

# Laboratory Pumps



Peristaltic  
Vacuum



### Features of Peristaltic Pumps (pages 142–149)

- ▶ 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
- ▶ Roller Back-steps for Drip-free Dispensing
- ▶ Contamination-Free Pumping
- ▶ Pumping Sterile Media
- ▶ High Accuracy
- ▶ High Repeatability
- ▶ Multichannel Pumping



**ERC GmbH**  
Tel.: +49 (0)89 660 55 696

### Laboratory Pumps Introduction

Liquid and air handling are common needs in most labs. With smaller dispense requirements and the need for longer, continuous duty operations, more accurate and robust pumping solutions are necessary. To meet these needs, we offer pumping solutions from sister IDEX® Health & Science Group business units: Ismatec® peristaltic pumps and Gast® Manufacturing Air Compressor and Vacuum Pumps.

### Peristaltic Pumps Introduction

- ▶ For a Broad Array of Applications

With a wide range of tubing available, Ismatec peristaltic tubing pumps are capable of pumping almost any media, including corrosive or sterile fluids.

- Many tubing materials available
- Independent, yet simultaneous delivery of various media at different flow rates (multichannel pumps-up to 24 channels)
- Self-priming from a depth of up to 8 m
- Reversible rotation direction
- Extremely accurate dispensing with calibrateable, microprocessor controlled drives

- ▶ Inexpensive to Maintain

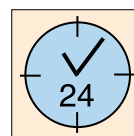
- Nearly maintenance-free
- Tubing is generally the only part to wear
- No expensive seals, valves or diaphragms
- Ready again after simple tubing change
- High quality and precision deliver optimum performance even after years of intensive use

- ▶ Safe and Easy to Use

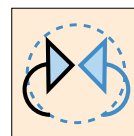
- Developed for continuous duty, 24 hours/day, 7 days/week
- No contamination of the fluid or the pump
- Immune to dry-running
- No valves to clog, hang up or service
- No seals which can leak
- No syphoning effect when the pump stops
- No flushing and cleaning required
- Immediately adaptable to new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



The peristaltic pump principle of Ismatec pumps.



Continuous Duty



Rotation Direction Reversible

### ISMATEC PERISTALTIC PUMP BENEFITS:

The data in this table is for the Ismatec pumps listed in this catalog; the data, however, does not represent any single pump's parameters. Please contact Ismatec for more options (see page 172 for contact information).

| Features                |                    | Pumping                |                 |
|-------------------------|--------------------|------------------------|-----------------|
| Max. Flow Rate          | 230 mL/min         | Multichannel System    | yes             |
| Min. Flow Rate          | 0.0004 mL/min      | Shearing Forces        | low             |
| Max. Diff. Pressure     | 1.5 bar (21 psi)   | Contamination Free     | yes             |
| Suction Lift, Water     | 7–8 m              | Reverse Operation      | yes             |
| Dead Volume             | practically none   | Pulsation Ratio        | low to moderate |
| Chemical Compatibility  | depends on tubing  | Media                  |                 |
| Accuracy, Repeatability | high               | Pump Particles         | yes             |
| Self-Priming            | yes                | Viscous Liquids        | yes             |
| Dry-Running             | yes                | Pump Living Cells      | yes             |
| Maintenance             | tubing replacement | Foaming                | yes             |
|                         |                    | Corrosive / Aggressive | yes             |
|                         |                    | Gas                    | yes             |

### Low Flow Peristaltic Pumps

- ▶ 4 to 24 Channels
- ▶ 0.0004 to 44 mL/min Flow Rates
- ▶ For Dispensing and Continuous Flow Applications
- ▶ Lowest Pulsation, Highest Accuracy
- ▶ Very High Repeatability on All Channels

Ismatec® high accuracy, multichannel peristaltic tubing pumps are ideal for both continuous pumping and discrete dispensing applications. Smooth, low pulse and repeatable operation is ensured by a unique planetary drive system (see Note).

These pumps are easily calibrated and can be programmed to dispense by flow rate, volume or time, making them adaptable to many applications. A pause time of up to 999 hours can also be programmed between dispense volumes. There's even a back-step routine option to prevent drips as well as a stand-by mode.

The LED display indicates the current setting. Priming and flushing are accomplished with a simple push of a button on the membrane key pad, without affecting programmed settings.

Choose from Ismatec's line of standard or low speed units, each available with 4, 8, 12 and 24 channels.

| Speed    | Model | Flow Rates (mL/min per channel) |
|----------|-------|---------------------------------|
| Standard | IPC   | 0.002–44                        |
| Low      | IPC-N | 0.0004–11                       |

Speed (rpm) coupled with the selection of tubing ID determines actual flow rate per channel. The standard Click'n'go cassettes, supplied with each pump, feature an automatic pressure setting. Maximum differential pressure is 15 psi (1.0 bar), depending on tubing material. Tubing with small IDs and/or optional cassettes with pressure lever (page 147) may enable higher pressures.

