pump-heads available
– Bayonet coupling system enables a system change without tools

Flow rates, channels, rollers and differential pressure depend on the pump-head mounted (see Pages 20 to 25)

Get your free plugin for ProgEdit
(German/English switchable)
see Page 61

Dispensing and calibrating function see Page 5

Specifications

Motor type	DC motor
Speed	1 – 240 rpm
Speed setting	rpm, resolution 0.1 rpm
Flow rate setting	µl/min, ml/min, l/min
Power consumption	100 W
Mains connection	100–230 V_{AC} / 50 – 60 Hz
Protection rating	IP 65
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	6.9 kg (without pump-head)

Ordering information

The complete pump system MCP *Process* consists of:	
Drive	ISM 915
Pump-head	Pages 20 to 25
Tubing	Pages 30 to 39
Accessories	Page 61
Software ProgEdit	**free**
Foot switch	**IS 10039**

LabVIEW driver
download for free: www.ismatec.com

Applications

With pump-head Pro 381 and pressure sensor
Pressure controlled sterile filtration of human plasma through a filter plate 0.2 µm. Constant monitoring is no longer necessary thanks to an optical alarm if pre-set pressure is exceeded.

With pump-head MS/CA 4-12 and switching valves
Stabilizing of an electrophysiological test system with Ringer solution and switching to the test solutions without delay at very low flow rates.

1

Gentle pumping

This pump-head is gentle enough for pumping highly concentrated viable cells

Pro-280 0.49–3700 ml/min

Order No. **ISM 785**

- Coated aluminum pump-head
- **Can be dismantled for cleaning**
- Self-centering tube-track thanks to concave tube-bed and convex rollers, which lengthens the tube-life
- 2 stainless steel rollers (higher max. flow rate but more pulsation than with 3 rollers)
- For tubing with 1.6 mm wall thickness
- 1.5 bar differential pressure[1]

Pro-281 3.6–3100 ml/min

Order No. **ISM 793**

Same pump-head as Pro-280, but

- For tubing with **2.4 mm wall thickness**
- 2.5 bar differential pressure[1]

Instantly interchangeable pump system

Especially suitable for:

- Chemical, biotechnological and pharmaceutical applications
- Food industry
- Elevated differential pressures (Pro-281 and Pro-381)
- Viscous fluids
- Fluids containing a high content of sensitive solids
- Applications requiring hygienic conditions, durability and reliability

Comparisons to gear, piston and centrifugal pumps proved that peristaltic pumps are the only suitable and sterilisable pump system for gently pumping media containing living cells.

[1] Differential pressure depends on tubing material; tubing with small i.d.'s enable higher pressures.

The flow rates are based on a drive speed of 1 (or 2.4) to 240 rpm. For the BVP Standard drive the indicated min. flow rates must be multiplied by factor 2.4.
Approx. values: determined with water, at 22° C, no differential pressure, Tygon tubing.

Pro-380 0.45–3400 ml/min

Order No. **ISM 791**

Same pump-head as Pro-280, but

- 3 stainless steel rollers (less pulsation but lower max. flow rate than with 2 rollers)

Pro-381 3.3–2900 ml/min

Order No. **ISM 797**

Same pump-head design as Pro-280, but

- 3 stainless steel rollers (less pulsation but lower max. flow rate than with 2 rollers)
- For tubing with **2.4 mm wall thickness**
- 2.5 bar differential pressure[1]

Flow rates/ Tubing — Model Pro-280

Tygon® ST R-3603/R-3607 Order No.	Wall (mm)	Tubing i.d. (mm)	ml/min min.	ml/min max.
MF0028	1.6	1.6	0.49	120
MF0030	1.6	3.2	1.9	450
SC0379	1.6	4.8	4.2	1000
MF0031	1.6	6.4	7.2	1700
MF0032	1.6	8.0	11	2600
SC0383	1.6	9.5	14	3300
SC0384	1.6	11.1	16	3700

Flow rates/ Tubing — Model Pro-281

Tygon ST R-3603/R-3607 Order No.	Wall (mm)	Tubing i.d. (mm)	ml/min min.	ml/min max.
MF0029	2.4	4.8	3.6	870
MF0033	2.4	6.4	6.5	1600
SC0502	2.4	8.0	9.9	2400
SC0503	2.4	9.5	13	3100

Flow rates/ Tubing — Model Pro-380

Tygon ST R-3603/R-3607 Order No.	Wall (mm)	Tubing i.d. (mm)	ml/min min.	ml/min max.
MF0028	1.6	1.6	0.45	110
MF0030	1.6	3.2	1.7	400
SC0379	1.6	4.8	3.7	890
MF0031	1.6	6.4	6.5	1600
MF0032	1.6	8.0	9.7	2300
SC0383	1.6	9.5	13	3000
SC0384	1.6	11.1	14	3400

Flow rates/ Tubing — Model Pro-381

Tygon ST R-3603/R-3607 Order No.	Wall (mm)	Tubing i.d. (mm)	ml/min min	ml/min max
MF0029	2.4	4.8	3.3	800
MF0033	2.4	6.4	5.8	1400
SC0502	2.4	8.0	8.8	2100
SC0503	2.4	9.5	12	2900

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Application

Pumping animal cell cultures

A comparison between different peristaltic pump systems was made by Ms Fan Guo and Prof. Dr. U. Graf-Hausner of Zurich Technical University Winterthur, and Dr. Joanne Laukart of Ismatec.

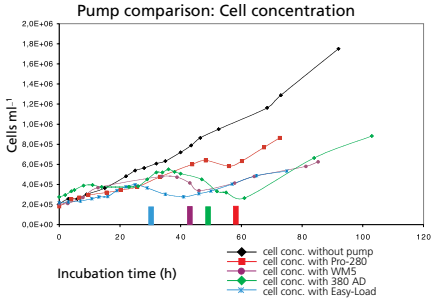
Experimental target: Gentle cell delivery

– Cell viability remains high
– Cell damage remains low

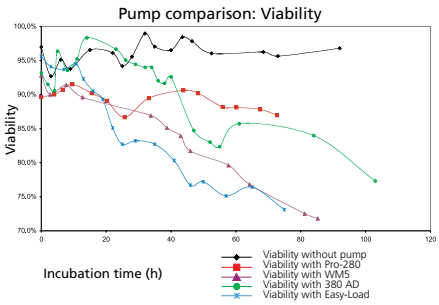
Pumping application

Production monitoring by analyzing by-pass cell streams and reactor innoculation.

Test results



With the pump-head Pro-280 cell death was observed only after 56 hours whilst with the Easy-Load® pump-head death occured already after 29 hours.



With the pump-head Pro-280 a viability of 87% was observed after **56 hours**. With the Easy-Load head a viability of only 72% was observed already after 29 hours.

Pumps tested

(Colors according to diagram)

MCP *Process* Pro-280 2 convex, non-spring-loaded rollers	MCP *Process* WM5 2 straight, spring-loaded rollers
MCP *Process* 380AD 3 convex, non-spring-loaded rollers	MCP *Process* Easy Load 3 straight, non-spring-loaded rollers

Comparative parameters

1. **Number of pump rollers**: 2 or 3
2. **Rollers**: spring-loaded vs. non-spring- loaded
3. **Tube-bed / roller geometry:** convex vs. straight rollers

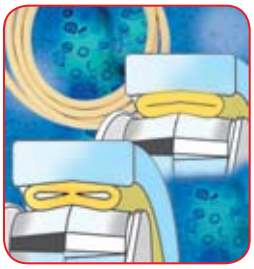
The winner: Pro-280

Thanks to convex rollers and a concave tube-bed, the MCP Process **Pro-280** proved to be the gentlest pump system with respect to cell viability and cell concentration.

Method

Cultivation of hybridoma cells in spinner bottles.

The cells are continuously pumped through an external loop at a constant flow rate (½ reactor volume / hour = 250 ml/h) until a identifiable cell death is observed.



The secret of the Pro-280

Before the roller totally closes the squeezed tubing, the cells can escape through a gap towards the tubing wall and, hence, are neither «squashed» nor damaged.

The pump-head Pro-280 has 2 convex rollers and the tube-bed is concave.

Conclusion

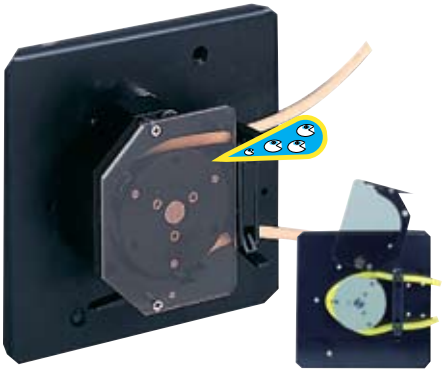
The Pro-280 (mounted either on an MCP or BVP Process drive) is a uniquely designed pump system especially suited for use in biotechnology. It has been tested for **use in laboratory scale and small production scale up to 30 liters**.

1

Multi-purpose single-channel pump-heads

For MCP and BVP drives

Change the pump-heads within seconds without the use of tools



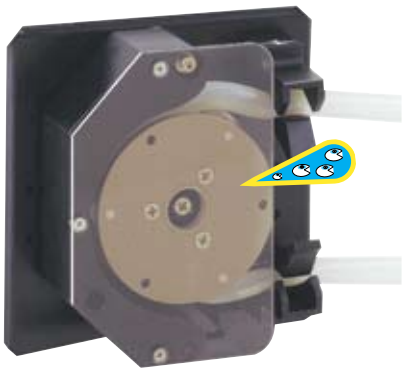
360 [1] 0.072–530 ml/min

Order No. **ISM 719**

- Easily accessible flip-up tube-bed guarantees easy and rapid tube change-over
- Transparent protection cover allows monitoring the tube and the revolving rotor
- Self-centering tube-track design thanks to the **concave tube-bed** and **convex rollers** (lengthens tube-life)
- Rotor for tubing i.d. from 0.8 to 6.4 mm with 1.6 mm wall thickness
- 3 stainless steel rollers
- 1.5 bar differential pressure [2]

Flow rates / Tubing			Model 360	
Tygon®ST R-3603/R-3607	Wall	Tubing	ml/min	
Order No.	(mm)	i.d. (mm)	min.	max.
MF0001	1.6	0.8	0.072	17
MF0028	1.6	1.6	0.26	62
MF0030	1.6	3.2	1.0	240
SC0379	1.6	4.8	2.2	530

[1] An OEM version of this pump-head is also available. Ask for the detailed data sheet.



380 [1] 0.44–2800 ml/min

Order No. **ISM 718**

Same design as pump-head 360, but larger size

- For tubing i.d. from 1.6 to 9.5 mm with 1.6 mm wall thickness
- 1.5 bar differential pressure [2]

Ideal for sterile media

Flow rates / Tubing			Model 380	
Tygon ST R-3603/R-3607	Wall	Tubing	ml/min	
Order No.	(mm)	i.d. (mm)	min.	max.
MF0028	1.6	1.6	0.44	100
MF0030	1.6	3.2	1.7	400
SC0379	1.6	4.8	3.6	860
MF0031	1.6	6.4	6.0	1400
MF0032	1.6	8.0	8.8	2100
SC0383	1.6	9.5	12	2800

[2] Differential pressure depends on tubing material; tubing with small i.d.'s may enable higher pressures.

380AD 0.41–3600 ml/min

Order No. **ISM 725**

- Pressure on tubing adjustable via rollers
- Rotor accepts tubing with1.6 and 2.4 mm wall thickness and 1.6 to 11.1 mm i.d.
- 3 stainless steel rollers
- 1.5 bar differential pressure [2] (with tubing wall thickness 1.6 mm)
- 2.5 bar differential pressure [2] (with tubing wall thickness 2.4 mm)

Ideal for media with high viscosity or a certain level of solid content

Flow rates / Tubing			Model 380AD	
Tygon ST R-3603/R-3607	WS	Tubing	ml/min	
Order No.	(mm)	iØ (mm)	min.	max.
MF0028	1.6	1.6	0.4	99
MF0030	1.6	3.2	1.5	370
SC0379	1.6	4.8	3.4	830
MF0031	1.6	6.4	6.2	1500
MF0032	1.6	8.0	9.5	2300
SC0383	1.6	9.5	13.0	3000
SC0384	1.6	11.1	15.0	3600
MF0029	2.4	4.8	3.4	830
MF0033	2.4	6.4	6.2	1500

The flow rates are based on a drive speed of 1 (or 2.4) to 240 rpm. For the BVP Standard drive the indicated min. flow rates must be multiplied by factor 2.4. Approx. values: determined with water, at 22° C, no differential pressure, and Tygon tubing.

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ISMATEC.

The pump-head for PTFE tubing

Easy-Load® [3] 0.07–1100 ml/min

Order No. **MF 0313/ISM738**

- Easily accessible pump-head
- Allows rapid tube change-over
- PSF housing (Polysulfone)
- Rotor for tubing with 1.6 mm wall thickness
- Rotor with 3 stainless steel rollers
- 0.7 bar differential pressure[2]

Flow rates / Tubing			Model Easy-Load	
Tygon® ST R-3603/R-3607	Wall	Tubing	ml/min	
Order No.	(mm)	i.d. (mm)	min.	max.
MF0001	1.6	0.8	0.066	16
MF0028	1.6	1.6	0.25	59
MF0030	1.6	3.2	0.91	220
SC0379	1.6	4.8	1.9	450
MF0031	1.6	6.4	3.1	730
MF0032	1.6	8.0	4.7	1100

[2] Differential pressure depends on tubing material; tubing with small i.d.'s may enable higher pressures.

Easy-Load II [3] 0.24–1000 ml/min

Order No. **MF 0446/ISM738**

Same specifications as Easy-Load, but

- Adjustable pressure setting
- Improved, automatic tubing retention
- PPS housing (Polyphenylene sulfide)
- Rotor with 4 stainless steel rollers
- 0.7 bar differential pressure[2]

Flow rates / Tubing			Model Easy-Load II	
Tygon ST R-3603/R-3607	Wall	Tubing	ml/min	
Order No.	(mm)	i.d. (mm)	min.	max.
MF0028	1.6	1.6	0.24	58
MF0030	1.6	3.2	0.92	220
SC0379	1.6	4.8	1.9	460
MF0031	1.6	6.4	3.0	730
MF0032	1.6	8.0	4.2	1000

[3] 2 pump-heads can be mounted on one drive. (Special mounting sets must be ordered separately).

PTFE-Tube 0.07–45 ml/min

Order No. **MF 0330/ISM727**

Pump-head for PTFE tubing

- 6 stainless steel rollers
- Stainless steel rotor
- Anodized aluminum body
- Adjustable tube-bed pressure with locking knob
- Up to **6.9 bar** differential pressure

Ideal for dispensing and pumping aggressive chemicals and for the filtration of organic solvents.

Flow rates for PTFE-Tubing

Tubing i.d.	Flow rates ml/min
2 mm	0.07 to 15
4 mm	0.19 to 45

See ordering information and tubing below.

Ordering information for pump-head PTFE tubing

Article	Specifications	Order No.	Pack size
PTFE pump tubing, 38 cm long	**2 mm i.d.** / 4 mm o.d., for 0.07 – 15 ml/min	MF 0331	2 pieces
PTFE pump tubing, 38 cm long	**4 mm i.d.** / 6 mm o.d., for 0.19 – 45 ml/min	MF 0332	2 pieces
Tube connectors (straight) (2 connectors are needed for one tube)	for tubing with **2 mm i.d.**	MF 0333	3 pieces
Tube connectors (straight) (2 connectors are needed for one tube)	for tubing with **4 mm i.d.**	MF 0334	1 pieces
PTFE extension tubing, 3.65 m long	for tubing with **2 mm i.d.**	SC 1017BO	1 x 3.65 m
PTFE extension tubing, 3.65 m long	for tubing with **4 mm i.d.**	SC 1016BO	1 x 3.65 m
Tubing grooving tool (Use only tubing with 4 mm i.d.)	Important for connections which must withstand 2.8 bar (40 psi) or greater.	MF 0337	1 pieces

1

Pump-heads up to 24 channels

For MCP and BVP drives

Change the pump-heads in seconds without tools

CA-4, CA-8, CA-12 **0.002–230 ml/min**

Order No. **ISM 721** CA 4 (with cassettes for 4 channels)
Order No. **ISM 732** CA 8 (with cassettes for 8 channels)
Order No. **ISM 733** CA 12 (with cassettes for 12 channels)

- CA Click'n'go cassettes (spare cassettes, see Page 60)
- Automatic pressure setting
- Easy and rapid tube change-over; each channel separately, even while pump is running
- 8 rollers
- **4 to 12 channels**, each channel can take different tube sizes
- 2-stop tubing, 0.13 to 3.17 mm i.d.
- 1.0 bar differential pressure[1]

Ideal pump-head for multi-channel applications at higher flow rates

Flow rates / Tubing

Tygon®ST R-3603/R-3607 Order No.	Tubing i.d. (mm)	ml/min per channel min.	ml/min per channel max.
SC0188	0.13	0.002	0.31
SC0002	0.25	0.008	1.8
SC0005	0.51	0.034	8.2
SC0008	0.76	0.074	18
SC0011	1.02	0.13	31
SC0014	1.22	0.18	42
SC0017	1.52	0.26	62
SC0020	1.85	0.36	86
SC0023	2.54	0.62	150
SC0222	3.17	0.94	230

OEM versions of these pump-heads are also available. Ask for the detailed data sheet.