Operations can be controlled via RS-232 computer interface. Analog input and output controls via contact closure include: 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 and autostart. Download drivers for LabVIEW™ Software at no cost from our "Support" section at [www.idex-hs.com](http://www.idex-hs.com).

Each unit is housed in lacquered stainless steel.

Typical applications for these Ismatec Peristaltic Tubing Pumps include:

- ▶ Toxicological in-vitro use
- ▶ Perfusion of animal tissue slices
- ▶ Sampling from tablet dissolution systems
- ▶ Flow injection analyzers

Please Note: Analog and 16 channel units are available upon request. These items are not stocked items—please contact us for lead times.

#### SPECIFICATIONS:

|                   |   |
|-------------------|---|
| Motor type        | DC motor  |
| Speed             | IPC 0.4–45 rpm<br>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  |
| Power supply      | 230 V <sub>AC</sub> /50 Hz, 115 V <sub>AC</sub> /60 Hz adjustable |
| Protection rating | IP 30   |

#### DIMENSIONS / WEIGHT

|             | Depth/Width/Height (mm) | Weight (kg) |
|-------------|-------------------------|-------------|
| 4 channels  | 180 x 175 x 130         | 4.6         |
| 8 channels  | 220 x 175 x 130         | 5.1         |
| 12 channels | 260 x 175 x 130         | 5.8         |
| 24 channels | 380 x 175 x 130         | 7.9         |



Standard Speed (IPC)

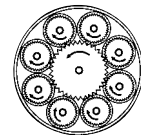


ERC GmbH  
Tel.: +49 (0)89 660 55 696



### Note

With the planetary drive system, all eight rollers are directly driven in unison by the central wheel. This design prevents axial push-pull friction on the tubing, resulting in increased tubing service life, lower pulsation and high repeatability.



### ORDERING TUBING & ACCESSORIES:

| Standard Accessory           | Page                 |
|------------------------------|----------------------|
| Tubing                       | 2-Stop 148 – 149     |
| Spare Cassettes <sup>1</sup> | CA Click'n'go 147    |
| Foot Switch <sup>2</sup>     | ISM016 / IS10039 147 |



<sup>1</sup> One set of cassettes provided with each pump.  
<sup>2</sup> Depending on firmware (see page 147)

#### LOW FLOW PERISTALTIC TUBING PUMPS

| Order No.                   | Model    | Flow Rates (mL/min per channel) | Channels | Speed (rpm) |
|-----------------------------|----------|---------------------------------|----------|-------------|
| <b>Standard Speed (IPC)</b> |          |                                 |          |             |
| ISM930                      | IPC 4    | 0.002–44                        | 4        | 0.4–45      |
| ISM931                      | IPC 8    | 0.002–44                        | 8        | 0.4–45      |
| ISM932                      | IPC 12   | 0.002–44                        | 12       | 0.4–45      |
| ISM934                      | IPC 24   | 0.002–44                        | 24       | 0.4–45      |
| <b>Low Speed (IPC-N)</b>    |          |                                 |          |             |
| ISM935                      | IPC-N 4  | 0.0004–11                       | 4        | 0.11–11.25  |
| ISM936                      | IPC-N 8  | 0.0004–11                       | 8        | 0.11–11.25  |
| ISM937                      | IPC-N 12 | 0.0004–11                       | 12       | 0.11–11.25  |
| ISM939                      | IPC-N 24 | 0.0004–11                       | 24       | 0.11–11.25  |

### Compact REGLO Peristaltic Pumps

- ▶ 2 and 4 Channels
- ▶ 0.002–68 mL/min Flow Rates
- ▶ Ismatec®'s Smallest Calibrateable Dispensing Pump
  - Foot Print Only 178 x 100 mm and only 13.5 cm high!
- ▶ High Repeatability

Ismatec compact REGLO peristaltic tubing pumps offer two or four channels in a small footprint. The eight rollers of these variable-speed pumps provide smooth, consistent flow. Two control options are available — analog and programmable digital.

#### REGLO Digital Programmable Pumps with dispensing function

The digital pump version is easily calibrated and programmed via a 6-button membrane keypad and LED display interface. Dispense by flow rate, volume or time. A pause time of up to 999 hours can be programmed between dispense volumes. Back-steps can also be programmed to prevent drips.

Control operations remotely via RS-232 computer interface. An analog speed output signal is available (see REGLO Analog, below). Activate start/stop and autostart with analog contact closure input signals. Drivers for LabVIEW™ Software are available at no cost from the "Support" section at [www.idex-hs.com](http://www.idex-hs.com). Just click on the Ismatec link.

#### REGLO Analog Pumps without dispensing function

Flow for the analog version is controlled by setting the pump speed (rpm). Speed is adjustable from 1–99% in 1% steps via a 2-digit potentiometer.