SB2V
ISM 734 + ISM 010
Standard tubing
3.2 to 8.0 mm i.d.
Wall thickness 1.6 mm

SB3V
ISM 734 + ISM 011
Standard tubing
0.8 to 4.8 mm i.d.
Wall thickness 1.6 mm

SB 2V / SB 3V **0.09–1100 ml/min**

Order No. ISM 734 (depends on tube-bed)
+ Tube-bed set:
2-channel, SB 2V **ISM 010** for Standard tubing 1.1 to 1100 ml/min
3-channel, SB 3V **ISM 011** for Standard tubing 0.09 to 530 ml/min

- Spring-loaded, exchangeable tube-beds
- Individual and continuously adjustable pressure setting per channel
- 6 rollers, **2 to 3 channels**, for Standard tubing
- Differential pressure 1.5 bar[1]

Ideal for sensitive substances requiring a smooth pressure adjustment

Flow rates / Tubing SB2V

Tygon ST R-3603/R-3607 Order No.	WT (mm)	Tubing i.d. (mm)	ml/min per channel min.	ml/min per channel max.
MF0030	1.6	3.2	1.1	260
SC0379	1.6	4.8	2.3	550
MF0031	1.6	6.4	3.7	890
MF0032	1.6	8.0	4.6	1100

Flow rates / Tubing SB3V

Tygon ST R-3603/R-3607 Order No.	WT (mm)	Tubing i.d. (mm)	ml/min per channel min.	ml/min per channel max.
MF0001	1.6	0.8	0.09	22
MF0028	1.6	1.6	0.26	63
MF0030	1.6	3.2	0.99	240
SC0379	1.6	4.8	2.2	530

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ISMATEC

BVP *Standard*
ISM 444

MCP *Standard*
ISM 404

BVP *Process*
ISM 920

MCP *Process*
ISM 915

Instantly interchangeable pump system

Choose from 4 drives
Memory for up to 4 user-defined programs. Pump-heads and tubing are pre-programmed, which enables you to work with varying flow rates. See Pages 14 to 19.

Single-channel pump-heads for MCP and BVP drives:
See Pages 20 to 23.

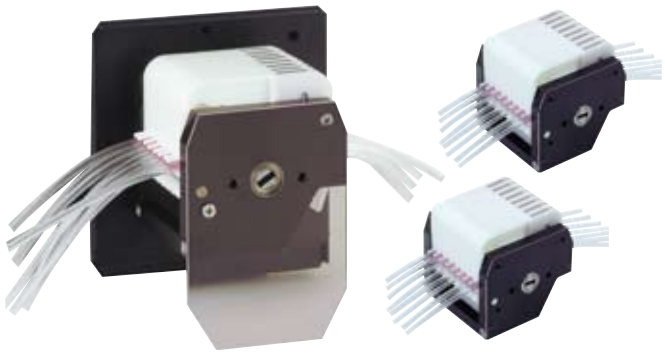
Tubing for aggressive media, see Page 35.

MS/CA 4-12 0.001–57 ml/min

Order No. ISM 735
+ max. 3 extension blocks ISM 737
- Click'n'go cassettes (spare cassettes, Page 60)
- Each channel can take different tube sizes. Tube change-over is possible even while pump is running.
- **12 rollers for extremely low pulsation**
- 4 channels, extendable **up to 16 channels**
- 3 extension blocks with 4 channels each
- 3-stop tubing, 0.13 to 3.17 mm i.d.
- 1.0 bar differential pressure[1]

Flow rates / Tubing

Tygon® ST R-3603/R-3607	Tubing	ml/min per channel	
Order No.	i.d. (mm)	min.	max.
SC0189	0.13	0.001	0.22
SC0050	0.25	0.004	0.91
SC0053	0.51	0.016	3.8
SC0056	0.76	0.033	8.0
SC0059	1.02	0.056	13
SC0062	1.22	0.075	18
SC0065	1.52	0.10	25
SC0068	1.85	0.13	32
SC0071	2.54	0.19	46
SC0224	3.17	0.24	57



MS/CA 8-6 0.002–100 ml/min

Order No. ISM 724
+ max. 2 extension blocks ISM 185
- Click'n'go cassettes (spare cassettes, Page 60)
- Each channel can take different tube sizes. Tube change-over is possible even while pump is running.
- 6 rollers
- 8 channels, extendable **up to 24 channels**
- 2 extension blocks with 8 channels each
- 3-stop tubing, 0.13 to 3.17 mm i.d.
- 1.0 bar differential pressure[1]

Flow rates / Tubing

Tygon ST R-3603/R-3607	Tubing	ml/min per channel	
Order No.	i.d. (mm)	min.	max.
SC0189	0.13	0.002	0.33
SC0050	0.25	0.005	1.1
SC0053	0.51	0.019	4.6
SC0056	0.76	0.042	10
SC0059	1.02	0.073	18
SC0062	1.22	0.10	24
SC0065	1.52	0.15	36
SC0068	1.85	0.21	50
SC0071	2.54	0.33	79
SC0224	3.17	0.43	100

[1] Differential pressure depends on tubing material; tubing with small i.d.'s and/or cassettes with the pressure lever (see Page 60) may enable higher pressures.

The flow rates are based on a drive speed of 1 (or 2.4) to 240 rpm. For the BVP Standard drive the indicated min. flow rates must be multiplied by factor 2.4. The indicated flow rates are approx. values: determined with water, at 22° C, no differential pressure, and Tygon tubing.

1

MS-CA Stand-mounted pumps

Save space with stand-mounted pumps

- **Fixed speed**
- Excellent start/stop characteristics
- Highly reproducible
- Ideal for limited space situations e.g. cabinets

CE

MS-CA
0.021–26 ml/min (per channel)

- 2 or 4 channels
- 6 or 8 rollers
- Click'n'go cassettes
- Each channel can take different tube sizes
- 3-stop tubing
- Differential pressure 1.0 bar
  Possible with appropriate tubing material; tubing with small i.d.'s and/or pressure lever cassettes (see Page 60) may enable higher pressures.

Spare cassettes MS/CA
(see Page 60)

Specifications MS-CA

Motor type	Synchronous motor
Speed	20, 40 or 60 rpm
Power consumption	8 W
Mains connection[1]	230V_{AC} (50/60 Hz) or 115V_{AC} (50/60 Hz)
Protection rating	IP 30
Depth/Width/Height	2-channel 125x88x135 mm 4-channel 145x88x135 mm
Weight	2-channel 1.2 kg 4-channel 1.3 kg

[1] Please state required mains voltage and frequency on your order.

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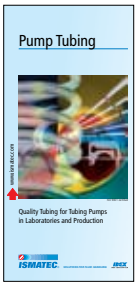
These pumps are also available as OEM versions.
Our engineers welcome your ideas.
Please contact us.



Contents of tubing selection guide:
(is supplied with each pump)
- Material and tubing properties
- Chemical resistance chart
- Ordering information

(see also Pages 30 to 39 and Internet www.ismatec.com)

Interfaces

No interfaces for external control

Flow rates and tubing

Model		MS-CA _/620	MS-CA 4/640	MS-CA 2/660	MS-CA _/820	MS-CA 4/840	MS-CA 2/860
Channels / Rollers		2 / 4 / 6	4 / 6	2 / 6	2 / 4 / 8	4 / 8	2 / 8
Speed rpm		20	40	60	20	40	60
Tygon® ST R-3603/R-3607 Order No.	Tubing i.d. (mm)	ml/min per channel	ml/min per channel	ml/min per channel	ml/min per channel	ml/min per channel	ml/min per channel
SC0189	0.13	0.028	0.055	0.083	0.021	0.043	0.064
SC0050	0.25	0.10	0.19	0.29	0.08	0.16	0.24
SC0053	0.51	0.38	0.77	1.2	0.34	0.67	1.0
SC0056	0.76	0.84	1.7	2.5	0.73	1.5	2.2
SC0059	1.02	1.5	2.9	4.4	1.3	2.5	3.8
SC0062	1.22	2.0	4.1	6.1	1.8	3.5	5.3
SC0065	1.52	3.0	6.0	9.1	2.6	5.1	7.7
SC0068	1.85	4.2	8.4	13	3.5	7.0	10
SC0071	2.54	6.6	13	20	5.5	11	16
SC0224	3.17	8.5	17	26	7.1	14	21

Approx. values: determined with water, at 22°C, no differential pressure, Tygon tubing.

Long-term determination of environmental influences on asbestos-cement

Ordering information

Model	Order No.	Flow rates* ml/min per channel	Channels max.	Rollers	Speed rpm
MS-CA 2/620	ISM 844	0.028 – 8.5	2	6	20
MS-CA 2/640	ISM 845	0.055 – 17.0	2	6	40
MS-CA 2/660	ISM 846	0.083 – 26.0	2	6	60
MS-CA 2/820	ISM 847	0.021 – 7.1	2	8	20
MS-CA 2/840	ISM 848	0.043 – 14.0	2	8	40
MS-CA 2/860	ISM 849	0.064 – 21.0	2	8	60
MS-CA 4/620	ISM 850	0.028 – 8.5	4	6	20
MS-CA 4/640	ISM 851	0.055 – 17.0	4	6	40
MS-CA 4/820	ISM 852	0.021 – 7.1	4	8	20
MS-CA 4/840	ISM 853	0.043 – 14.0	4	8	40

* 26 different tubing i.d.'s give 26 flow rates!

Please state required mains connection 230V_{AC} (50/60 Hz) or 115V_{AC} (50/60 Hz) on your order.
Spare cassettes MS/CA . . . (see Page 60)

Applications

- Multi-channel delivery processes with constant flow rate, e.g.
- Sipper pump for flow-through cuvettes
- Feeding of overflow level control systems

1

Flowmaster®

Ideal for heavy-duty processes

The most convincing solution for fluid transfer in biotechnology, as well as pharmaceutical, food and beverage industries

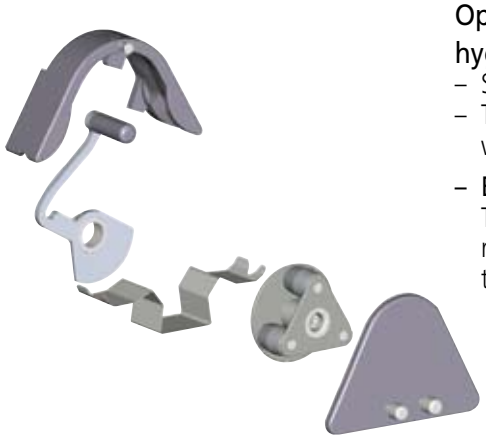
- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment and in clean room areas
- Convex rollers treat the liquid and tubing gently
- Protection rating of IP 65

Flowmaster FMT300

37 ml/min – 13 l/min
1 channel
3 convex stainless steel rollers
– Automatic tube retention
– Standard tubing
6.4 to 15.9 mm i.d.,
wall thickness 3.2 mm,
differential pressure max. 2 bar
(depends on tubing material used)

Safety

– Pump stops when opening the tube-bed
– Multiple overload protection



Optimized for increased hygienic requirements

– Stainless steel housing
– Tube-loading under sterile conditions without aspirating air
– **Easy disassembly of the pump-head**
Thorough cleaning thanks to easy and rapid disassembly and reassembly in less than a minute.

Specifications

Motor type	DC motor
Speed	5 to 500 rpm
Speed setting	resolution 0.1 rpm membrane key-pad, LED display
Power consumption	500 W
Mains connection	$230V_{AC}$/50Hz,$115V_{AC}$/60Hz adjustable
Protection rating	IP 65
Depth/Width/Height	500x220x262 mm
Weight	26 kg

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flowmaster®

Tube exchange in 5 seconds

- Insert the tube (easily and fast)
- Press down the lever (automatically correct pressure setting of the tube)
- Start the pump!

PLC compatible interface

with status information for process control systems (the level of the inputs can be configured: 5, 12 or 24 V)

- Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
- Start/Stop, Rotation direction
- Autostart
- Speed output
- Digital output (potential free) (Error, okay, busy)

Settings menu

- Configuration of analog interface
- Entry of basic settings, e.g.
  - Foot switch control
  - Rotation speed (% or rpm)
  - Service life of tubing
  - **Timer function, etc.**

Suited for:
1-channel delivery processes with large flow rates in clean room areas or a dusty, humid or wet environment.

Flow rates / Tubing

Tubing Information				Flow rates in liters/min							
Tygon® LFL	**PharMed®**	Wall (mm)	Tubing i.d. (mm)	rpm 5	rpm 10	rpm 50	rpm 100	rpm 200	rpm 300	rpm 400	rpm 500
Order No.	Order No.										
SC0531	MF0015	3.2	6.4	0.037	0.074	0.37	0.74	1.5	2.2	3.1	3.7
SC0395	MF0016	3.2	9.5	0.08	0.16	0.80	1.6	3.2	4.8	6.4	8.0
SC0396	MF0034	3.2	12.7	0.10	0.20	1.0	2.0	4.0	6.0	8.0	10.0
	SC0696	3.2	15.9	0.13	0.26	1.3	2.6	5.2	7.8	10.4	13.0

Approx. values: determined with water, at 22°C, no differential pressure, PharMed tubing

Ordering information

Model	Order No.	Flow rates ml/min	Channels max.	Rollers	Speed rpm
Flowmaster FMT300					
230V$_{AC}$ / 50 Hz	ISM 1020	37 –13'000	1	3	5–500
Flowmaster FMT300					
115V$_{AC}$ / 50 Hz	ISM 1022	37 – 13'000	1	3	5–500

Accessories
Foot switch (Page 61) IS 10279

Tubing for aggressive media, see Page 35.

Applications

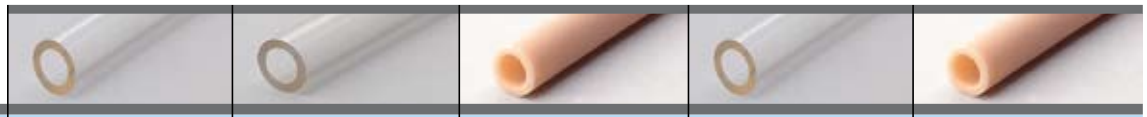
Filling of large volumes of pharmaceutical solution from a seed reactor to bulk vessels under sterile conditions.

1

Rating comparison

Rating: + meets the stated property
± meets the stated property to limited extent
– does not meet the stated property

1 not recommended
10 excellent



Properties	Tygon® LFL	Tygon® ST R-3603/R-3607	PharMed® Ismaprene	Tygon® MHSL 2001	Tygon® MHLL
FDA	+	+	+	+	+
US Pharmacopoeia Class VI	+	–	+	–	+
Transparency	+	+	–	+	–
Long Life	7	1	10	3	10
Gas Permeability CO_2	8	7	5	5	5
O_2	9	9	8	9	8
N_2	10	9	8	6	8
Temperature, above 0°C	2	2	7	1	7
Temperature, below 0°C	3	4	8	7	8
Pressure	9	5	1	1	1
Absorption / Adsorption	6	6	9	10	9
Chemical Resistance,					
Acids (H_2SO_4) 10%	10	10	10	10	10
30%	10	10	10	10	10
95–98%	1	1	1	7	1
Bases (NaOH) 10–15%	10	10	10	10	10
30–40%	4	4	10	10	10
Hydrocarbons (aliphatic)	1	1	1	1	1
Mineral Salts	10	10	10	10	10
Alcohols	1	1	10	10	10
Ketones (Acetone)	1	1	1	7	1

Maximum recommended operating pressure

WT* (mm)	i.d. (mm)	bar	bar	bar	bar	bar
1.6	0.8	8.7	8.7	3.7	N.A.	N.A.
1.6	1.6	4.8	4.8	2.1	3.1	N.A.
1.6	2.4	3.8	3.8	1.6	N.A.	N.A.
1.6	3.2	3.0	3.0	1.3	2.0	N.A.
1.6	4.8	2.2	2.2	0.9	1.5	N.A.
1.6	6.4	1.8	1.8	0.8	1.1	N.A.
1.6	8.0	1.5	1.5	0.6	0.9	N.A.
1.6	9.5	1.3	1.3	0.5	0.8	N.A.
1.6	11.1	1.2	1.2	0.5	N.A.	N.A.
1.6	12.7	1.1	1.1	0.5	N.A.	N.A.
1.6	15.9	1.0	1.0	0.4	N.A.	N.A.
2.4	4.8	3.0	3.0	1.3	N.A.	N.A.
2.4	6.4	2.4	2.4	1.0	N.A.	N.A.
2.4	8.0	2.0	2.0	0.8	N.A.	N.A.
2.4	9.5	1.8	1.8	0.8	N.A.	N.A.
2.4	11.1	1.5	1.5	0.6	N.A.	N.A.
2.4	12.7	1.3	1.3	0.6	N.A.	N.A.
2.4	15.9	1.2	1.2	0.5	N.A.	N.A.
3.2	6.4	3.0	3.0	1.3	N.A.	N.A.
3.2	9.6	2.2	2.2	0.9	N.A.	N.A.
3.2	12.7	1.8	1.8	0.8	1.1	N.A.
3.2	15.9	1.5	1.5	0.6	0.9	N.A.

*WT: Wall thickness

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We recommend you to also observe the chart 'Tubing Properties' on the following pages. All information has been supplied to ISMATEC by the tubing manufacturers. It is for your guidance only. We recommend you to test the tubing before use.

Properties	Tygon® HC F-4040-A	Tygon® SI Silicone 3350 (Platinum)	Silicone Peroxid	Norprene® A-60-G	Viton® Fluran® HCA F-5500-A
FDA	–	+	+	–	–
US Pharmacopoeia Class VI	–	+	+	–	–
Transparency	±	±	±	–	–
Long Life	2	4	4	10	3
Gas Permeability CO_2	9	1	1	5	10
O_2	10	1	1	8	10
N_2	10	1	1	8	10
Temperature, above 0°C	2	10	10	7	9
Temperature, below 0°C	1	10	10	8	4
Pressure	7	1	1	1	1
Absorption / Adsorption	6	1	1	9	7
Chemical Resistance,					
Acids (H_2SO_4) 10%	10	10	10	10	10
30%	7	7	8	10	10
95–98%	1	1	1	1	10
Bases (NaOH) 10–15%	1	10	10	10	10
30–40%	1	10	10	10	10
Hydrocarbons (aliphatic)	7	1	1	1	7
Mineral Salts	10	7	7	10	10
Alcohols	7	7	10	10	1
Ketones (Acetone)	1	4	1	1	1

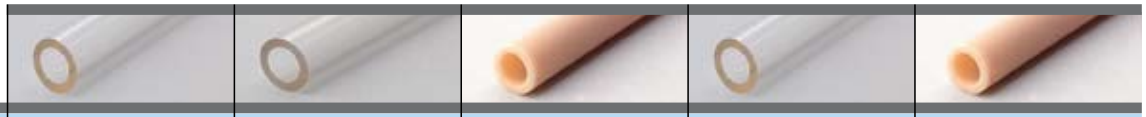
Maximum recommended operating pressure

WT* (mm)	i.d. (mm)	bar	bar	bar	bar	bar
1.6	0.8	10.9	1.9	1.9	3.7	3.7
1.6	1.6	6.1	1.0	1.0	2.1	2.1
1.6	2.4	4.8	0.8	0.8	1.6	1.6
1.6	3.2	3.8	0.6	0.6	1.3	1.3
1.6	4.8	2.7	0.5	0.5	0.9	0.9
1.6	6.4	2.2	0.4	0.4	0.8	0.8
1.6	8.0	1.8	0.3	0.3	0.6	0.6
1.6	9.5	1.6	0.3	0.3	0.5	0.5
1.6	11.1	1.5	0.3	0.3	0.5	0.5
1.6	12.7	1.4	0.2	0.2	0.5	0.5
1.6	15.9	1.2	0.2	0.2	0.4	0.4
2.4	4.8	3.8	0.6	0.6	1.3	1.3
2.4	6.4	3.0	0.5	0.5	1.0	1.0
2.4	8.0	2.5	0.4	0.4	0.8	0.8
2.4	9.5	2.2	0.4	0.4	0.8	0.8
2.4	11.1	1.8	0.3	0.3	0.6	0.6
2.4	12.7	1.7	0.3	0.3	0.6	0.6
2.4	15.9	1.5	0.3	0.3	0.5	0.5
3.2	6.4	3.8	0.6	0.6	1.3	1.3
3.2	9.6	2.7	0.5	0.5	0.9	0.9
3.2	12.7	2.2	0.4	0.4	0.8	0.8
3.2	15.9	1.8	0.3	0.3	0.6	0.6

*WT: Wall thickness

Properties of ISMATEC® tubing

Proven quality for a wide range of laboratory applications. Be sure to choose the tubing most suitable for your application.



Type	Tygon® LFL	Tygon® ST R-3603/R-3607	PharMed® Ismaprene	Tygon® MHSL 2001	Tygon® MHLL
Special Properties	The tubing with the longest service-life of any clear Tygon® tubing	The inexpensive all-round tubing for general laboratory applications	The ideal tubing for pharmaceutical and medical applications, and for foodstuffs.	The transparent, plasticiser-free tubing with superior pump-life. Especially designed for MEK and other aggressive solvents.	Chemically resistant to acetone, MEK and other aggressive solvents. Long life tubing.
Advantages	• Transparent • Broad chemical resistance • Tasteless • Extremely low particulate spallation • Meets USP Class VI and FDA criteria • Non-aging • High dielectric constant	• Transparent • Resistant to almost all inorganic chemicals • Tasteless • Smooth polished inner wall • Low gas permeability • Non-aging and non-oxidizing • High dielectric constant	• Recommendable for cell and tissue cultures • Ideal for production filtration, fermentation and bioreactor process lines • Very long service-life • Non-toxic and non hemolytic • Impermeable to normal light and UV-radiation • Appropriate for medical products and foodstuffs • Low particulate spallation • Can be autoclaved repeatedly • Withstands repeated CIP and SIP cleaning and sterilization • Meets USP class VI, FDA and NSF criteria	• Plasticizer and oil-free • Smooth inner-bore • Low sorption maintains fluid and tube integrity • Does not impart anything into the pumping medium • No release of hazardous materials when properly incinerated	• Plasticizer-free • Smooth innerbore • Low sorption maintains fluid integrity • Minimal adhesion and diffusion • Suitable for MEK, Acetone and other corrosive solvents • Long life tubing
Limitations	• Potential leaching of plasticizers • Not recommended for human blood and tissue	• Potential leaching of plasticizers • Short service-life	• Potential leaching of additives (lubricants)	None	• Cannot be repeatedly sterilized • Only available as stopper tubing
Physical Properties	• Thermoplastic • PVC-based material with plasticizer • Flexible, firm, transparent	• Thermoplastic • PVC-based material with plasticizer • Flexible, firm, transparent	• Thermoplastic Elastomer based on polypropylene. • Flexible, firm, opaque	• Polyolifin	• Special thermoplastic of high purity • Without additives • Without plasticizer • Environmental-friendly disposal • Flexible, firm, opaque
Service Temperature Tange	–50°C to +74°C (–58°F to +165°F)	–50°C to +74°C (–58°F to +165°F)	–60°C to +135°C (–75°F to +275°F)	–73°C to +57°C (–100°F to +135°F)	–70°C to +74°C (–94°F to +165°F)
Applications					
Acids	good	good	good	excellent	excellent
Alkaline solutions	good	good	good	excellent	excellent
Solvents	not recommended	not recommended	not recommended	good/excellent	excellent
Pressure	good	fair	not recommended	–	not recommended
Vacuum	good	good	excellent	–	good
Viscous media	excellent	excellent	good	–	good
Sterile Media	limited	limited	excellent	–	good
Complies with the standards	FDA 21CFR175.300 US Pharmacopoeia Class VI	FDA 21CFR175.300	FDA 21CFR177.2600 US Pharmacopoeia Class VI NSF listed (Standard 51)	FDA	FDA 21CFR177.2600 USP Pharmacopoeia Class VI
Sterilization	Autoclavable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F); tubing will appear milky Gas sterilization with Ethylene oxide Not recommended for sterilization with radiation.	Autoclavable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F); tubing will appear milky Gas sterilization with Ethylene oxide Not recommended for sterilization with radiation.	Autoclaveable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F) Gas sterilization with Ethylene oxide / Sterilization with radiation up to 2.5 mrad / Caution: Use special tubing version (welded stoppers) when autoclaving 2 or 3-stop colour-coded tubing.	Autoclaveable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F) Gas sterilization with Ethylene oxide Sterilization with radiation up to 2.5 mrad	Autoclaveable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F) Gas sterilization with Ethylene oxide Sterilization with radiation up to 2.5 mrad Caution: Can not be repeatedly sterilized
Gas permeability [1] CO_2	563	360	1200	1140	–
O_2	124	80	200	76	–
N_2	67	40	80	190	–
Odour and Taste	none	none	low	–	–
Toxicity	non-toxic	non-toxic	non-toxic and non-hemolytic	–	–
Tubing life [3] at 0 bar	800 hrs	35 hrs	1000 + hrs	75 hrs	800 + hrs
at 0.7 bar	700 hrs	30 hrs	1000 hrs	–	800 + hrs

[1] Permeability Coefficient = $\frac{\text{Amount of gas (cm}^3\text{) x tubing wall thickness (cm)}}{\text{Surface area of tubing ID (cm}^2\text{) x time (seconds) x pressure drop across tubing wall (cmHg)}} \cdot 10^{-11}$

You can find your local ISMATEC sales representative at:
US: **+1 360 253 2008** Germany: **+49 93 77/92 03 0**
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For more tubings for aggressive media, see page 35.

This information has been supplied to Ismatec by the tubing manufacturers. It is for your guidance only.
We recommend you to test the tubing before use.

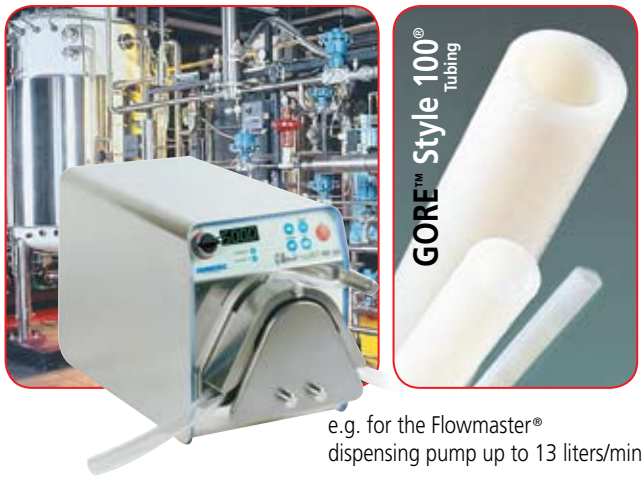
Tygon® HC F-4040-A	Tygon® SI Silicone 3350 (Platinum)	Silicone Peroxide	Norprene® A-60-G	Norprene® Chemical	Viton® Fluran® HCA F-5500-A
The special tubing for hydrocarbons, petroleum products and distillates.	The platinum-cured silicone tubing with an ultra-smooth inner surface for sanitary transfer of sensitive fluids.	Silicone tubing blended with organic peroxide for biological applications	The high performance tubing for industrial use.	Chemically resistant to acetone, MEK and other aggressive solvents. Long life tubing.	The special tubing for concentrated acids and corrosive solvents.
• Specially formulated to transport hydrocarbons, petroleum products and distillates • Ideal for gasoline, kerosene, heating oils, cutting liquids and coolants based on glycols • High dielectric constant • Low gas permeability	• Steam autoclaveability • Excellent biological compatibility • Ultra-smooth inner bore reduces potential for particle entrapment • Lower level of protein binding. • Entirely non-toxic, non-hemolytic and non-pyrogenic. • Weather, ozone, sunlight and radiation resistant • Resistant to fungus • Odourless	• Steam autoclaveability • Excellent biological compatibility • Greater physical compression capability • Not prone to mould • Non-toxic • Waterproof and resistant to ozone, radiation and sunlight • Resistant to fungus • Odourless	• Offers longest service-life with good flow consistency • Good resistance to acids and alkaline chemicals • Superior weathering • Abrasion resistant • Non-ageing and non-oxidizing • Outstanding flexural fatigue resistance • Low gas permeability versus rubber tubing • Ozone (300 pphm) and UV light resistant • Ideal for use in vacuum system	• Plasticizer-free • Smooth innerbore • Low sorption maintains fluid integrity • Minimal adhesion and diffusion • Suitable for MEK, Acetone and other corrosive solvents • Long life tubing	• High chemical resistance • Low gas permeability • Wide temperature range
• Not recommended for strong acids and alkalies, foodstuffs, beverages and medicines • Potential leaching of plasticizers	• Not suitable for concentrated solvents, oils, acids or diluted sodium hydroxide • Relatively high gas permeability	• Not recommended for concentrated solvent, oils, acids or diluted sodium hydroxide • Relatively high gas permeability	• Potential leaching of blend material	• Cannot be repeatedly sterilized • Only available as stopper tubing	• Limited service-life
• Thermoplastic • PVC-based material with plasticizer • Flexible, firm, translucent, yellow	• Thermal set rubber • Siloxane polymers and amorphous silica • Soft, translucent, clear to light amber • Excellent compression strength	• Polydimethylsiloxane with silica filter and silicone oil • Excellent resistance to compression • Soft, translucent, clear to light amber	• Thermoplastic elastomer based on polypropylene • Excellent tensile strength • Firm, opaque, black	• Special thermoplastic of high purity • Without additives • Without plasticizer • Environmental-friendly disposal • Flexible, firm, opaque	• Fluorpolymerelastomer • Firm, opaque, black
–37°C to +74°C (–35°F to +165°F)	–60°C to +200°C (–75°F to +392°F)	–51°C to +238°C (–60°F to +460°F)	–60°C to +135°C (–75°F to +275°F)	–70°C to +74°C (–94°F to +165°F)	–31°C to +204°C (–25°F to +400°F)
limited	limited	limited	excellent	excellent	excellent
not recommended	limited	good	excellent	excellent	excellent
not recommended	limited	not recommended	not recommended	excellent	limited
good	not recommended	not recommended	not recommended	not recommended	not recommended
good	good	good	good	good	good
excellent	fair	fair	excellent	good	good
limited	excellent	excellent	not recommended	good	fair
None	US Pharmacopoeia XXIII Class VI FDA 21CFR177.2600 also exceeds 3A sanitary standards	US Pharmaceopoeia Class VI FDA 21CFR177.2600	None	FDA 21CFR177.2600 USP Pharmacopoeia Class VI	None
Not recommended	Autoclaveable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F) Gas sterilization with Ethylene oxide Sterilization with radiation up to 2.5 mrad	Autoclaveable for 30 min at 1 bar (15 psi), 121°C (250°F) Radiation: Irradiate at up to 2.5 mrad Gas: Not recommended to sterilize with Ethylene oxide	Not recommended	Autoclaveable with steam 30 minutes at 1 bar (15 psi) and 121°C (250°F) Gas sterilization with Ethylene oxide Sterilization with radiation up to 2.5 mrad Caution: Can not be repeatedly sterilized	Not recommended
100	25147	25147	1200	–	38
22	4715	4715	200	–	14
12	2284	2284	80	–	5
[2]	none	–	[2]	–	[2]
[2]	non-toxic	–	[2]	–	[2]
60 hrs	200 hrs	–	1000 + hrs	800 + hrs	150 hrs
60 hrs	100 hrs	–	1000 hrs	800 + hrs	90 hrs

[2] Must not be used for foodstuffs, beverages, and drugs
[3] Tubing 6.4 mm i.d., 1.6 mm wall, 3-roller pump head, 600 rpm, 23°C, service-life ending with rupture (ISMATEC® tubing pumps run at approx. 11 rpm – 500 rpm)

1

Tubing for special applications

From GORE™ for **single channel** tubing pumps



e.g. for the Flowmaster®
dispensing pump up to 13 liters/min

For high-pressure application
Gore Style 100

- Extremely stable flow rates
- Variability in flow rate within 1% during total life time
- Virtually eliminates spallation (ensures continuously high purity in fluid transfer)
- For differential pressures up to 4 bar (60 psi)
- High burst strength (up to 25 bar / 360 psi)
- Exhibits 18 times the life of silicone rubber tubing

Application
in pharmacuetical, food and biotech processes

- Tangential flow filtration and other high-pressure applications
- Addition of anti-foam
- Long-term fermentation: continuous media recirculation over 75 days
- Transfer of live-cells from one container into another featuring excellent service life at low temperatures
- Ultra-filtration: high pressure stability allows higher system pressure and flow rate, which results in longer service life and fewer down-times due to tube exchanges

Specifications

Unique pressed composite material, not extruded, produced in clean room

- Platinum cured Silicone and expanded PTFE
- Available in bore sizes up to 50 mm ID
- USP Class VI approved and classified nontoxic
- Cited in FDA Type II Material Master File (MMF)
- Operates at pressures up to 4 bar (60 psi)
- In-line steam sterilizable

e.g. for the tubing pump
REGLO Quick™ up to 230 ml/min

For aggressive media
Gore Style 100CR

- Extremely long life perfluorelastomer tubing
- Stable flow rates, variation less than 1% over tubing life
- Low solvent swell
- Extreme long service life
- Suitable for almost all aggressive chemicals, including organic solvents, such as:
  - Methylethylketone
  - Toluene and Acetone

Application
in electronic, medical, textile, industry

- Solvent-based ink for gravure printing
- Coating of glass bottles
- Chemical coating of plastic plates and film
- Chemical-based flow in waste water treatment
- Solvent-based coating of tablets
- Synthesis with high through-put
- Laboratory analysis or dispensing

Specifications

Fluoroelastomer tubing with expanded PTFE, not extruded, produced in clean room

- 1,6 to 16 mm ID
- Permanently stable flow rates
- USP Class VI approved
- FDA for food contact
- Operates at pressures up to 4 bar (60 psi)

You can find your local ISMATEC sales representative at:
US: **+1 360 253 2008** Germany: **+49 93 77/92 03 0**
sales.ismatec@idexcorp.com
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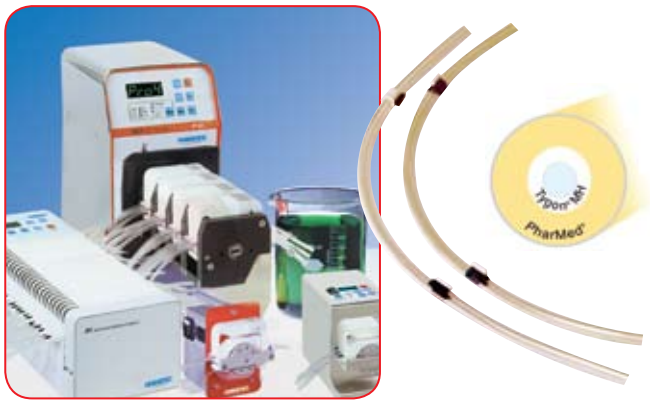
Special tubing for aggressive media

From Tygon® for **single** and **multi-channel** tubing pumps



Stopper tubing for aggressive media Tygon® MHLL

- Resistent to highly aggressive chemicals
- Meets USP Class VI criteria
- Low sorption maintains the fluid integrity
- Unequaled combination of chemical resistance, clarity and flexibility
- Color opaque, beige
- Extreme long service life (+800h)

Applications

- Battery acid filling
- Addition of anti-foam
- Hazardous material handling
- Applications with acids, bases, ketones, salts and alcohols

Its exceptionally smooth inner surface inhibits particulate buildup and reduces the potential for contamination.