Analog input and output controls via contact closure include: speed control (0–5 or 0–10V; 0–20 or 4–20 mA), speed output (2-channel: 0–8 kHz; 4-channel: 0–5 kHz), start/stop and rotation direction.

The combination of pump speed (rpm) and the ID of the selected tubing determines actual flow rate per channel. Standard Click'n'go cassettes, supplied with each pump, feature an automatic pressure setting. Maximum differential pressure is 15 psi (1.0 bar), depending on tubing material. Tubing with small IDs and/or optional cassettes with a pressure lever (see page 147) may enable higher pressures.

*Please Note: REGLO pumps with 6 and 12 rollers are available in each version, with two or four channels. These pumps are not stocked items—please contact us for lead times.*



REGLO Digital



REGLO Analog

4

ERC GmbH  
Tel.: +49 (0)89 660 55 696

#### SPECIFICATIONS:

|                    |           | REGLO Digital           | REGLO Analog   |
|--------------------|-----------|-------------------------|--|
| Motor type         |           | DC motor                | DC motor   |
| Speed              | 2-channel | 1.6–160 rpm             | 3.2–160 rpm  |
|                    | 4-channel | 1.0–100 rpm             | 2.0–100 rpm  |
| Speed setting      |           | rpm, resolution 0.1 rpm | 2–99%, resolution 1% 2-digit potentiometer                         |
| Flow rate setting  |           | µL/min or mL/min        | NA   |
| Power consumption  |           | 20 W                    | 20 W   |
| Power supply       |           | 100–240V / 50–60 Hz     | 230 V <sub>AC</sub> /50 Hz, 115 V <sub>AC</sub> /60 Hz, adjustable |
| Protection rating  |           | IP 30                   | IP 30  |
| Depth/Width/Height | 2-channel | 178 x 100 x 135 mm      | 178 x 100 x 143 mm   |
|                    | 4-channel | 190 x 100 x 135 mm      | 190 x 100 x 143 mm   |
| Weight             | 2-channel | 2.0 kg                  | 2.0 kg   |
|                    | 4-channel | 2.1 kg                  | 2.1 kg   |

#### ORDERING TUBING & ACCESSORIES:

| Standard Accessory                 |                       | Page      |
|------------------------------------|-----------------------|-----------|
| <b>Tubing</b>                      | 3-Stop                | 148 – 149 |
| <b>Spare Cassettes<sup>1</sup></b> | MS/CA Click'n'go      | 147       |
| <b>Foot Switch</b>                 | REGLO Digital: ISM894 | 147       |
|                                    | Analog: ISM891        | 147       |

<sup>1</sup> One set of cassettes provided with each pump.

#### COMPACT REGLO PERISTALTIC TUBING PUMPS

| Order No.      | Model   | Flow rates (mL/min per channel) | Channels | Rollers | Speed (rpm) |
|----------------|---------|---------------------------------|----------|---------|-------------|
| <b>Digital</b> |         |                                 |          |         |             |
| ★ ISM832       | MS-2/08 | 0.002–57                        | 2        | 8       | 1.6–160     |
| ★ ISM834       | MS-4/08 | 0.002–35                        | 4        | 8       | 1.0–100     |
| <b>Analog</b>  |         |                                 |          |         |             |
| ISM829         | MS-2/08 | 0.004–57                        | 2        | 8       | 3.2–160     |
| ISM827         | MS-4/08 | 0.003–35                        | 4        | 8       | 2.0–100     |

### Fixed-Speed, Rack-Mount Peristaltic Pumps

- ▶ Compact Size
- ▶ 2 and 4 Channels
- ▶ 0.021 to 21.0 mL/min Flow Rates

Ismatec® Fixed Speed, Rack-Mount Peristaltic Pumps are ideal for limited space applications. These compact, 2 or 4 channel economical pumps are simple to operate—just toggle the on/off switch and the eight rollers and synchronous motor ensure steady, reproducible flow rates. Tubing changes are equally simple, and can even be accomplished while the pump is running.

The flow rate of these fixed speed pumps is determined by the inner diameter of the selected tubing. Each pump is supplied with a set of standard Click 'n' go tubing cassettes, with automatic pressure setting. Maximum differential pressure is 15 psi (1.0 bar), depending on tubing material. Tubing with small IDs and/or optional cassettes with a pressure lever (see page 147) may enable higher pressures. Pumps are also supplied with a 6-foot cord and mounting rod (5.5" L x 0.5" diameter).