Specifications

Combination of MH- and Pharmed-tubing, opaque
- Available as stopper-tubing up to 2.79 mm i.d.
- USPXXIII Class VI
- FDA for food contact
- Autoclaveable, gas sterilisation, radiation
- Absolutely no odor or taste

Standard- and stopper tubing for chemical applications Tygon® MHSL

- Chemically resistant to a wide range of fluids
- Meets FDA criteria for food contact
- Plastizicer and oil free
- No contamination of the fluids
- Color clear, transparent
- Long service life in peristaltic pumps (75h)

Applications

- Transparent for visible flow monitoring
- Coating of tablets
- Laboratory analysis and dispensing
- Chemical-based flow in waste water treatment

Smooth inner surface, low sorption maintains fluid and tube integrity

Specifications

Ultra-pure tubing for peristaltic pumps
- Stopper tubing up to 2.79 mm i.d.
- Standard tubing up to 15.9 mm i.d.
- FDA for food contact
- Autoclaveable, gas sterilisation, radiation
- Absolutely no odor or taste

1

Pump tubing ordering information

Standard tubing for **single channel** pumps

i.d. mm	WT [1] mm	Tygon® LFL	Tygon® ST R-3603/R-3607	PharMed® Ismaprene	Tygon® HC F-4040-A	Tygon® MHSL 2001	Tygon® SI Silicone 3350	Silicone Peroxide	Norprene® A-60-G	Norprene® Chemical	Viton® Fluran® HCA F-5500-A
0.8	1.6		MF0001	MF0009			MF0291	MF0044	MF0017		MF0048
1.6	1.6	SC0389	MF0028	MF0010	MF0002	SC0830	SC0580	MF0035	SC0357		MF0049
2.4	1.6		SC0691	SC1006			SC0590				SC0590
3.2	1.6	SC0390	MF0030	MF0012	MF0004	SC0831	SC0581	MF0037	SC0358	SC1022	MF0051
4.8	1.6	SC0391	SC0379	MF0011	MF0003	SC0832	SC0582	MF0045	SC0359	SC1023	MF0322
6.4	1.6	SC0392	MF0031	MF0013	MF0005	SC0833	SC0584	MF0046	SC0360	SC1024	MF0052
8.0	1.6	SC0394	MF0032	MF0014	MF0006	SC0834	SC0587	MF0047	SC0361		MF0053
9.5	1.6		SC0383			SC0835	SC0387		SC0385	SC1025	
11.1	1.6		SC0384				SC0697		SC0386		
4.8	2.4		MF0029	MF0448	MF0476		SC0583	MF0288	SC0362		MF0050
6.4	2.4		MF0033		MF0007		SC0585	MF0040	SC0363		MF0054
8.0	2.4		SC0502				SC0515		SC0511		
9.5	2.4		SC0503				SC0516		SC0512		
11.1	2.4		SC0504				SC0517				
12.7	2.4		SC0505				SC0518				
6.4	3.2	SC0393	SC0380	MF0015			SC0586	MF0314	SC0364		MF0323
9.5	3.2	SC0395	SC0381	MF0016	MF0008		SC0588	MF0041	SC0365		MF0055
12.7	3.2	SC0396	SC0382	MF0034	SC0725	SC0845	SC0589	MF0315	SC0366	SC1026	
15.9	3.2		SC0695	SC0696		SC0846	SC0532		SC0698		
9.5	6.0			MF0351			MF0359*	MF0355*			
12.7	5.0			MF0352			MF0360*	MF0356*			
19.0	6.0			MF0353			MF0361*	MF0357*			
25.4	4.0			MF0354			MF0362*	MF0358*			
Pack size		7.5 m	15 m	7.5 m	15 m	15 m	15 m	7.5 m	15 m	15 m	7.5 m

[1] WT = Wall thickness

(Other tubing sizes and wall thicknesses available on request.)

Tygon MHSL and Tygon MHLL special tubing for aggressive media

Extension tubing for 2 and 3-stop tubing

i.d. mm	WT* mm	o.d. mm	Tygon® ST R-3603/R-3607	PharMed® Ismaprene	Tygon® HC F-4040-A	Silicone Peroxide	Silicone Platin	Viton® Fluran® HCA F-5500-A	Tygon® MHSL 2001
0.13	0.91	1.95	SC0226						
0.19	0.91	2.01	SC0025						
0.25	0.91	2.07	SC0026	SC0337	SC0173				
0.38	0.91	2.20	SC0027	SC0338	SC0174				SC0854
0.44	0.91	2.26	SC0028						
0.51	0.91	2.33	SC0029	SC0339	SC0175		SC06040	SC0550	
0.57	0.91	2.39	SC0030						
0.64	0.91	2.46	SC0031	SC0340	SC0176	SC0448	SC06041	SC0551	SC0856
0.76	0.86	2.48	SC0032	SC0341	SC0177	SC0449	SC06042	SC0552	
0.89	0.86	2.61	SC0033	SC0342	SC0120	SC0450	SC06043	SC0553	
0.95	0.86	2.67	SC0034						
1.02	0.86	2.74	SC0035	SC0343	SC0121	SC0451	SC06044	SC0554	SC0858
1.09	0.86	2.81	SC0036						
1.14	0.86	2.86	SC0037	SC0344	SC0122	SC0452	SC06045	SC0555	
1.22	0.86	2.94	SC0038						
1.30	0.86	3.02	SC0039	SC0345	SC0123	SC0453	SC06046	SC0556	
1.42	0.86	3.14	SC0040	SC0346	SC0124	SC0454	SC06047	SC0557	
1.52	0.86	3.24	SC0041	SC0347	SC0125	SC0455	SC06048	SC0558	SC0860
1.65	0.86	3.37	SC0042	SC0348	SC0126	SC0456	SC06049	SC0559	
1.75	0.86	3.47	SC0043						
1.85	0.86	3.57	SC0044	SC0349	SC0127	SC0457	SC06050	SC0560	
2.06	0.86	3.78	SC0045	SC0350	SC0128	SC0458	SC06051	SC0561	SC0862
2.29	0.86	4.01	SC0046	SC0351	SC0129	SC0459	SC06052	SC0562	
2.54	0.86	4.26	SC0047	SC0352	SC0130	SC0460	SC06053	SC0563	
2.79	0.86	4.51	SC0048	SC0353	SC0131	SC0461	SC06054	SC0564	SC0864
3.17	0.86	4.89	SC0223						
Tube Length			10 m	3 m	3 m	15 m	10 m	10 m	10 m

* WT = Wall thickness

To improve the gliding properties and service-life of the tubing, we recommend you to periodically lubricate the pump rollers with silicone spray.

Order No. SC 0179

You can find your local ISMATEC sales representative at:
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ISMATEC.

3-Stopper tubing for **MS/CA cassettes**

i.d. mm	Color-Code	Tygon® LFL	iØ mm	Tygon® ST R-3603/R-3607	PharMed® Ismaprene		Tygon® HC F-4040-A	Tygon® MHSL 2001	Tygon® MHLL	Tygon® SI Silicone 3350	Silicone Peroxide	Viton® Fluran® HCA F-5500-A
0.13 [1]	orange-black			SC0189								
0.19 [1]	orange-red			SC0049								
0.25 [1]	orange-blue	SC0397	0.27	SC0050	SC0303	SC0730*	SC0286					
0.38 [1]	orange-green	SC0398	0.38	SC0051	SC0304		SC0287	SC0802**	SC0710**			
0.44 [1]	green-yellow			SC0052								
0.51 [1]	orange-yellow	SC0399	0.48	SC0053	SC0305	SC0731	SC0288			SC0600		SC0255
0.57 [1]	white-yellow			SC0054								
0.64 [1]	orange-white	SC0400	0.64	SC0055	SC0306		SC0289	SC0804**		SC0601	SC0106	SC0256
0.76 [2]	black-black	SC0401	0.76	SC0056	SC0307		SC0290		SC0711**	SC0602	SC0107	SC0257
0.89 [2]	orange-orange	SC0402	0.89	SC0057	SC0308	SC0732	SC0291			SC0603	SC0108	SC0258
0.95 [2]	white-black			SC0058								
1.02 [2]	white-white	SC0403	1.02	SC0059	SC0309	SC0737	SC0292	SC0806**		SC0604	SC0109	SC0259
1.09 [2]	white-red			SC0060								
1.14 [2]	red-red	SC0404	1.14	SC0061	SC0310		SC0293		SC0712**	SC0605	SC0110	SC0260
1.22 [2]	red-grey			SC0062								
1.30 [2]	grey-grey	SC0405	1.25	SC0063	SC0311	SC0733*	SC0294			SC0606	SC0111	SC0261
1.42 [2]	yellow-yellow	SC0406	1.37	SC0064	SC0312		SC0295			SC0607	SC0112	SC0262
1.52 [2]	yellow-blue	SC0407	1.52	SC0065	SC0313	SC0734	SC0296	SC0808**	SC0713**	SC0608	SC0113	SC0263
1.65 [2]	blue-blue	SC0408	1.60	SC0066	SC0314		SC0297			SC0609	SC0114	SC0264
1.75 [2]	blue-green			SC0067								
1.85 [2]	green-green	SC0409	1.85	SC0068	SC0315		SC0298			SC0610	SC0115	SC0265
2.06 [2]	purple-purple	SC0410	2.06	SC0069	SC0316	SC0735	SC0299	SC0810**	SC0714**	SC0611	SC0116	SC0266
2.29 [2]	purple-black	SC0411	2.20	SC0070	SC0317		SC0300			SC0612	SC0117	SC0267
2.54 [2]	purple-orange	SC0412	2.62	SC0071	SC0318		SC0301			SC0613	SC0118	SC0268
2.79 [2]	purple-white	SC0413	2.79	SC0072	SC0319	SC0736*	SC0302	SC0812**	SC0715**	SC0614	SC0119	SC0269
3.17 [2]	black-white			SC0224								
Pack size (pces.)		12		12	6		12	6	6	6	6	12
Tube length (mm)		400		400	400		400	300	300	400	400	400

[1] Wall thickness **0.91** mm [2] Wall thickness **0.86** mm

* Welded stoppers for autoclaving **These tubes are only equipped with 2 stoppers

2-Stopper tubing for **CA cassettes**

i.d. mm	Color-Code	Tygon® LFL	iØ mm	Tygon® ST R-3603/R-3607	PharMed® Ismaprene		Tygon® HC F-4040-A	Tygon® MHSL 2001	Tygon® MHLL	Tygon® SI Silicone 3350	Silicone Peroxide	Viton® Fluran® HCA F-5500-A
0.13 [1]	orange-black			SC0188								
0.19 [1]	orange-red			SC0001								
0.25 [1]	orange-blue	SC0414	0.27	SC0002	SC0320	SC0740*	SC0156					
0.38 [1]	orange-green	SC0415	0.38	SC0003	SC0321		SC0157	SC0814**	SC0716**			
0.44 [1]	green-yellow			SC0004								
0.51 [1]	orange-yellow	SC0416	0.48	SC0005	SC0322	SC0741	SC0158			SC0620		SC0132
0.57 [1]	white-yellow			SC0006								
0.64 [1]	orange-white	SC0417	0.64	SC0007	SC0323		SC0159	SC0816**		SC0621	SC0092	SC0133
0.76 [2]	black-black	SC0418	0.76	SC0008	SC0324		SC0160		SC0717**	SC0622	SC0093	SC0134
0.89 [2]	orange-orange	SC0419	0.89	SC0009	SC0325	SC0742	SC0161			SC0623	SC0094	SC0135
0.95 [2]	white-black			SC0010								
1.02 [2]	white-white	SC0420	1.02	SC0011	SC0326	SC0747	SC0162	SC0818**		SC0624	SC0095	SC0136
1.09 [2]	white-red			SC0012								
1.14 [2]	red-red	SC0421	1.14	SC0013	SC0327		SC0163		SC0718**	SC0625	SC0096	SC0137
1.22 [2]	red-grey			SC0014								
1.30 [2]	grey-grey	SC0422	1.25	SC0015	SC0328	SC0743*	SC0164			SC0626	SC0097	SC0138
1.42 [2]	yellow-yellow	SC0423	1.37	SC0016	SC0329		SC0165			SC0627	SC0098	SC0139
1.52 [2]	yellow-blue	SC0424	1.52	SC0017	SC0330	SC0744	SC0166	SC0820**	SC0719**	SC0628	SC0099	SC0140
1.65 [2]	blue-blue	SC0425	1.60	SC0018	SC0331		SC0167			SC0629	SC0100	SC0141
1.75 [2]	blue-green			SC0019								
1.85 [2]	green-green	SC0426	1.85	SC0020	SC0332		SC0168			SC0630	SC0101	SC0142
2.06 [2]	purple-purple	SC0427	2.06	SC0021	SC0333	SC0745	SC0169	SC0822**	SC0720**	SC0631	SC0102	SC0143
2.29 [2]	purple-black	SC0428	2.20	SC0022	SC0334		SC0170			SC0632	SC0103	SC0144
2.54 [2]	purple-orange	SC0429	2.62	SC0023	SC0335		SC0171			SC0633	SC0104	SC0145
2.79 [2]	purple-white	SC0430	2.79	SC0024	SC0336	SC0746*	SC0172	SC0824**	SC0721**	SC0634	SC0105	SC0146
3.17 [2]	black-white			SC0222								
Pack size (pces.)		12		12	6		12	6	6	6	6	12
Tube length (mm)		400		400	400		400	381	381	400	400	180

[1] Wall thickness **0.91** mm [2] Wall thickness **0.86** mm

* Welded stoppers for autoclaving **These tubes are only equipped with 2 stoppers

1

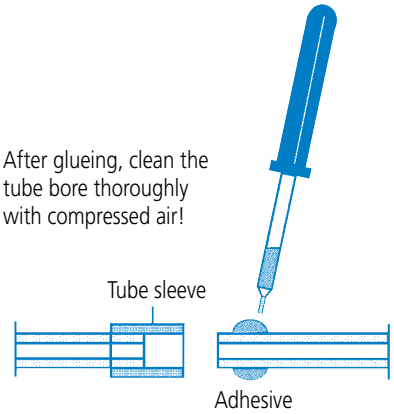
Tube connectors

for ISMATEC® pump tubing

Standard tube connectors in plastic

Tubing i.d. mm	Order No.	Order No.	Order No.	Order No.	Order No.
1.5	ISM 566 [1]	ISM 558 [1]		ISM 694 [2]	
2.5	ISM 557 [1]	ISM 693 [1]		ISM 510 [1]	
3.0	ISM 558	ISM 510	ISM 524	ISM 493	
4.0	ISM 559	ISM 511	ISM 525	ISM 494	ISM 535
5.0	ISM 560	ISM 512	ISM 526	ISM 495	ISM 536
6.0	ISM 561	ISM 513	ISM 527	ISM 496	ISM 537
7.0		ISM 514			
8.0	ISM 562	ISM 515	ISM 528	ISM 497	
10.0	ISM 563	ISM 516	ISM 529	ISM 498	
12.0	ISM 564	ISM 517	ISM 530	ISM 499	
13.0	ISM 565	ISM 518	ISM 531	ISM 500	
14.0	ISM 566	ISM 519	ISM 532	ISM 501	
15.0		ISM 520		ISM 502	
16.0	ISM 567	ISM 521	ISM 533	ISM 503	
19.0	ISM 568	ISM 522	ISM 534	ISM 523	
Pack size	10 pieces	10 pieces	10 pieces	10 pieces	10 pieces

Material: Polypropylene except [1] = Acetal, [2] = White Nylon



How to make connections with tube sleeves

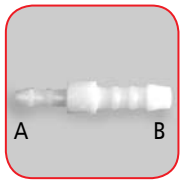
- The tubing material of the tube sleeves should be equal to the tubes to be connected.
- For the tube sleeve choose an inner diameter that equals the outer diameter of the tubes to be connected.
- If possible, clean the tube bore thoroughly with compressed air.

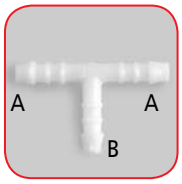
Adhesive for connections with tube sleeves

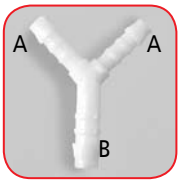
ergo® Adhesive for all tubing materials	Content	Order number
Complete Set including:		SC 1010
– ergo® Adhesive	20 g	
– ergo® Primer	10 ml	
ergo® Adhesive (separate) type 5861 Porous	20 g	SC 1011
ergo® Primer (separate) type 5150 Porous important for pretreatment of the tubing	10 ml	SC 1012

You can find your local ISMATEC sales representative at:
US: +1 360 253 2008 Germany: +49 93 77/92 03 0
sales.ismatec@idexcorp.com
www.ismatec.com

Reducer tube connectors in plastic







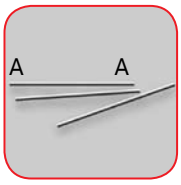
Tubing i.d. mm A	Tubing i.d. mm B	Order No
1.5	2.5	ISM 569 [1]
1.5	3.0	ISM 570 [1]
2.5	3.0	ISM 571 [1]
3.0	4.0	ISM 572
4.0	6.0	ISM 573
4.0	8.0	ISM 574
6.0	8.0	ISM 575
6.0	10.0	ISM 576
8.0	10.0	ISM 577
8.0	12.0	ISM 578
10.0	12.0	ISM 579
Pack size		10 pieces

Tubing i.d. mm A	Tubing i.d. mm B	Order No
3	4	ISM 538
4	6	ISM 539
6	4	ISM 540
8	4	ISM 541
8	6	ISM 542
10	6	ISM 544
10	8	ISM 545
10	13	ISM 546
12	8	ISM 547
12	10	ISM 548
15	6	ISM 549
	Pack size	10 pieces

Tubing i.d. mm A	Tubing i.d. mm B	Order No
4	6	ISM 553
6	8	ISM 554
	Pack size	10 pieces

Material: Polypropylene except [1] = Acetal

Steel 18/8 Standard tube connectors



Tubing i.d. mm	Tubing o.d. mm	Connector length	Order No.
0.30	.63	x15 mm	ISM 580
0.58	.90	x15 mm	ISM 581
0.58	.90	x11 mm	ISM 582
0.84	1.27	x11 mm	ISM 583
0.84	1.27	x16 mm	ISM 584
0.30	.63	x25 mm	ISM 585
0.58	.90	x25 mm	ISM 586
0.58	.90	x19 mm	ISM 587
Pack size			6 pieces

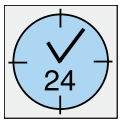
Contents of tubing selection guide:
- Material and tubing properties
- Chemical resistance chart
- Ordering information

Gear Pumps

Pulsefree pumping

Gear pumps allow differential pressures up to maximum 5.6 bar

ISMATEC® gear pumps run only in the clockwise direction (Exception REGLO-Z *Digital*)



Safe and easy to operate

- Developed for continuous duty, 24 hours a day, 7 days a week
- Compact drives with hermetically sealed and magnetically coupled pump-heads
- Safe overload protection – magnetically driven pump-heads decouple when load exceeds the coupling torque
- Internal bypass valve limits the differential pressure
- Pump-heads are interchangeable within seconds
- MAX key enables rapid filling of the system (BVP-Z and MCP-Z pumps)

Application range of gear pumps

Industries	Applications	Special media
– Biotechnological – Chemical – Food – Mining – Power – Pulp and Paper – Semiconductor – Textile	– Sampling – Refrigeration technology – Water treatment – Liquid chromatography – Surface treatment – Distillation systems	– Biozides – Dye stuffs – Thixotropic products – Liquid waxes – Hydrogen peroxide – Flux Not suited for media containing particulates

Multifunctional

- Interchangeable pump-heads for different flow rates available in specific, media-resistant materials
- Virtually no pulsation
- Very accurate dispensing pumps due to calibrateable drives
- REGLO-Z *Digital* with reversible rotation direction
- Specially designed pump-heads (Suction Shoe Design) for elevated differential pressures
- Excellent media compatibility stainless steel housing gears available in PTFE, Graphite, PPS or PEEK™
- Pump-heads for media with elevated viscosities

Low operation costs

- Interchangeable, magnetically coupled pump-heads
- Maintenance-free drives
- Only few wearing parts (gears, seals)
- Service kits allow the user to exchange worn parts
- High quality and precision for an optimum performance even after many years of intensive use

MICROPUMP®

ISMATEC gear pumps are

- Easy to service
- Almost maintenance-free
- Leak-free
- Differential pressure up to 5.6 bar

Note

All microprocessor controlled drives are LabVIEW compatible and can easily be integrated into process control systems.