Typical applications for these pumps are multichannel delivery processes requiring a constant flow rate, such as:

- ▶ Pump seal wash (see Application Note on this page for more information)
- ▶ Sipper pump for flow-through cuvettes
- ▶ Long-term determination of environmental influences
- ▶ Feeding of overflow level control systems

*Please Note: Fixed Speed, Rack-Mounted pumps are available with 6 rollers and flow rates from 0.028–26 mL/min. These pumps are not stocked items—please contact us for lead times.*



ERC GmbH  
Tel.: +49 (0)89 660 55 696

### Application Note

Mobile phase buffers are used in many liquid chromatography and syringe pump applications. When using concentrated buffer solutions (>0.01 M), buffer salts may precipitate, reducing the life of the pump pistons and seals. Solve this problem by using one channel of an Ismatec 2-channel Fixed-Speed Rack-Mount Pump to continuously rinse the back of the seals. This set-up also provides a barrier of liquid to isolate process fluids from the atmosphere.

#### SPECIFICATIONS:

|                    |  |                   |
|--------------------|--|-------------------|
| Motor type         | Synchronous motor  |                   |
| Speed              | 20, 40 or 60 rpm   |                   |
| Power consumption  | 8 W  |                   |
| Power supply       | 115 V <sub>AC</sub> (50/60 Hz) or 230 V <sub>AC</sub> (50/60 Hz) |                   |
| Protection rating  | IP 30  |                   |
| Depth/Width/Height | 2-channel  | 125 x 88 x 135 mm |
|                    | 4-channel  | 145 x 88 x 135 mm |
| Weight             | 2-channel  | 1.2 kg            |
|                    | 4-channel  | 1.3 kg            |

#### ORDERING TUBING & ACCESSORIES:

| Standard Accessory                 | Page                 |
|------------------------------------|----------------------|
| <b>Tubing</b>                      | 3-Stop 148 – 149     |
| <b>Spare Cassettes<sup>1</sup></b> | MS/CA Click'n'go 147 |

<sup>1</sup> One set of cassettes provided with each pump.



Visit our website [www.idex-hs.com](http://www.idex-hs.com) to request the complete Ismatec Catalog. This catalog includes Ismatec's full line of peristaltic, gear and rotary piston pumps and accessories.

#### ISMATEC FIXED-SPEED, RACK-MOUNT PUMPS

| Order No.                   | Model       | Flow rates (mL/min per channel) | Channels | Rollers | Speed (rpm) |
|-----------------------------|-------------|---------------------------------|----------|---------|-------------|
| <b>115 Volts / 50/60 Hz</b> |             |                                 |          |         |             |
| ISM847                      | MS-CA 2/820 | 0.021–7.1                       | 2        | 8       | 20          |
| ISM849                      | MS-CA 2/860 | 0.064–21.0                      | 2        | 8       | 60          |
| ISM852                      | MS-CA 4/820 | 0.021–7.1                       | 4        | 8       | 20          |
| ISM853                      | MS-CA 4/840 | 0.043–14.0                      | 4        | 8       | 40          |
| <b>230 Volts / 50/60 Hz</b> |             |                                 |          |         |             |
| ISM847                      | MS-CA 2/820 | 0.021–7.1                       | 2        | 8       | 20          |
| ISM849                      | MS-CA 2/860 | 0.064–21.0                      | 2        | 8       | 60          |
| ISM852                      | MS-CA 4/820 | 0.021–7.1                       | 4        | 8       | 20          |
| ISM853                      | MS-CA 4/840 | 0.043–14.0                      | 4        | 8       | 40          |

## Single-Channel Peristaltic Pumps

Ismatec® Single-Channel Peristaltic Pumps are cost-effective, space-saving and ideally suited for applications where simple fluid transfer and/or filling are required.

### REGLO Quick

- ▶ 1 Channel, 4 Rollers
- ▶ 2.1-230 mL/min Flow Rates
- ▶ Fast Tubing Change-over
- ▶ Compact Size—178 x 100 mm x 14.3 cm High

This single-channel, variable speed pump-head is popular in applications where frequent tubing change-over is required. The easily accessible tube-bed has a wide opening angle, enabling users to change out their tubing configurations without difficulty. Its innovative design features a transparent protective covering to help prevent accidental finger injury while inserting pump tubing.

Flow is controlled through an analog interface by setting the pump speed, adjustable from 1–99%, in 1% steps via a 2-digit potentiometer. Use only the recommended standard tubing without stoppers, as specified below.

*Please Note: Only tubing with a 3.2 mm ID or 4.8 mm ID can be used with the REGLO Quick. See pages 148–149 for more information.*

### SPECIFICATIONS:

|                    | <b>REGLO Quick</b>   |
|--------------------|--|
| Motor type         | DC motor   |
| Speed              | 3.2–160 rpm  |
| Speed setting      | 1–99%, resolution 1%<br>2-digit potentiometer                        |
| Power consumption  | 30 W   |
| Power supply       | 230 V <sub>AC</sub> /50 Hz,<br>115 V <sub>AC</sub> /60 Hz adjustable |
| Protection rating  | IP 30  |
| Depth/Width/Height | 178 x 100 x 143 mm   |
| Weight             | 2.2 kg   |

### ORDERING TUBING & ACCESSORIES:

| Standard Accessory |                    | Page      |
|--------------------|--------------------|-----------|
| <b>Tubing</b>      | Standard (no-stop) | 148 – 149 |
| <b>Foot Switch</b> | ISM891             | 147       |



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

**ERC GmbH**  
Tel.: +49 (0)89 660 55 696

### PERISTALTIC TUBING PUMPS

| Order No.          | Flow rates<br>(mL/min per channel) | Channels | Rollers | Speed<br>(rpm) |
|--------------------|------------------------------------|----------|---------|----------------|
| <b>REGLO Quick</b> |                                    |          |         |                |
| ISM897             | 2.1–230                            | 1        | 4       | 3.2–160        |

## Tubing Cassettes

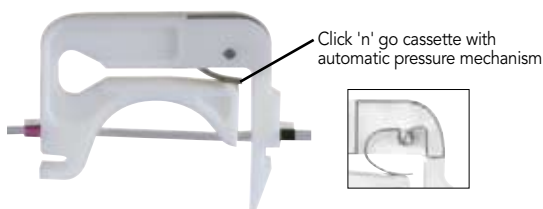
► Developed and Consistently Improved by Ismatec®

### Click 'n' go Cassettes (Standard)<sup>1</sup>

Advantages:

- Automatic tubing pressure; no readjustment necessary
- Ideal for non-monitored, long-time use

Please Note: Click 'n' go cassettes are not suitable for differential pressure greater than 1 bar (15 psi). For these conditions you should choose the pressure lever cassettes.



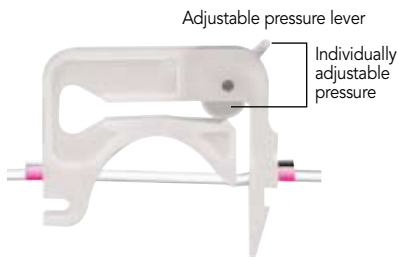
MS/CA Click 'n' go



CA Click 'n' go

### Pressure Lever Cassettes (Optional)

The optional 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. To maintain constant flow rates it may be necessary to periodically adjust the tubing pressure.



MS/CA pressure lever (optional)



CA pressure lever (optional)

## Foot Switch

The Ismatec foot switch for start/stop is very practical for use with pumps as dispensing systems, e.g. for filling tubes, bottles etc. A foot switch provides the start/stop signal required, allowing hands-free activation of the filling system. The switch's protection rating is IP21 (higher safety categories, e.g. IP67 on request). A 6-foot (1.8 m) cable is included.



ERC GmbH  
Tel.: +49 (0)89 660 55 696

## Note



Ismatec offers a wide variety of peristaltic, gear and rotary piston pump solutions for instrument manufacturers. Please contact Ismatec today to discuss your OEM needs (see page 172).

### TUBING CASSETTES AND ADAPTERS

#### Click 'n' go Spare Cassettes<sup>1</sup>

| Order No. | Model              | Material           | Adapters Req'd?  |
|-----------|--------------------|--------------------|------------------|
| IS3510    | MS/CA Click 'n' go | POM-C <sup>4</sup> | No               |
| IS3710    | CA Click 'n' go    | POM-C <sup>4</sup> | Yes <sup>2</sup> |

#### Pressure Lever Optional Cassettes

| Order No. | Model                | Material            | Adapter Req'd?   |
|-----------|----------------------|---------------------|------------------|
| IS0649    | MS/CA Pressure Lever | POM-C <sup>4</sup>  | No               |
| IS3629    | MS/CA Pressure Lever | PVDF <sup>3,4</sup> | No               |
| IS0122    | CA Pressure Lever    | POM-C <sup>4</sup>  | Yes <sup>2</sup> |
| IS3820    | CA Pressure Lever    | PVDF <sup>3,4</sup> | Yes <sup>2</sup> |

#### Replacement Adapters for CA Cassettes<sup>2</sup>

| Order No. | Model                    | Material            |
|-----------|--------------------------|---------------------|
| IS0123    | Adapter for CA Cassettes | POM-C <sup>4</sup>  |
| IS3861    | Adapter for CA Cassettes | PVDF <sup>3,4</sup> |

### FOOT SWITCH

| Order No. | Foot switch suitable for pump models:            |
|-----------|--|
| ISM016    | IPC and IPC-N (firmware version older than 4.00) |
| IS10039   | IPC and IPC-N (from firmware version 4.00)       |
| ISM891    | REGLO Analog, REGLO Quick                        |
| ISM894    | REGLO Digital                                    |

<sup>1</sup> One set is included with all Ismatec cassette-style pumps.  
<sup>2</sup> When ordering replacement CA Cassettes, two Adapters per cassette must also be ordered.  
<sup>3</sup> PVDF offers higher chemical resistance.  
<sup>4</sup> POM-C = Polyoxymethylene Copolymer, PVDF = Polyvinylidene Fluoride

## Peristaltic Pumps and Tubing

The pumps presented on pages 143–146 require peristaltic tubing to operate. Flow rate of a given fluid through a peristaltic tubing pump depends on two variables:

1. The speed of the pump, measured in revolutions per minute (rpm)
2. The volume held with the internal diameter (ID) of the selected tubing

### Variable Speed Pump Flow Rates

For a variable speed pump, such as the products on pages 143–146, the flow rate of a channel can be changed by varying the pump rpm, or by using tubing with different IDs, or a combination of both.