You can find your local ISMATEC sales representative at:
US: **+1 360 253 2008** Germany: **+49 93 77/92 03 0**

sales.ismatec@idexcorp.com
www.ismatec.com

Overview of gear pumps
Flow rates and models

Flow rates ml/min min.	max.	Bar	Model	Page
1	3290	5.2	REGLO-Z *Analog*, *Digital*	44
1	3290	5.2	REGLO-ZS *Analog*, *Digital*	44
1	7241	5.2	BVP-Z *Standard*	46
1	7241	5.2	MCP-Z *Standard*	47
1	7241	5.2	MCP-Z *Process*	48

Unique!
Only the ISMATEC® gear pump
MCP-Z *Process features:*

Carrying out programs independently of a PC
- Create the application profile in the PC (with Prog*Edit software*, Page 61)
- Download the file data into the pump memory
- Disconnect the pump from the PC
- Carry out your application on the spot, using the pump as a stand-alone unit

This mark indicates dispensing function
(You'll find dispensing gear pumps on pages 44, 47, 48)

- Pumping by speed or flow rate
- Dispensing by volume or time

- Interval dispensing by volumes with a pause
- Interval dispensing by time with a pause
- Programming a number of dispensing cycles

- ***Calibrating*** the flow rate and dispensing volume
- Factory set gear pump-heads

NEW pump-head reference chart
The Micropump pump-head numbers have recently been updated to new series product code to simplify the global understanding of the products we provide. Below, you'll find an easy reference chart updating the old Pump-head numbers to the new series product code. Please note that ISMATEC order numbers for Micropump pump-heads have now been updated to the Micropump order number.

OLD Order No.	OLD Pump-head No.	NEW Pump-head No.	Order No.
		Series GA	
MI0006	Z-186	GA-X21.CFS.B	82092
MI0007	Z-181	GA-V21.CFS.B	82114
MI0008	Z-183	GA-V23.CFS.B	82115
MI0131	Z-1830	GA-T23.PFS.B	81473
MI0312	Z-186 P	GA-X21.JFS.B	L20820
MI0280	Z-1830 P	GA-T23.JFS.B	L18489
MI0309	Z-186 HC	GA-X21.CFC.B	L17164
MI0310	Z-183 HC	GA-V23.CFC.B	L2383
		Series GB	
MI0022	Z-200	GB-P25.PVS.A.B1	81281
MI0023	Z-201	GB-P35.PVS.A.B1	81281
MI0306	Z-200 P	GB-P25.JVS.B	220004
MI0378	Z-201 PKC	GB-P35.JKS.B	L22609
		Series GJ	
MI0013	Z-120	GJ-N23.FF1S.B.B1	82004
MI0015	Z-122	GJ-N25.FF1S.B.B1	82006
MI0016	Z-140	GJ-N23.FF1S.B	82001
MI0018	Z-142	GJ-N25.FF1S.B	82003
MI0019	Z-130	GJ-N23.PF1S.B.B1	81529
MI0020	Z-150	GJ-N23.PF1S.B	81531
MI0313	Z-140 P	GJ-N23.JF1S.B	L197735
MI0284	Z-140 HC	GJ-N23.FF1C.B	L20284
MI0311	Z-142 HC	GJ-N25.FF1C.B	L21812

2

Selection criteria
Find the optimum pump-head design

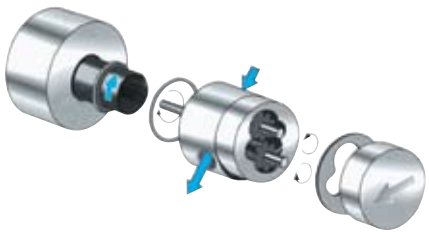
		Cavity Style	Suction Shoe
Flow performance and pressure			
Only flow		✓	✓
Pre-pressure necessary		—	✓
Back-pressure			
Flow rate stable		—	✓
Back-pressure high			
BVP-Z and MCP-Z drives		✓	✓
Forward and reverse delivery		✓	—
Bypass depending on pump-head/Series		GJ	GB
Range of flow rates (ml/min)			
Series GA	1–560	—	✓
Series GJ	33–3950 (Reglo-Z)	✓	—
Series GJ	55–5480 (MCP-Z)	✓	—
Series GB	35–7241	—	✓
Max. operating temperature			
54°C (129°F), 77°C (170°F), 99°C (210°F)		✓	—
(depending on the seals)			
Up to 177°C (350°F)		—	✓
Max. suction height varies (depends on pump-head, speed and tubing)			
	for water		
wetted gears	1 m	✓	—
	30 cm	✓	✓
flooded	8 m	✓	—
	3 m	✓	✓
Pumping out of vacuum			
recommended up to 200 mbar			
absolutely		✓	—
not suitable		—	✓
Viscosity			
0.2 to 1500 cp		✓	✓
max 2000 cp, depending on pump-head		✓	—
Particles up 5 µm		Z-150WI	—
Gear material			
PTFE		✓	—
Graphite		—	✓
PEEK™		✓	✓
PPS		✓	✓
NiC		Z-150WI	—

Cavity style:
Series GJ

- Max. suction height with water and flooded pump-head: 8 m, depending on pump-head and tubing
- Pumping out of a vacuum of 200 mbar
- Based on the traditional gear pump technology
- For application with moderate differential pressure

In comparison to the Suction Shoe pump-heads, the Cavity style pump-heads can be used for viscous media and applications with a certain suction height

Advantages:
- Excellent chemical resistance
- Smooth operation at a low noise level
- Low internal friction



Suction shoe style:
Series GA and GB

- An exclusive Micropump product featuring a patented technology
- Modified pump chamber compared to the conventional gear pump technique

This type of pump-head design has a seal plate mounted with a deliberate play in the suction part of the pump chamber (hence the expression Suction Shoe). Discharge pressure keeps the Suction Shoe seated tightly on top of the gears which prevents flow from decreasing in high-pressure applications.

Advantages:
- Temperature range from –46 – 177 °C (–51 – 350°F)
- The Suction Shoe acts as a dynamic seal element which results in a temperature- and pressure-independent pump chamber.
- Ease of servicing due to fewer parts. The service kit, including the Suction Shoes, enables an extended pump life; conventional pumps require more frequent replacement.

Main features of pump-head designs

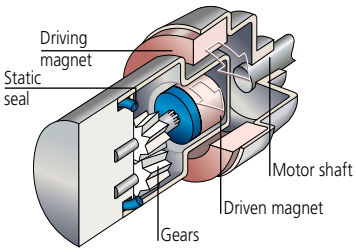
	Reverse delivery	Main sealing zone	Max. suction height - dry	Max. suction height flooded	Recommended for	Temperature range	Differential pressure	Suction from vacuum	Wearing material	Pulseless helical gearing	Pulseless spur gearing
Cavity Style	Yes	Tooth edges	1 m	8 m	High flow rate	54°C, 77°C, 99°C depending on seals	only low	200 mbar	– Service kit – Cavity plate	Head: GJ	
Suction Shoe	No	Front surfaces of gears	30 cm	3 m	Preferred for diff. pressure	from –46 to 177°C (–29°C 200 series)	5.6 bar 8.7 bar*	not suitable	Service kit incl. suction shoe	Head: GB	Head: GA

*Pump-head for Industrial drive provided by customer

You can find your local ISMATEC sales representative at:
US: +1 360 253 2008 Germany: +49 93 77/92 03 0
sales.ismatec@idexcorp.com
www.ismatec.com

The magnetically coupled drive principle

Consists of two magnets, a driving magnet that attaches to the motor shaft and a driven magnet that is completely sealed within the pump-head and is connected to the driving gear. The driven magnet is a wetted component and is totally encapsulated.



The two magnets couple automatically such that the driving magnet turns the driven magnet and gears without physical contact.

Decoupling occurs when the pump load exceeds the coupling torque between the two magnets. This feature can act as a safety device to prevent damage to the pump and motor as well as associated piping. The magnets can be recoupled by bringing the motor to a complete stop, then eliminating the cause of the decoupling and restarting.

Pump-head material options

Enhance the chemical compatibility and application potential

- Base material
  Standard: Stainless steel 316
  Options: e.g. Hastelloy® B2, Hastelloy C-276, Alloy 20 and Titan
- Gears
  Standard: PPS, Graphite, PTFE (depends on pump-head)
  Options: e.g. PEEK™, PPSKV
- Static seals
  Standard: Viton®, PTFE (depends on pump-head)
  Options: EP, Buna N, Kalrez®
- Magnets
  Standard: Ferrite
  Options: e.g. SmCo, NdFeB

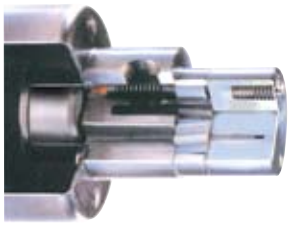
PTFE = Polytetrafluoroethylene
PPS = Polyphenylenesulphide
PEEK = Polyetheretherketone

Further pump-head options

- Integral drive
- High system pressure
- Deck ports
- ¼-18 NPT ports
- Tri-clamp fittings

Internal bypass

- An adjustable fluid bypass valve helps protect against decoupling and system damage from high-pressure build-up
- It allows for adjustment of a max. differential pressure (from 0.7 bar up to the max. differential pressure, depending on the individual pump-head)
- Should only be used for safety purposes and not for pressure controlling (bypass conditions may create a sufficient temperature rise to cause significant swelling in PTFE-geared pumps)



MICROPUMP®

2

REGLO-Z, REGLO-ZS

Compact and powerful

Footprint only 10 by 18 cm!

- Pulseless fluid delivery
- 10 cm wide, 13.5 cm high
- Reversible rotation
  (with Cavity Style Pump-heads)
- Interchangeable Micropump® pump-heads
- Exellent repeatability

Repetitive error (rel.)	5 ml	0.5%	(REGLO-Z *Digital*)
	20 ml	<0.2%	
	100 ml	<0.1%	

REGLO-ZS *Analog*

REGLO-Z *Analog*

REGLO-Z *Analog*
1–3290 ml/min

– Variable speed
– Differential pressure max. 5.2 bar

REGLO-ZS
Drive and pump-head are separated by a 2 m long cable.

Interchangeable pump-heads

Dispensing and calibrating function see Page 41

REGLO-ZS *Digital*

REGLO-Z *Digital*

REGLO-Z *Digital*
1–3290 ml/min

with dispensing functions
– Membrane key-pad
– LED display with setting menu
– Differential pressure max. 5.2 bar

with Cavity Style pump-head, rotation direction is reversible

with Suction shoe pump-head, run only in the clock-wise direction

CE

Specifications REGLO-Z/ZS *Analog*

Motor type	DC motor
Speed	50 – 5000 rpm
Speed setting	1–99%, resolution 1% 2-digit potentiometer
Power consumption	50 W
Mains connection	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	
Drive REGLO-Z	178 x100 x 143 mm
Drive REGLO-ZS	175 x 65 x 80 mm
External control unit	178 x 100 x 143 mm
Weight	
Drive REGLO-Z	2.1 kg (without pumphead)
Drive REGLO-ZS	0.7 kg (without pumphead)
External control unit	1.7 kg

Specifications REGLO-Z/ZS *Digital*

Motor type	DC-Motor
Speed range	50 – 5000 rpm
Speed setting	rpm, resolution 1 rpm
Flow rate setting	ml/min, liters/min
Power Consumption	75 W
Mains connection	100 – 230V_{AC}/50 – 60Hz
Protection rating	IP 30
Depth/Width/Height	
Drive REGLO-Z	178 x 100 x 135 mm
Drive REGLO-ZS	175 x 65 x 80 mm
External control unit	178 x 100 x 135 mm
Weight	
Drive REGLO-Z	1.7 kg (without pumphead)
Drive REGLO-ZS	0.7 kg (without pumphead)
External control unit	1.2 kg

Ordering Information

Model	Order No.
REGLO-Z *Analog*	ISM 895
REGLO-ZS *Analog*	ISM 896
REGLO-Z *Digital*	ISM 901
REGLO-ZS *Digital*	ISM 1143
Foot switch	ISM 891
Pump-head	Page 45
2 Nozzles	Page 45

LabVIEW drivers for Reglo-Z / -ZS *Digital*
download for free: www.ismatec.com

Never use a gear pump for media containing particulates.

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ISMATEC

MICROPUMP

Ordering Information pump-heads for REGLO-Z / -ZS

Pump-heads »Suction shoe«

- Enhanced pumping performance at elevated differential pressures
- Suited for elevated temperature ranges
- Not recommended for applications requiring a suction lift

Suction Shoe	Pump-head No.	Order No.	Flow rate (ml/min) min.	max.	Differential pressure max. bar	Gear material	Seals	Stainless steel housing	System pressure, max. (bar)	Temperature range °C	Internal Bypass
	GA-X21.CFS.B	MI0006	0.85	85	1.4	Graphite	PTFE	SS316	21	–46 – +177	–
	GA-X21.JFS.B	MI0312	0.85	85	2.3	PEEK™	PTFE	SS316	21	–46 – +177	–
	GA-V21.CFS.B	MI0007	2.1	210	2.8	Graphite	PTFE	SS316	21	–46 – +177	–
	GA-V23.CFS.B	MI0008	4.2	420	2.8	Graphite	PTFE	SS316	21	–46 – +177	–
	GA-V23.PFS.B	MI0131	4.6	460	5.2	PPS	PTFE	SS316	22	–46 – +177	–
	GA-V23.JFS.B	MI0280	4.6	460	5.2	PEEK	PTFE	SS316	22	–46 – +177	–
For corrosive media	GA-X21.CFC.B	MI0309	0.85	85	1.4	Graphite	PTFE	Hastelloy®-C276	21	–46 – +177	–
	GA-V23.CFC.B	MI0310	4.2	420	2.8	Graphite	PTFE	Hastelloy-C276	21	–46 – +177	–

– Ports (internal thread) 1/8"-27NPT
– Flow rates without differential pressure
– Operating temperature: with other seals up to 99°C possible

Pump-heads »Cavity style«

- Can be used for viscous media and applications requiring a certain suction lift
- Excellent chemical resistance
- Smooth and precise flow

Cavity Style	Pump-head No.	Order No.	Flow rate (ml/min) min.	max.	Differential pressure max. bar	Gear material	Seals	Stainless steel housing	System pressure, max. (bar)	Temperature range °C	Internal Bypass
	GJ-N23.FFS.B.B1	MI0013	32	3200	1*	PTFE	PTFE	SS316	21	–46 – +54	✓
	GJ-N23.FFS.B	MI0016	32	3200	1*	PTFE	PTFE	SS316	21	–46 – +54	–
	GJ-N23.JFS.B	MI0313	32	3200	1*	PEEK	PTFE	SS316	21	–46 – +54	–
	GJ-N23.JFS.B.B1	MI0019	32	3200	1*	PPS	PTFE	SS316	21	–46 – +54	✓
	GJ-N23.JFS.B	MI0020	32	3200	1*	PPS	PTFE	SS316	22	–46 – +54	–
For corrosive media	GJ-N23.FFC.B	MI0284	32	3200	1*	PTFE	PTFE	Hastelloy-C276	21	–46 – +54	–
For abrasive media	GJ-N23.9FD.B	MI0265	32	3200	1*	NiC	PTFE	Surface hardened	21	–46 – +54	–

– Ports (internal thread) 1/8"-27NPT
– Flow rates without differential pressure
– Operating temperature: with other seals up to 99°C possible

* For applications with differential pressures exceeding 1 bar we recommend using the MCP-Z drive.

Service Kits
contain the wearing parts (bushings, seals, gears)

These pump-heads are also available as OEM versions. Ask for the detailed data sheet.