### Fixed Speed Pump Flow Rates

For a fixed speed pump, such as the MS/CA line on page 146, the only variable is the tubing ID. Therefore, to change the flow rate of a fixed speed pump channel, the operator must use tubing with a different ID.

Single-channel and multichannel peristaltic tubing pumps are available in this catalog. The number of channels refers to how many pieces of tubing that can be used simultaneously. Tubing with different IDs can be used in each channel to deliver varying flow rates at any given pump speed.

## Ordering your Pump and Tubing

Follow these steps to complete your Ismatec® peristaltic tubing pump order:

1. Select the pump for your application from pages 143–146, determined by the requirements of your fluid delivery task(s):
  - a. Level of accuracy
  - b. Fluid streams (# of channels)
  - c. Flow rate range(s)
  - d. Need for constant flow, discrete dispensing, or both
  - e. Need for variable speed
  - f. Need for automation/programmability
2. Note whether the selected pump requires 2-stop, 3-stop or no-stop tubing (standard tubing).
3. Review the tubing properties table on this page and select the tubing material best suited for your application.
4. Refer to the tubing table on page 149 that corresponds to the number of stops required for the pump selected. Find the column in the right side of this table that contains your selected pump model.
5. Find the flow rate range in this column that meets your application needs.
6. Follow this row back to the tubing material column on the right side of the table that corresponds with the tubing material desired.
7. If required, order extension tubing that corresponds to the tubing material and ID of your 2- or 3-stop tubing.

### Note

Connectors and adapters for peristaltic tubing are on pages 47, 50 and 51.

ERC GmbH  
Tel.: +49 (0)89 660 55 696

## PROPERTIES OF ISMATEC TUBING:

| Type                                       | Tygon® ST<br>R-3603/R-3607  | PharMed®<br>Ismaprene  | Tygon®<br>MHLL  |
|--|---|--|---|
| <b>General description</b>                 | The inexpensive all-around tubing for general laboratory applications, and for food and beverage applications   | The ideal tubing for pharmaceutical and medical applications, and for foodstuffs   | Chemically resistant and long life tubing   |
| <b>Advantages</b>                          | <ul style="list-style-type: none"> <li>• Transparent</li> <li>• Resistant to almost all inorganic chemicals</li> <li>• Tasteless</li> <li>• Appropriate for food and beverage applications</li> <li>• Does not age</li> <li>• High dielectric constant</li> <li>• Low gas permeability</li> <li>• Smooth inner surface</li> </ul> | <ul style="list-style-type: none"> <li>• Ideal for cell and tissue cultures</li> <li>• Very long service life</li> <li>• Non-toxic and non-hemolytic</li> <li>• Impermeable to normal light and UV-radiation</li> <li>• Low gas permeability</li> <li>• Appropriate for medical products and food and beverage applications</li> </ul> | <ul style="list-style-type: none"> <li>• Plasticizer-free</li> <li>• Smooth inner bore</li> <li>• Low sorption maintains fluid integrity</li> <li>• Minimal adhesion and diffusion</li> <li>• Long life tubing</li> </ul> |
| <b>Limitations</b>                         | <ul style="list-style-type: none"> <li>• Short service life</li> <li>• Potential leaching of plasticizers</li> </ul>  | <ul style="list-style-type: none"> <li>• Potential leaching of additives (lubricants)</li> </ul>   | <ul style="list-style-type: none"> <li>• Cannot be repeatedly sterilized</li> <li>• Only available as stopper tubing</li> </ul>   |
| <b>Physical properties</b>                 | Thermoplastic PVC-based material with plasticizer   | Thermoplastic Elastomer based on polypropylene   | Special thermoplastic of high purity  |
|  | <ul style="list-style-type: none"> <li>• Flexible, firm, transparent</li> </ul>   | <ul style="list-style-type: none"> <li>• Firm, opaque, beige color</li> </ul>  | <ul style="list-style-type: none"> <li>• Without additives</li> <li>• Without plasticizer</li> <li>• Environmental-friendly disposal</li> <li>• Flexible, firm, opaque</li> </ul>   |
| <b>Service temperature range</b>           | -50°C to +74°C (-58°F to +165°F)  | -60°C to +135°C (-75°F to +275°F)  | -70°C to +74°C (-94°F to +165°F)  |
| <b>Chemical Resistance<sup>1,4</sup></b>   |   |  |   |
| <b>Acids (H<sub>2</sub>SO<sub>4</sub>)</b> | 10%<br>30%<br>95–98%  | 10<br>10<br>1  | 10<br>10<br>10  |
| <b>Bases (NaOH)</b>                        | 10–15%<br>30–40%  | 10<br>4  | 10<br>10  |
| <b>Hydrocarbons (aliphatic)</b>            | 1   | 1  | 1   |
| <b>Mineral salts</b>                       | 10  | 10   | 10  |
| <b>Alcohols</b>                            | 1   | 10   | 10  |
| <b>Ketones (Acetone)</b>                   | 1   | 1  | 7   |
| <b>Applications</b>                        | pressure fair<br>vacuum good<br>viscous media excellent<br>sterile media limited  | not recommended<br>excellent<br>good<br>excellent  | not recommended<br>good<br>good<br>good   |
| <b>Standards compliance</b>                | FDA 21CFR175.300  | <ul style="list-style-type: none"> <li>• USP Class VI</li> <li>• FDA 21 CFR, 177.2600</li> <li>• NSF listed (Standard 51)</li> </ul>   | <ul style="list-style-type: none"> <li>• USP Class VI</li> <li>• FDA 21 CFR, 177.2600</li> </ul>  |
| <b>Sterilization</b>                       | Steam autoclavable and sterilizable with ethylene oxide. Coil loosely in non-linting cloth or paper; autoclave at 121°C (250°F), 1 kg/cm <sup>2</sup> (15 psi) for 30 min. (tubing will appear milky); air dry at max. 66°C (150°F) for 2 to 2.5 hours until clear  | Autoclavable without any effects on the service life<br><br>Caution: Use special tubing version (welded stoppers) when autoclaving 2 or 3-stop color-coded tubing  | Autoclavable for 30 min. at 1 bar (15 psi), 121°C (250°F)<br><br>Radiation: Irradiate at up to 2.5 MRad<br>Gas: ethylene oxide<br><br>Caution: cannot be repeatedly sterilized  |
| <b>Gas permeability<sup>2</sup></b>        | CO <sub>2</sub> 360<br>O <sub>2</sub> 80<br>N <sub>2</sub> 40   | 1200<br>200<br>80  | ca. 4900<br>ca. 1000<br>ca. 350   |
| <b>Odor and Taste</b>                      | none  | low  | n.a.  |
| <b>Toxicity</b>                            | non-toxic   | non-toxic  | n.a.  |
| <b>Tubing life<sup>3</sup></b>             | at 0 bar 35 hrs.<br>at 0.7 bar 30 hrs.  | 1000 + hrs.<br>1000 hrs.   | 800 + hrs.<br>800 + hrs.  |