Interfaces

REGLO *Analog*
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output 2-channel: 0–8 kHz 4-channel: 0–5 kHz
- Start/Stop
- Rotation direction

REGLO *Digital*
PC-controllable
Analog: only speed output (see Reglo ***Analog***), start/stop and autostart

Tubing adaptors for gear pump-heads

Threaded stainless steel connectors

Order No.	External thread	Tubing adaptor	Tubing i.d. mm
AR0001	1/8" NPT	Tube nozzle	6
AR0002	1/8" NPT	Tube nozzle	3
AR0004	3/8" NPT	Tube nozzle	12
AR0008	1/8" NPT	Tube nozzle	8
AR0009	1/8" NPT	Tube nozzle	9.5
AR0024	1/8" NPT	Pipe connection	6 (outside)

Threaded connectors in Hastelloy-C

AR0001-HC	1/8" NPT	Tube nozzle	6

BVP-Z *Standard*

Economical
Robust, powerful gear pump drive

- Variable speed (no dispensing functions)
- Pulseless pumping
- Up to 5.2 bar differential pressure

Interfaces

- Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
- Speed output (0–10V_{DC} or 0–12 kHZ)
- Start/Stop

BVP-Z *Standard*
with interchangeable gear pump-heads
(see Page 49)
(material options, see Page 43)

BVP-Z *Standard*
without dispensing functions
– **3-digit potentiometer** (for speed setting)
– 12 interchangeable Micropump® pump-heads
Flow rates and differential pressure depend on the pump-head mounted

Specifications

Motor type	DC motor
Speed	60 – 6000 rpm
Speed setting	1–99.9%, resolution 0.1% 3-digit potentiometer
Power consumption	150 W
Mains connection	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	5.7 kg (without pump-head)

Ordering information

The complete pump system BVP-Z *Standard* consists of:	
Drive (magnet included)	**ISM 446**
Pump-head	Page 49
2 Nozzles	Page 49
Accessories	Page 61
– Foot switch	**ISM 891**
– Valve	on request

Applications

- Single-channel delivery processes under pressure for particulate-free fluids, e.g.: addition of reagents/ solvents in organic synthesis at laboratory scale.
- Pumping propylene oxide into a laboratory reactor with a dispensing precision of +/–1% and a differential pressure of up to max. 3 bar.

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MCP-Z *Standard*

Multi-purpose

Saves individual application parameters!

- Microprocessor controlled
- Ideal for dispensing and filling
- Pulseless pumping
- Robust, powerful gear pump drive
- Up to 5.2 bar differential pressure

Interfaces

PC-controllable:
– RS232

– Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
– Speed output (0–10V_{DC} or 0–12 kHZ)
– Start/Stop
– Autostart

MCP-Z *Standard*
with interchangeable gear pump-head
(see Page 49)
(material options, see Page 43)

MCP-Z *Standard*
with dispensing functions
– Membrane key-pad, LED display
– **4 program memories for saving individual application parameters**
– 12 interchangeable Micropump® pump-heads (pre-programmed)
Flow rates and differential pressure depend on the pump-head mounted

Dispensing and calibrating function see Page 41

Specifications

Motor type	DC motor
Speed	60 – 6000 rpm
Speed setting	rpm, resolution 1 rpm
Flow rate setting	µl/min, ml/min, liters/min
Power consumption	150 W
Mains connection	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	6.4 kg (without pump-head)

Ordering information

The complete pump system MCP-Z *Standard* consists of:	
Drive (magnet included)	ISM 405
Pump-head	Page 49
2 Nozzles	Page 49
Accessories	Page 61
– Foot switch	IS 10039

Applications

Single-channel delivery and dispensing processes of particulate-free fluids under pressure.

With pump-heads GJ-N23 and GA-X21

Pulseless dispensing under pressure of different reagents with 2 pumps in different quantity ratios via a mixing valve into a reactor.

2

MCP-Z *Process*

Programmable

Programs can be carried out on the spot independently of a PC! Protection rating of IP 65

- Suitable for industries, extremely robust gear pump drive
- For pulseless pumping (up to 5.2 bar)
- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment, and in clean room areas (IP 65, dust-tight and protected against water jets)

Interfaces

PC-controllable:
– RS232

– Speed control (0–5 or 0–10V, 0–20 or 4–20mA)
– Speed output (0–10V_{DC} or 0–12 kHZ)
– Start/Stop
– Autostart
– 2 universal inputs
– 2 universal outputs

MCP-Z *Process*
with interchangeable gear pump-heads
(material options, see Page 43)

MCP-Z *Process*
– Stainless steel housing
– Membrane key-pad with LED display
– **4 program memories for saving individual application parameters or PC programmed command sequences**
– pre-programmed pump-heads
– 21 interchangeable Micropump® pump-heads

Flow rates and differential pressure depend on the pump-head mounted

Software ProgEdit
LabVIEW drivers
Free download on www.ismatec.com

Dispensing and calibrating function see page 41

Specifications

Motor type	DC motor
Speed	60–6000 rpm
Speed setting	rpm, resolution 1 rpm
Flow rate setting	µl/min, ml/min, liters/min
Power consumption	200 W
Mains connection	100 – 230 V_{AC} / 50 – 60 Hz
Protection rating	IP 65
Depth/Width/Height	260 x 160 x 262 mm (without pump-head)
Weight	6.9 kg (without pump-head)

Ordering information

The complete pump system MCP-Z *Process* consists of:	
Drive (magnet included)	**ISM 918**
Pump-head	Page 49
2 Nozzles	Page 49
Accessories	Page 61
– Software ProgEdit	free download
– Foot switch	**IS 10039**

LabVIEW driver
download for free: www.ismatec.com

Applications

– Single-channel delivery and dispensing processes under pressure, for particulate-free solutions
– Addition of various reagents in different quantity ratios via mixing valve into reactor

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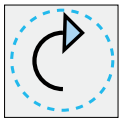
Ordering Information pump-heads for BVP-Z / MCP-Z



ISMATEC gear pumps run only in the clockwise direction.
Never use a gear pump for media containing particulates.

Pump-heads »Suction shoe«

- **Enhanced pumping performance at elevated differential pressures**
- Suited for elevated temperature ranges
- Not recommended for applications requiring a suction lift

Suction Shoe	Pump-head No.	Order No.	Flow rate (ml/min) min.	max.	Differential pressure max. bar	Gear material	Seals	Stainless steel housing	System pressure, max. (bar)	Temperature range °C	Internal Bypass
	GA-X21.CFS.B	MI0006	1	99	1.4	Graphite	PTFE	SS316	21	–46 – +177	–
	GA-X21.JFS.B	MI0312	1	99	2.3	PEEK™	PTFE	SS316	21	–46 – +177	–
	GA-V21.CFS.B	MI0007	3	252	2.8	Graphite	PTFE	SS316	21	–46 – +177	–
	GA-V23.CFS.B	MI0008	5	504	2.8	Graphite	PTFE	SS316	21	–46 – +177	–
	GA-V23.PFS.B	MI0131	6	560	5.2	PPS	PTFE	SS316	21	–46 – +177	–
	GA-V23.JFS.B	MI0280	6	560	5.2	PEEK	PTFE	SS316	21	–46 – +177	–
	GB-P25.PVS.B	MI0022	35	3509	3.5	PPS	Viton	SS316	21	–29 – +177	✓
	GB-P25.JVS.B	MI0306	35	3480	3.5	PEEK	Viton	SS316	21	–29 – +177	–
	GB-P35.PVS.B	MI0023	70	7020	3.5	PPS	Viton	SS316	21	–29 – +177	✓
Organic solvents	GB-P35.JKS.B	MI0378	73	7241	3.5	PEEK	Kalrez®	SS316	21	–29 – +177	✓
For corrosive media	GA-X21.CFC.B	MI0309	1	99	1.4	Graphite	PTFE	Hastelloy®-C276	21	–46 – +177	–
	GA-V23.CFC.B	MI0310	5	504	2.8	Graphite	PTFE	Hastelloy-C276	21	–46 – +177	–

– Ports (internal thread) 1/8"-27NPT
– Flow rates without differential pressure
– Operating temperature: with other seals up to 99°C possible

Service Kits
contain the wearing parts (bushings, seals, gears)

Pump-heads »Cavity style«

- **Can be used for viscous media and applications requiring a certain suction lift**
- Excellent chemical resistance
- Smooth and precise flow

Cavity Style	Pump-head No.	Order No.	Flow rate (ml/min) min.	max.	Differential pressure max. bar	Gear material	Seals	Stainless steel housing	System pressure, max. (bar)	Temperature range °C	Internal Bypass
	GJ-N23.FFS.B.B1	MI0013	40	3950	3.5	PTFE	PTFE	SS316	21	–46 – +54	✓
	GJ-N23.FFS.B	MI0016	40	3950	3.5	PTFE	PTFE	SS316	21	–46 – +54	–
	GJ-N23.JFS.B	MI0313	40	3950	5.6	PEEK	PTFE	SS316	21	–46 – +54	–
	GJ-N25.FFS.B	MI0018	55	5460	3.5	PTFE	PTFE	SS316	21	–46 – +54	–
	GJ-N23.JFS.B.B1	MI0019	40	3950	5.2	PPS	PTFE	SS316	21	–46 – +54	✓
	GJ-N23.JFS.B	MI0020	40	3950	5.2	PPS	PTFE	SS316	22	–46 – +54	–
For corrosive media	GJ-N23.FFC.B	MI0284	40	3950	3.5	PTFE	PTFE	Hastelloy-C276	21	–46 – +54	–
	GJ-N25.FFC.B	MI0311	55	5480	3.5	PTFE	PTFE	Hastelloy-C276	21	–46 – +54	–
For abrasive media	GJ-N23.9FD.B	MI0265	40	3950	5.2	NiC	PTFE	Surface hardened	21	–46 – +54	–

– Ports (internal thread) 1/8"-27NPT
– Flow rates without differential pressure
– Operating temperature: with other seals up to 99°C possible

Delivery pump
BVP-Z Standard
ISM 446

Dosing pump
MCP-Z Standard
ISM 405

Programmed dosing
MCP-Z Process IP65
ISM 918

Tubing adaptors for gear pump-heads

Threaded stainless steel connectors

Order No.	External thread	Tubing adaptor	Tubing i.d. mm
AR0001	1/8" NPT	Tube nozzle	6
AR0002	1/8" NPT	Tube nozzle	3
AR0004	3/8" NPT	Tube nozzle	12
AR0008	1/8" NPT	Tube nozzle	8
AR0009	1/8" NPT	Tube nozzle	9.5
AR0024	1/8" NPT	Pipe connection	6 (outside)

Threaded connectors in Hastelloy-C

AR0001-HC	1/8" NPT	Tube nozzle	6

Rotary Piston Pumps

For corrosive media and very accurate dispensing

The pump-heads are available with ceramic pistons and ceramic cylinder liners, which makes these components very resistant even to highly aggressive chemicals.

Rotation direction reversible

Safe and easy to use

- Developed for continuous duty, 24 hrs./day, 7 days/week
- Positive displacement
- No valves to clog
- **Precision better than ± 1%**
- High repeatability of dispensing volume
- Calibrateable drives
- MAX key enables rapid filling of the system (BVP-Z and MCP-Z pumps)

Inexpensive to maintain

- Interchangeable pump-heads
- No valves
- Only one moving part – the piston
- High quality and precision guarantee an optimum performance even after many years of intensive use

Application range of piston pumps

Industries	Applications	Special media
– Biotechnology – Chemistry – Industry – Electronic – Food and Diary – Perfume/Cosmetics – Rubber/Plastics – Glass / Ceramic – Pulp and Paper – Medical	– Accurate dispensing e.g. into bioreactors – Emulsion and slurry dosing – Medical diagnostics production – Milk and beverage enrichment – Plating bath replenishment – Titration equipment	– Biozides – Dyes – Flux compound – Hydrogen peroxide – Liquid wax – Thixotropic products Not suited for media containing particles larger than 0.8 mm

For a wide range of applications

- Interchangeable pump-heads
- Adjustable stroke volume
- Very accurate dispensing pumps due to calibrateable drives
- Rotation direction reversible
- Chemically inert to a great extent
- Ideal for corrosive media, suited for viscous media
- Differential pressure up to 6.9 bar

Advantages of the valveless piston pump

- No valves which clog or hang up
- Only one moving part – the piston
- Drift free precision, better than ±1%
- Variation coefficient smaller than 0.17%
- Medium-contacted parts available in ceramic and fluorocarbon
- Viscosity independent
- Positive displacement up to 6.9 bar
- Self-priming to 4.5 Meter

Typical Applications for Rotary Piston Pumps

Medical
For precise dispensing, aspirating, rinsing and mixing systems and for syringe pump replacement in diagnostic, clinical chemistry, dialysis and medical equipment manufacturing. Also for dispensing adhesives and lubricants used in assembly of disposable medical components.

Industrial
For accurate metering and mixing of paint and pigment additives, catalyst for foundry resins, plating bath regeneration, petroleum additives, photo chemicals, inks, monomers and adhesives.

Electronics Manufacturing
For dispensing of ceramic slurries in the manufacture of capacitors and diodes. Also for dispensing of insulating and encapsulating materials used in electric motor manufacture, addition of flux for wave soldering equipment, dispensing of mercury for switch manufacturing and metering of semiconductor wash and etch solutions.

Food and Dairy
For candy coating and polishing, vitamin fortification for milk; addition of flavors, colors and preservatives, hops for brewing and sanitizing agents for aseptic packaging. Also used for sample and reagent fluid control in milk analyzers and other food quality control instrumentation.

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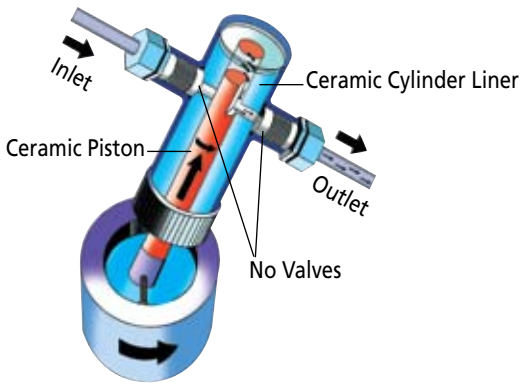

Valveless pumping

The valveless pumping function is accomplished by the synchronous rotation and reciprocation of the ceramic piston in the precisely mated ceramic cylinder liner. One complete piston revolution is required for each suction/discharge cycle.

The piston always bottoms for maximum fluid and bubble clearing. Together with the drive speed the stroke volume, which can be pre-set by the adjustment of the pump-head angle, determines the actual flow rate.

Note

All microprocessor controlled drives are LabVIEW compatible and can easily be integrated into process control systems.

Rotary piston pumps

Selection by flow rate and model

Flow rates ml/min min.	max.	**Bar**	**Model**	**Page**
0.045	180	6.9	REGLO-CPF *Analog*	52
			RH-type pump-heads	54
0.1	180	6.9	REGLO-CPF *Digital*	53
0.025	2300	6.9	MCP-CPF *Process*	56
			RH-type pump-heads	54
			Q-type pump-heads	58

3

Unique

Only the ISMATEC® Rotary Piston Pump
MCP-CPF *Process features:*

Carrying out programs independently of a PC

- Create the application profile in the PC (with Prog*Edit software*, Page 61)
- Download the file data into the pump memory
- Disconnect the pump from the PC
- Carry out your application on the spot, using the pump as a stand-alone unit

This mark indicates dispensing function

(You'll find dispensing rotary piston pumps on pages 53, 56)

- Pumping by speed or flow rate
- Dispensing by volume or time
- Interval dispensing with a pause
- Dispensing a volume within a pre-set time
- Interval dispensing with a pre-set number of dispensing cycles
- ***Calibrating*** the flow rate and dispensing volume
- Piston stroke back-steps ***for drip-free dispensing***
- Factory-set piston pump-heads

REGLO-CPF

Calibrateable dispensing pumps
Ideal for dispensing corrosive media

- High repeatability
- Differential pressure up to 6.9 bar
- 10 cm wide, 13.5 cm high
- Wide selection of ceramic piston pumps

Rotation direction
reversible

REGLO-CPF *Analog*
2-digit potentiometer
1–99%, resolution 1% (for speed)

REGLO-CPF *Analog*
with piston pump-head RH 00.CKC-LF

REGLO-CPF *Analog*
without dispensing functions
0.045–180 ml/min
Variable speed

Overview of piston pump-heads
on Pages 54 to 55

Specifications REGLO-CPF *Analog*

Motor type	DC-Motor
Speed	18 to 1800 rpm
Speed setting	1–99%, resolution 1% 2-digit potentiometer
Power consumption	50 W
Mains connection	230V_{AC}/50Hz,115V_{AC}/60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	250x100x143 mm
Weight	2.5 kg

Specifications REGLO-CPF *Digital*

Motor type	DC-Motor
Speed	40 to 1800 rpm
Speed setting Flow rate setting	rpm, resolution 0.1rpm µl/min and ml/min
Power consumption	75 W
Mains connection	100 – 230V_{AC} / 50 – 60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	250x100x135 mm
Weight	2.1 kg

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www.ismatec.com

Rotation direction reversible

REGLO-CPF *Digital*
6-button membrane key-pad, LED display
Flow rate setting in µl/min and ml/min

Interfaces

REGLO-CPF *Analog*
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output 0–9 kHz
- Start/Stop
- Rotation direction

REGLO-CPF *Digital*
– RS232
– Analog
Speed output 0–9 kHz,
Start/Stop, Autostart

3

Dispensing and calibrating function see Page 51

REGLO-CPF *Digital*
with dispensing functions
0.1–180 ml/min
Microprocessor controlled

REGLO-CPF *Digital*
with piston pump-head RH 00.CKC-LF

Application

Highly reproducible, single-channel dispensing processes of organic solvents or acids/bases, e.g.:
Dispensing of hydrogen fluoride and other highly corrosive acids with an X-Y-Z dispenser. Remote controlled pump.

Ordering information

Model (Drive only)	Order No. (drive only)	Flow rates	Channels Channels	Speed
REGLO-CPF *Analog*	**ISM 1014**	0.045 – 180	1	18 to 1800
REGLO-CPF *Digital*	**ISM 321**	0.1 – 180	1	40 to 1800
Foot switch				
REGLO-CPF *Analog*	**ISM 891**	see Page 61		
REGLO-CPF *Digital*	**ISM 894**	see Page 61		

The complete pump system REGLO-CPF consists of:
1 Drive
1 **Piston pump-head** see on Pages 54 to 55

RH pump-heads

For REGLO-CPF drives (Pages 52 to 53)
For MCP-CPF Process drive (Pages 56 to 57)

MCP-CPF *Process* with RH pump-head

REGLO-CPF *Digital*

REGLO-CPF *Analog*

Pump-head RH 00

Stroke volumes 2.5 – 25 µl

Drives and flow rates:
REGLO-CPF *Analog*
0.045 – 45 ml/min
REGLO-CPF *Digital*
0.1 – 45 ml/min
MCP-CPF *Process*
0.025 – 45 ml/min

Type Order No.	RH00.CKC-LF FMI 009	RH00.SKY-LF FMI 010	RH00.STY-LF FMI 011	RH00.CTC-LF FMI 012
Piston	Ceramic	316 Stainless Steel	316 SS	Ceramic
Cylinder case	Kynar® (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})	Tefzel®	Tefzel
Cylinder liner	Ceramic	Carbon	Carbon	Ceramic
Lip seals	Rulon® AR	Rulon J	Rulon J	Rulon AR
Gland washers	PTFE	PTFE	PTFE	PTFE
Max. temperature	100°C	60°C	60°C	100°C
Max. differential pressure	6.9 bar	6.9 bar	6.9 bar	6.9 bar
Flow ports	Kynar UNF ¼"–28 (female)	Kynar UNF ¼"–28 (female)	UNF ¼"–28 (female)	UNF ¼"–28 (female)

PTFE tubing for pump-heads mentioned above (must be ordered separately)
1.6 mm i.d., 3.2 mm o.d. with 2 fittings UNF ¼"–28 male

Length	Order No.	Length	Order No.	Length	Order No.	Length	Order No
0.25 m	IC 0053	0.75 m	IC 0061	0.50 m	IC 0057	1.00 m	IC 0065

Tubing adaptors
for the following pump-heads
RH00.CKC
RH00.SKY
RH0.CKC
RH1.CKC

These adaptors enable the use of other tubing.
The integrally molded port fittings on the **standard FMI Type K pump-heads** accept all tubing with 6.4 mm o.d. For other tubing arrangements, these special port adaptors are required.

Description			Order No.
1	R412-0K	for tubing with 3.2 mm i.d.	FMI 050
2	R412-1K	for tubing with 6.4 mm i.d.	FMI 051
3	R412-2K	for tubing with 9.5 mm i.d.	FMI 052
4	R412-5K	for tubing with ¼–28 ferrule fittings	FMI 053
5	H476K	for tubing with 3.2 mm o.d.	FMI 054

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www.ismatec.com

Pump-head RH 0

Stroke volumes 5 – 50 µl

Drives and flow rates:
REGLO-CPF *Analog*
0.09 – 90 ml/min
REGLO-CPF *Digital*
0.2 – 90 ml/min
MCP-CPF *Process*
0.050 – 90 ml/min

(LF = Low Flow
for flow rates below 50 ml/min)

Type and Order No.	RH0.CKC / FMI 005	RH0.CKC-LF / FMI 013	RH0.CTC / FMI 006
Piston	Ceramic	Ceramic	Ceramic
Cylinder case	Kynar® (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})	Tefzel®
Cylinder liner	Ceramic	Ceramic	Ceramic
Lip seals	Rulon® AR	Rulon AR	Rulon AR
Gland washers	PTFE	PTFE	PTFE
Max. temperature	100°C	100°C	100°C
Max. differential pressure	6.9 bar	6.9 bar	6.9 bar
Flow ports	2 fixed tube fittings for PTFE tubing 6 mm o.d.	Kynar UNF ¼"–28 (female)	2 fixed tube fittings for PTFE tubing 6 mm o.d.
Tubing (must be ordered separately)	PTFE tubing 4 mm i.d., 6 mm o.d. **Order No. MF 0336** (For other tubing material; use tubing adaptors, see Page 54)	**PTFE tubing** 1.6 mm i.d., 3.2 mm o.d. with 2 fittings UNF ¼"–28 male **Length** – **Order No.** 0.25 m – **IC 0053** 0.50 m – **IC 0057** 0.75 m – **IC 0061** 1.00 m – **IC 0065**	PTFE tubing 4 mm i.d., 6 mm o.d. **Order No. MF 0336** (For other tubing material; use tubing adaptors, see Page 54) This pump-head is also available as LF version.

Pump-head RH 1

Stroke volumes 10 – 100 µl

Drives and flow rates:
REGLO-CPF *Analog*
0.18 – 180 ml/min
REGLO-CPF *Digital*
0.4 – 180 ml/min
MCP-CPF *Process*
0.1 – 180 ml/min

(LF = Low Flow
for flow rates below 50 ml/min)

Type and Order No.	RH1.CKC / FMI 007	RH1.CKC-LF / FMI 015	RH1.CTC / FMI 008
Piston	Ceramic	Ceramic	Ceramic
Cylinder case	Kynar (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})	Tefzel
Cylinder liner	Ceramic	Ceramic	Ceramic
Lip seals	Rulon AR	Rulon AR	Rulon AR
Gland washers	PTFE	PTFE	PTFE
Max. temperature	100°C	100°C	100°C
Max. differential pressure	6.9 bar	6.9 bar	6.9 bar
Flow ports	2 fixed tube fittings for PTFE tubing 6 mm o.d.	Kynar UNF ¼"–28 (female)	2 fixed tube fittings for PTFE tubing 6 mm o.d.
Tubing (must be ordered separately)	PTFE tubing 4 mm i.d., 6 mm o.d. **Order No. MF 0336** (For other tubing material, use tubing adaptors; see Page 54)	**PTFE tubing** 1.6 mm i.d., 3.2 mm o.d. with 2 fittings UNF ¼"–28 male **Length** – **Order No.** 0.25 m – **IC 0053** 0.50 m – **IC 0057** 0.75 m – **IC 0061** 1.00 m – **IC 0065**	PTFE tubing 4 mm i.d., 6 mm o.d. **Order No. MF 0336** (For other tubing material; use tubing adaptors, see Page 54) This pump-head is also available as LF version.

MCP-CPF *Process*

Programmable

Programmable without a PC!
Protection rating of IP 65

- Ideal for aggressive media
- High repeatability
- Differential pressure 6.9 bar
- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment and in clean room areas (IP 65, dust-tight and protected against water jets)

Dispensing and calibrating function see Page 51

Rotation direction reversible

MCP-CPF *Process*

- **Pre-programmed pump-heads allow you to work with flow rates**
- Stainless steel housing, membrane key-pad, LED display
- **4 program memories for saving individual application parameters or PC programmed command sequences**
- **Programming similar to PLC**
- Wide selection of different, interchangeable pump-heads

Flow rates and differential pressure depend on the pump-head mounted, see Pages 54, 55 and 57–59

MCP-CPF *Process*
with rotary piston pump-head QP Q0.SSY-LF

Specifications

Motor type	DC motor
Speed	10.0 to 1800 rpm
Speed setting	rpm, resolution 0.1 rpm
Flow rate setting	µl/min, ml/min, liters/min
Power consumption	100 W
Mains connection	100 – 230 V_{AC} / 50 – 60 Hz
Protection rating	IP 65
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	6.9 kg (without pump-head)

Ordering information

The complete pump system MCP-CPF *Process* consists of:	
Drive	ISM 919
Pump-head and tubing see Pages 54, 55 and 57–59 / 62–63	
Accessories	
– Software ProgEdit (Page 61)	SOF 104
– Foot switch (Page 61)	IS 10039

LabVIEW driver
download for free: www.ismatec.com

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US: **+1 360 253 2008** Germany: **+49 93 77/92 03 0**

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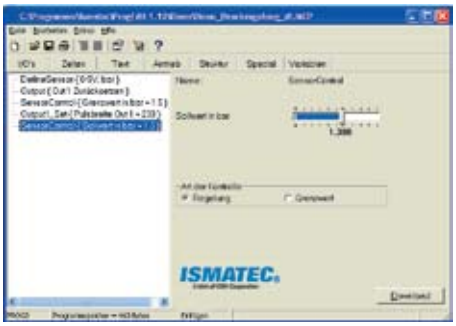


Software ProgEdit
LabVIEW drivers
Free download on
www.ismatec.com

Interfaces

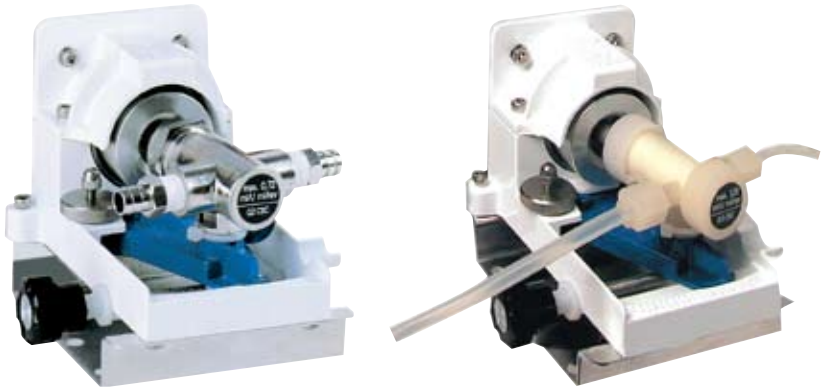
PC-controllable:
– RS232

– Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
– Speed output (0–10 V_{DC} or 0–7.2 kHZ)
– Start/Stop
– Rotation direction
– Autostart
– 2 universal inputs
– 2 universal outputs

3

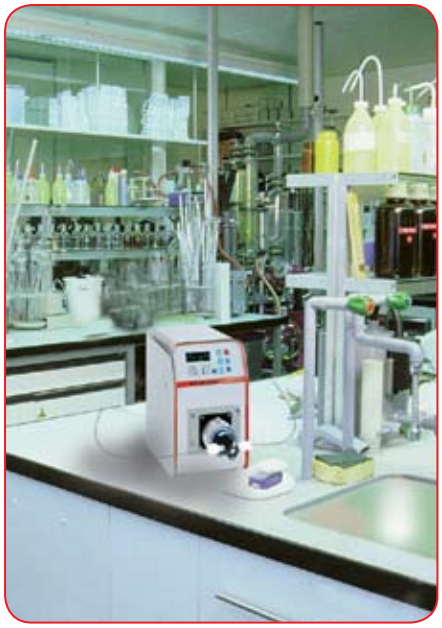
'RH' pump-heads (description see Pages 54 to 55)

Type	Flow rates	Stroke volumes
	ml/min	µl
RH 00	0.025 – 45	2.5 – 25
RH 0	0.050 – 90	5.0 – 50
RH 1	0.10 – 180	10.0 – 100



'Q' pump-heads (description see Pages 58 to 59)

Type	Flow rates	Stroke volumes
	ml/min	µl
QP Q0	0.04 – 144	3.2 – 80
QP Q1	0.13 – 576	12.8 – 320
QP Q2	0.29 – 1300	28.8 – 720
QP Q3	0.51 – 2300	51.2 – 1280



Application

– Single-channel sterile delivery and dispensing processes under pressure for particulate-free solvents
– Addition of various reagents in different volume ratios through mixing valve into reactor

Q-type pump-heads

For MCP-CPF Process drive (Page 56)

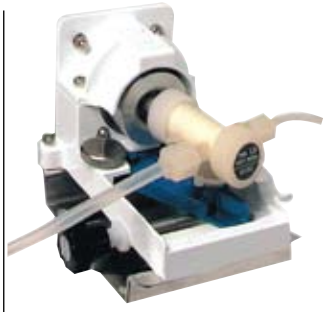
MCP-CPF *Process*
with Q pump-heads
and Low Flow Kit R479

3

Pump-heads Q0 and Q3

Q0 = Stroke vol. 3.2 – 80 µl
Q3 = Stroke vol. 51.2 – 1280 µl

Q0 = Flow rate 0.04 – 144 ml/min
Q3 = Flow rate 0.51 – 2300 ml/min



Type and Order No.	QP Q0.SSY / FMI 202	QP Q0.SKY / FMI 316	QP Q3.CKC / FMI 217
Piston	316 Stainless Steel	316 Stainless Steel	Ceramic
Cylinder case	316 Stainless Steel	Kynar® (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})
Cylinder liner	Carbon	Carbon	Ceramic
Lip seals	Rulon® J	Rulon J	Rulon AR
Gland washers	PTFE	PTFE	PTFE
Cylinder head seal	PTFE	none	none
Max. temperature	60°C	60°C	100°C
Max. differential pressure	6.9 bar	4.1 bar	1.7 bar (to 1600rpm) 0.5 bar (from 1600 rpm)
Flow ports	¼ NPT (female) Included: 2 stainless steel adaptors with thread ¼ NPT (male) and fitting for tubing with 6.4 mm i.d.	for tubing up to 12.7 mm i.d. Included: 2 Kynar (PVDF) adaptors for tubing with 6 mm o.d.	for tubing up to 12.7 mm i.d. or PTFE tubing 6 mm o.d. Included: 2 Kynar (PVDF) adaptors for tubing with 6 mm o.d.
Tubing (must be ordered separately)	Tubing Tygon® ST R-3603 6.4 mm i.d. **Order No. MF 0031** Accessories Low Flow Kit R 479 (see below) **Order No. FMI 056**	Tubing Tygon ST R-3603 12.7 mm i.d. **Order No. SC 0382** PTFE Tubing 4 mm i.d. / 6 mm o.d., 3.6 m long **Order No. MF 0336**	Tubing Tygon ST R-3603 12.7 mm i.d. **Order No. SC 0382** PTFE Tubing 4 mm i.d. / 6 mm o.d., 3.6 m long **Order No. MF 0336**

Low Flow Kit R 479 Order No. **FMI 056**
suitable for the following pump-heads:

QP Q0.SSY	QP Q1.SSY	QP Q2.CSY
QP Q1.CSC	QP Q2.CSC	QP Q2.SSY
	QP Q1.CSY	

This Low Flow adaptor Kit enables the use of the above mentioned pump-heads **for flow rates below 50 ml/min** or in case that a minimum dead volume or a maximum of chemical compatibility are required. The adaptor features a ¼-28 inner thread. These threads are used with low flow tube fittings for small bore tubing of 3.2 mm o.d. or less. Hence, this »Low Flow Kit« is also very interesting for chromatography applications.

PTFE tubing for Low Flow Kit R 479
1.6 mm i.d. / 3.2 mm o.d., with 2 fittings ¼-28 (male)

0.25 m long	Order No. **IC 0053**	0.75 m long	Order No. **IC 0061**
0.50 m long	Order No. **IC 0057**	1.00 m long	Order No. **IC 0065**

Tubing adaptors for pump-heads with a Kynar cylinder case:

Q0.SKY	Q2.CKC
Q1.CKC	Q2.CKY
Q1.CKY	Q2.SKY
Q1.SKY	Q3.CKC

In addition to the tubing mentioned above, these adaptors enable the use of other tubing.

Description			Order No.
1	R412-0K	for tubing with 3.2 mm i.d.	**FMI 050**
2	R412-1K	for tubing with 6.4 mm i.d.	**FMI 051**
3	R412-2K	for tubing with 9.5 mm i.d.	**FMI 052**
4	R412-5K	for tubing with 1/4–28 ferrule fittings	**FMI 053**
5	H476K	for tubing with 3.2 mm o.d.	**FMI 054**

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ISMATEC

Pump-heads Q1 and Q2

Q1 = stroke vol. 12.8 – 320 µl
Q2 = stroke vol. 28.8 – 720 µl

Q1 = flow rates 0.13 – 576 ml/min
Q2 = flow rates 0.29 – 1300 ml/min

Type	QP Q1.CSC	QP Q2.CSC	QP Q1.CSC-W	QP Q2.CSC-W	QP Q1.CSC-WT	QP Q2.CSC-WT
Order No.	FMI 205	FMI 212	FMI 320	FMI 321	FMI 219	FMI 218
Piston	Ceramic		Material and design like QP Q1.CSC and CP Q2.CSC but with **isolation gland** (2 extra ports 10–32 – female)		Material and design like QP Q1.CSC and CP Q2.CSC but with **isolation gland** (2 extra ports 1/8" NPT – female) and **heating mantel**	
Cylinder case	316 Stainless Steel					
Cylinder liner	Ceramic					
Lip seals	Rulon® AR					
Gland washers	PTFE					
Cylinder head seal	PTFE					
Max. temperature	177°C					
Max. differential pressure	6.9 bar					
Main flow ports	1/4 NPT (female) Included: 2 stainless steel adaptors with thread 1/4 NPT (male) and fitting for tubing with 9.5 mm i.d.		Thanks to a barrier gland of fluid, gas, steam or whatever is needed, the pumped fluid can be isolated from the seal area and atmosphere. Slurries, particulates, crystal formers and anaerobics are easily handled.		**Same barrier gland as described under CP Q1./Q2.CSC-W** In addition, 2 cartridge heaters (1/4" diam. x 1 1/2" long) and 1 thermo-couple (1/8" diam. x 1" long) can be used for heating the pump-head.	
Tubing (must be ordered separately)	Tubing Tygon® ST R-3603 9.5 mm i.d. **Order No. SC 0383** Accessories Low Flow Kit R 479 **Order No. FMI 056**		Included for barrier gland ports: 2 Polypropylene adaptors, thread 10–32 UNF and fitting for tubing with 3.2 mm i.d.		Not included: Tubing adaptors for: – barrier gland ports 1/8" NPT (female) – main flow ports 1/4" NPT (female)	

Other materials
for wetted parts for:

Pump-heads Q1 and Q2
(see table below)

Q1 = stroke vol. 12.8 – 320 µl
Q2 = stroke vol. 28.8 – 720 µl

Q1 = flow rates 0.13 – 576 ml/min
Q2 = flow rates 0.29 – 1300 ml/min

Tubing and connections for pump-heads with the suffix -W or -WT (must be ordered separately)