<sup>1</sup> Rating: Scale of 1 – 10 — 1 not recommended; 10 excellent

<sup>2</sup> Gas permeability = volume of gas (cc) x wall thickness (mm) / area of tubing i.d. (cm<sup>2</sup>) x time (sec) x pressure drop across tubing wall (cmHg) x 10<sup>-10</sup>

<sup>3</sup> Tubing 6.4 mm ID, 1.6 mm wall, 3 roller pump head, 600 rpm, 23°C, service life ending with rupture (Ismatec tubing pumps run about 11 rpm – 500 rpm)

<sup>4</sup> For chemical compatibility please visit the "Support" section at [www.idex-hs.com](http://www.idex-hs.com) and click on "Ismatec"

2-STOP TUBING FOR CA CASSETTES



| Tygon® ST<br>R-3603/R-3607 |                   |           | PharMed®<br>Ismaprene |           | Tygon MHLL<br>(for aggressive media) |      | Tubing ID<br>(mm)                  | Color Code     | Low Flow (page 143) |                      |        |       |
|----------------------------|-------------------|-----------|-----------------------|-----------|--------------------------------------|------|------------------------------------|----------------|---------------------|----------------------|--------|-------|
| Order No.                  | Qty. <sup>1</sup> | Order No. | Qty. <sup>1</sup>     | Order No. | Qty. <sup>2</sup>                    | Pump |                                    |                | Std. Speed<br>(IPC) | Low Speed<br>(IPC-N) |        |       |
|                            |                   |           |                       |           |                                      |      | Channels                           | 4, 8, 12 or 24 |                     | 4, 8, 12, or 24      |        |       |
|                            |                   |           |                       |           |                                      |      | Rollers                            | 8              |                     | 8                    |        |       |
|                            |                   |           |                       |           |                                      |      | Speed (rpm)                        | 0.45           | 45.0                | 0.11                 | 11.25  |       |
|                            |                   |           |                       |           |                                      |      | mL/min <sup>5</sup><br>per channel | Min.           | Max.                | Min.                 | Max.   |       |
| SC0188                     | 12-pk             | —         | —                     | —         | —                                    | —    | 0.13 <sup>3</sup>                  | Orange-Black   | 0.002               | 0.15                 | 0.0004 | 0.039 |
| SC0001                     | 12-pk             | —         | —                     | —         | —                                    | —    | 0.19 <sup>3</sup>                  | Orange-Red     | 0.003               | 0.26                 | 0.0007 | 0.066 |
| SC0002                     | 12-pk             | SC0320    | 6-pk                  | —         | —                                    | —    | 0.25 <sup>3</sup>                  | Orange-Blue    | 0.005               | 0.41                 | 0.001  | 0.10  |
| SC0005                     | 12-pk             | SC0322    | 6-pk                  | —         | —                                    | —    | 0.51 <sup>3</sup>                  | Orange-Yellow  | 0.015               | 1.5                  | 0.004  | 0.38  |
| SC0008                     | 12-pk             | SC0324    | 6-pk                  | SC0717    | 6-pk                                 | —    | 0.76 <sup>4</sup>                  | Black-Black    | 0.032               | 3.2                  | 0.009  | 0.81  |
| SC0011                     | 12-pk             | SC0326    | 6-pk                  | —         | —                                    | —    | 1.02 <sup>4</sup>                  | White-White    | 0.057               | 5.7                  | 0.014  | 1.4   |
| SC0014                     | 12-pk             | —         | —                     | —         | —                                    | —    | 1.22 <sup>4</sup>                  | Red-Grey       | 0.079               | 7.9                  | 0.020  | 2.0   |