Description	Order No.
– 2 stainless steel fittings for inlet/outlet, thread 1/4" NPT male, with fittings for tubing with 6.4 mm i.d.	FMI 060
– Tubing for inlet/outlet (Tygon ST R-3603) 6.4 mm i.d., 15 m long	MF 0031

Type / Order No.	QP Q1.CKC/FMI 352	QP Q1.CKC-W/FMI 356	QP Q1.CKY/FMI 358	QP Q1.CSY/FMI 359	QP Q1.SKY/FMI 361	QP Q1.SSY/FMI 363	QP Q1.SAN[1]/FMI 365
Type/ Order No.	QP Q2.CKC/FMI 355	QP Q2.CKC-W/FMI 357	QP Q2.CKY/FMI 353	QP Q2.CSY/FMI 360	QP Q2.SKY/FMI 362	QP Q2.SSY/FMI 364	QP Q2.SAN[1]/FMI 366
Piston	Ceramic	Ceramic	Ceramic	Ceramic	316 Stainless Steel	316 Stainless Steel	Ceramic
Cylinder Case	Kynar® [2]	Kynar [2]	Kynar [2]	316 Stainless Steel	Kynar [2]	316 Stainless Steel	316 Stainless Steel
Cylinder liner	Ceramic	Ceramic	Carbon	Carbon	Carbon	Carbon	316 Stainless Steel
Lip seals	Rulon AR	Rulon AR	Rulon AR	Rulon AR	Rulon J	Rulon J	PTFE
Gland washers	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Cylinder head seal	none	none	none	PTFE	none	PTFE	PTFE
Max. temperature	100°C	100°C	100°C	177°C	60°C	60°C	177°C
Max. diff. pressure	4.1 bar	4.1 bar	4.1 bar	6.9 bar	4.1 bar	6.9 bar	6.9 bar
Main flow ports	For tubing up to 9.5 mm i.d.	For tubing up to 9.5 mm i.d. With isolation gland Fittings for tubing with 3.2 mm i.d.	For tubing up to 9.5 mm i.d.	1/4 NPT (female)	For tubing up to 9.5 mm i.d.	1/4 NPT (female)	PTFE tubing adaptor

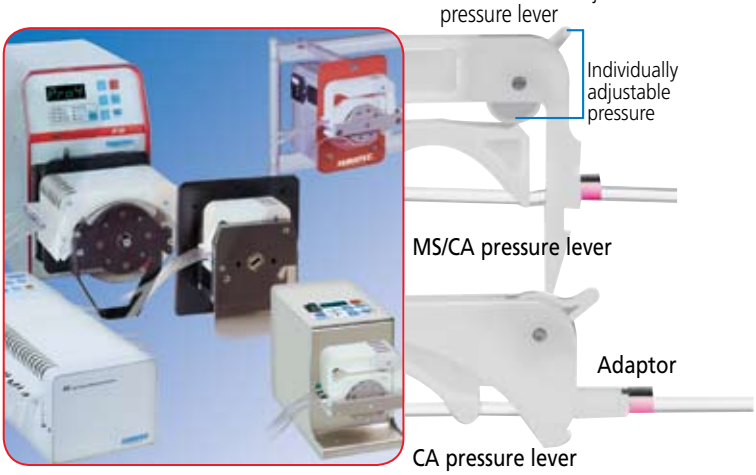
[1] designed for sanitary applications
[2] Kynar = Fluorocarbon (PVDF)

Tubing cassettes

Developed and consistently improved by ISMATEC

Click'n'go cassette with
automatic pressure mechanism

Option
Cassettes with adjustable
pressure lever



ISMATEC pumps equipped with Click'n'go cassettes

Click 'n' go Cassettes
(The new standard with all ISMATEC® cassette pumps)

The new, innovative tubing cassette from ISMATEC, a consequence of the constant improvement of the cassettes with pressure lever, offers the following advantages:

- **Automatic tubing pressure**
- Calibrated, fatigue-free spring guarantees optimal, reproducible tubing pressure independent of diameter, material and state of the tubing
- Pumping conditions are defined and repeatable at a later date
- Incorrect adjustment of the pressure lever is no longer possible
- **Readjustment** of tubing pressure is **not necessary**
- Long-time channel to channel conformity
- **Ideal for non-monitored long-time use**

Click 'n' go cassettes are not suitable for:

- Hard tubing materials
- Differential pressure greater than 1 bar

For these conditions you should choose the pressure lever cassettes.

Pressure Lever Cassettes
(Optional)

The successful, tried and tested tubing cassettes for many years. The pressure lever allows you to set a different tubing pressure for each channel. Depending on the application, tubing material and diameter, an optimally adjusted tubing pressure can be set, i.e. just as high as necessary (can be favourable to the tubing life). For constant flow rates it may be necessary to periodically adjust the tubing pressure.

The pressure lever should not be used to adjust the flow rate!
Such a 'calibration' can be unstable and is detrimental for tubing life.

These cassettes are available as an option. Under certain circumstances we recommend the use of these cassettes rather than the automatic click 'n' go cassettes:

- Under particular system conditions e.g. varying or high differential pressure
- When using very hard tubing material

Ordering information for spare Click'n'go cassettes
(included with the corresponding pump model).

Model	Material	Order No.
MS/CA Click'n'go	POM-C*	IS 3510
CA [1] Click'n'go	POM-C*	IS 3710

Ordering information for cassettes with pressure lever
Must be ordered separately.

Model	Material	Order No.
MS/CA pressure lever	POM-C*	IS 0649
MS/CA pressure lever	PVDF*	IS 3629
CA [1] pressure lever	POM-C*	IS 0122
CA [1] pressure lever	PVDF*	IS 3820

PVDF = higher chemical resistance

[1] Replacement adaptors for CA cassettes

Adaptor for CA cassettes	POM-C	IS 0123
Adaptor for CA cassettes	PVDF	IS 3861

Please order 2 adaptors each.

*Material properties

POM-C	Polyoxymethylen Copolymer
PVDF	Polyvinylidene Fluoride

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Foot switches, software

Foot switch for start/stop

Very practical **for use with pumps as dispensing systems e.g. for filling tubes, bottles etc**. Footswitch provides the start/stop signal required.

You have both hands free for handling the filling system.

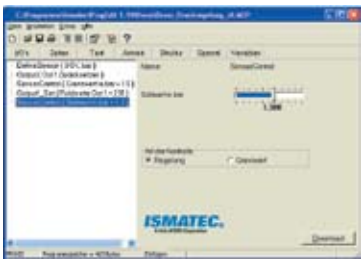
Protection rating
IP21 (higher safety categories e.g. IP67 on request)

Get your personal ProgEdit Software for free from www.ismatec.com

Create your application program in the PC and then work with your pump as a stand-alone system (for MCP-*Process*, MCP-Z *Process*, MCP-CPF *Process*)

With the **ProgEdit Software** you can individually define and program your dosing and pumping sequences.
The application programs written in the PC can be downloaded into the program memory of the pump drive. Up to 4 individual application programs can be saved. The pump can use PC downloaded programs as a stand-alone system independent of a PC, e.g.:

- Filling and dispensing (e.g. dispensing of a perfume proportionally to the speed of a conveyor belt).
- Sampling (e.g. volumetrically proportional sampling from a waste water channel).
- Pressure control (e.g. for safe filtering)
- Fully automatic 1- and 2-point niveau regulation (e.g. pump keeps liquid level constant between given boundaries)



Software English/German switchable

- Freely defined, time dependent rotation rate profile (e.g. ramps)
- Monitoring inputs (2) and setting outputs (2) for applications similar to SPS
- 'for/while' loops and 'if-then-else' commands
- Compare constants and variables with sensor signals

Ordering information

Foot switch suitable for pump models:	Order No.
IPC and IPC-N (firmware version older than 4.00)	ISM 016
IP and IP-N, IPC and IPC-N (from firmware version 4.00)	IS 10039
REGLO *Analog*, REGLO *Quick*™	
REGLO-Z , REGLO-ZS, REGLO-CPF *Analog*	ISM 891
REGLO *Digital*, REGLO-CPF *Digital*, REGLO-Z *Digital*	ISM 894
ecoline Series	IS 3572
MCP *Standard* (up to firmware version 7.00)	
MCP-Z (firmware version older than 4.00)	ISM 016
MCP *Standard* (from firmware version 7.00)	
MCP *Process,* MCP-CPF *Process,* MCP-Z *Process,* and	
MCP-Z *Standard* (from firmware version 4.00)	IS 10039
BVP *Process*	IS 10039
BVP *Standard*, BVP-Z	ISM 891
Flowmaster®	IS 10279

Download from our web-site (www.ismatec.com):
– Free ProgEdit software
– Operating manual (PDF-file) (1.0 MB)
– LabView Software Driver

IC-Tubing and fittings

Metered IC-tubing

The IC-tubing is made of high density PTFE. It is chemically inert and is available as a pack of 3 m length.

You can make the appropriate tubing connections for your system by flanging the IC-tubing and using combined with IC fittings.

For an alternative to flanging tubing, we highly recommend the Flangeless fittings on Page 63.

Ordering information

Dimensions			Order No.
i.d.	o.d.	Length	
0.3	1.5 mm (1/16")	3 m	IC 0046
0.5	1.5 mm (1/16")	3 m	IC 0047
0.8	1.5 mm (1/16")	3 m	IC 0048
1.5	3.0 mm (1/8")	3 m	IC 0049

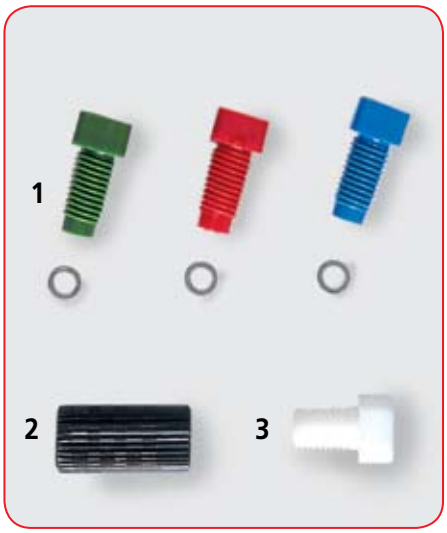
Flanged IC-tubing with fittings

The pre-flanged IC-tubing is made of the same high density PTFE tubing and is available in 4 different lengths and diameters. Comes complete with 2 fittings.

IC-tubing
with 2 fittings (UNF 1/4–28)

Ordering information

Tubing i.d./o.d. mm	Length 0.25 m Order No.	Length 0.50 m Order No.	Length 0.75 m Order No.	Length 1.00 m Order No.
0.3/1.5 (1/16")	IC 0050	IC 0054	IC 0058	IC 0062
0.5/1.5 (1/16")	IC 0051	IC 0055	IC 0059	IC 0063
0.8/1.5 (1/16")	IC 0052	IC 0056	IC 0060	IC 0064
1.5/3.0 (1/16")	IC 0053	IC 0057	IC 0061	IC 0065



1 IC-fitting for metered tubing

Each fitting comes with a washer.

Material	Polyacetate
Color	white, blue, red, green, yellow, black
Thread	UNF 1/4–28 for both tube sizes

IC-fitting for tubing Color	1.5 mm (1/16") o.d. Order No.	3 mm (1/8") o.d. Order No.
White	IC 0001	IC 0007
Blue	IC 0002	IC 0008
Red	IC 0003	IC 0009
Green	IC 0004	IC 0010
Yellow	IC 0005	IC 0011
Black	IC 0006	IC 0012
Spare U-washers	WA 0002	WA 0001

2 Coupling-sleeve

To join 2 fittings

Thread	UNF 1/4–28
Material	Delrin
Order No.	IC 0013

3 End-plug

To close a PTFE tubing (used with coupling-sleeve)

Material	PTFE
Order No.	IC 0021

Pack size: 5 pieces

You can find your local ISMATEC sales representative at:
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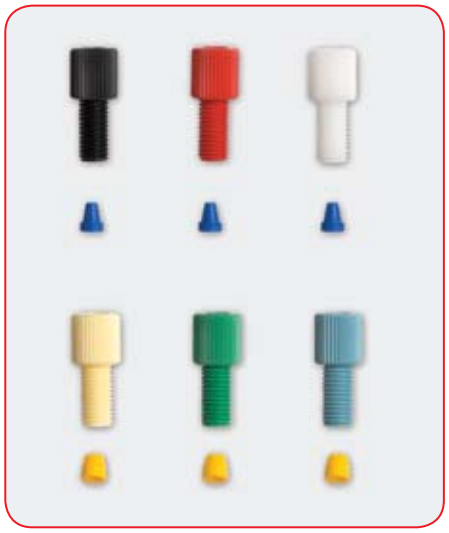
Flangeless fittings



Upchurch Scientific® Flangeless fittings eliminate the need to flange tubing. This removable and reusable system provides several benefits:

Convenience: Flangeless fittings are easy to replace. Just slip the nut and ferrule over the tubing and finger tighten the nut.

Minimal Down-Time: Component replacement is quick, taking only a few seconds — unlike the significant time required to flange tubing.

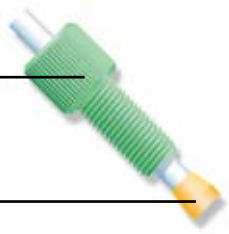
Cost-Effectiveness: Repairing a flanged tubing assembly requires a costly flanging tool or the purchase of a complete replacement assembly, including a new length of tubing and a set of fittings. The Flangeless fittings system typically requires only one new ferrule at minimal cost.

The Flangeless fittings are available for 1.5 mm (1/16") and 3.0 mm (1/8") o.d. tubing. Nuts and ferrules are sold separately. Use these fittings with the metered IC-tubing on page 62.

The convenience of Flangeless fittings

The Flangeless nut provides fingertight convenience – no wrenches required.

The Flangeless ferrule provides a leak-proof seal. There is no need to spend time flanging tubing.



Material

Nut	Delrin® (acetal resin)
Ferrule	Tefzel® (ETFE)

Color

Nut	black, red, white, cream, green, blue
Ferrule	blue 1.5 mm (1/16")
	yellow 3.0 mm (1/8")

Thread UNF 1/4-28 for both tubing sizes

Ordering information

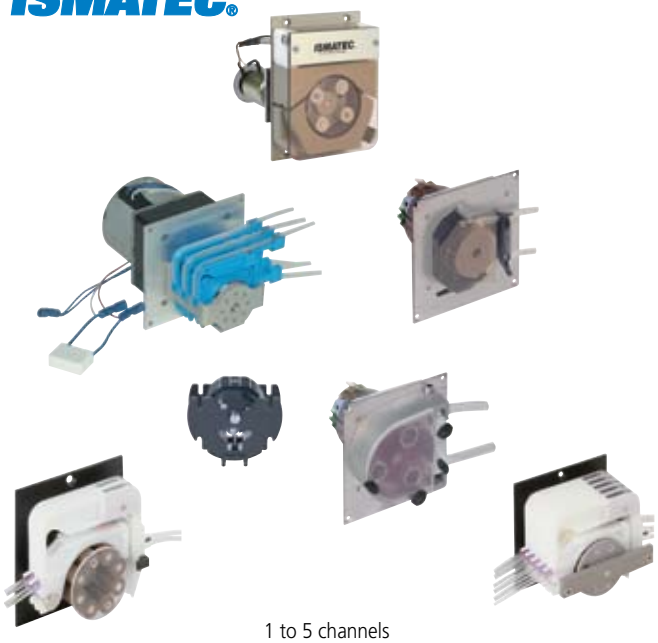
Flangeless fittings Color	1.5 mm (1/16") o.d. Order No.	3 mm (1/8") o.d. Order No.
Nuts		
Black	P-201x	P-301x
Red	P-202x	P-302x
White	P-203x	P-303x
Cream	P-204x	P-304x
Green	P-205x	P-305x
Blue	P-206x	P-306x
Ferrules		
Blue	P-200x	—
Yellow	—	P-300x

Pack size: 10 pieces

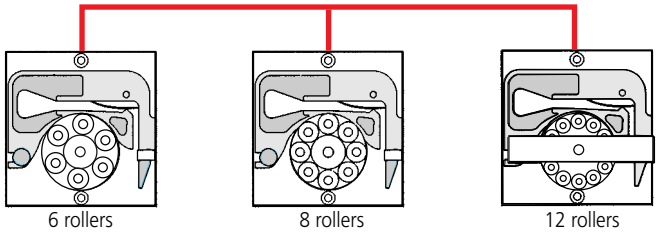
OEM tubing pumps

from 1 µl/min up to 7240 ml/min

ISMATEC®



1 to 5 channels
Synchro-, DC- or Steppermotor



6 rollers
0.002–68.8 ml/min

8 rollers
0.002–56 ml/min

12 rollers
0.001–38.4 ml/min
low pulsation

IDEX® Health & Science Complete Fluidic Solutions

- Custom fluidic system and component development
- Integration of fluid handling technologies
- Micro and nanofluidic technologies
- Ultra-hard materials processing for durability and compatability
- Process management for sterility and traceability compliance
- Patented, proprietary processes and long-term strategic parnerships with materials suppliers

OEM gear pumps

up to 5005 ml/min

MICROPUMP®

Small gear pump
DC motor with optical encoder

Micropump I-Drive electromagnetic drive pump for Series GA, GJ PPS head
Brushless DC motor

Applications

Integrated into systems for uses such as:

- UV/Vis spectraphotometric on-line analysis of water from a sewage treatment plant
- Continuous photometric analysis of process water
- Liquid analysis on-line from various processes
- Automated sample preperation of gas-form hydrides for IPC analysis
- Fully automated analysis of process sample streams by fluorescence spectroscopy
- Automated sampler for sample dialysis and ion-chromatography
- Continuous BOD, COD, toxicity, TOC, P and N analyzers

Visit our home page:
www.idex-hs.com
or ask for the separate OEM pump brochure

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