| SC0017                     | 12-pk             | SC0330    | 6-pk                  | SC0719    | 6-pk                                 | —    | 1.52 <sup>4</sup>                  | Yellow-Blue    | 0.12                | 12                   | 0.030  | 3.0   |
| SC0020                     | 12-pk             | SC0332    | 6-pk                  | —         | —                                    | —    | 1.85 <sup>4</sup>                  | Green-Green    | 0.17                | 17                   | 0.043  | 4.3   |
| SC0023                     | 12-pk             | SC0335    | 6-pk                  | —         | —                                    | —    | 2.54 <sup>4</sup>                  | Purple-Orange  | 0.30                | 30                   | 0.075  | 7.5   |
| SC0024                     | 12-pk             | SC0336    | 6-pk                  | SC0721    | 6-pk                                 | —    | 2.79 <sup>4</sup>                  | Purple-White   | 0.35                | 35                   | 0.088  | 8.8   |
| SC0222                     | 12-pk             | —         | —                     | —         | —                                    | —    | 3.17 <sup>4</sup>                  | Black-White    | 0.44                | 44                   | 0.11   | 11    |

3-STOP TUBING FOR MS/CA CASSETTES



| Tygon ST<br>R-3603/R-3607 |                   |           | PharMed<br>Ismaprene |           | Tygon MHLL<br>(for aggressive media) |          | Tubing ID<br>(mm)                  | Color Code    | Pump  | REGLO (page 138)<br>Digital & Analog |       | Fixed-Speed, Rack-Mount<br>(page 139) |             |             |             |       |
|---------------------------|-------------------|-----------|----------------------|-----------|--------------------------------------|----------|------------------------------------|---------------|-------|--------------------------------------|-------|---------------------------------------|-------------|-------------|-------------|-------|
| Order No.                 | Qty. <sup>1</sup> | Order No. | Qty. <sup>6</sup>    | Order No. | Qty. <sup>7</sup>                    | Channels |                                    |               | 2     | 4                                    | 2     | 2                                     | 4           | 4           |             |       |
|                           |                   |           |                      |           |                                      |          | Rollers                            | 8             | 8     | 8                                    | 8     | 8                                     | 8           |             |             |       |
|                           |                   |           |                      |           |                                      |          | Speed (rpm)                        | 1.6           | 160   | 1.0                                  | 100   | 20                                    | 60          | 20          | 40          |       |
|                           |                   |           |                      |           |                                      |          | mL/min <sup>5</sup><br>per channel | Min.          | Max.  | Min.                                 | Max.  | Fixed Speed                           | Fixed Speed | Fixed Speed | Fixed Speed |       |
| SC0189                    | 12-pk             | —         | —                    | —         | —                                    | —        | 0.13 <sup>3</sup>                  | Orange-Black  | 0.002 | 0.17                                 | 0.002 | 0.11                                  | 0.021       | 0.064       | 0.021       | 0.043 |
| SC0049                    | 12-pk             | —         | —                    | —         | —                                    | —        | 0.19 <sup>3</sup>                  | Orange-Red    | 0.004 | 0.37                                 | 0.003 | 0.23                                  | —           | —           | —           | —     |
| SC0050                    | 12-pk             | SC0303    | 6-pk                 | —         | —                                    | —        | 0.25 <sup>3</sup>                  | Orange-Blue   | 0.007 | 0.65                                 | 0.005 | 0.41                                  | 0.08        | 0.24        | 0.08        | 0.16  |
| SC0053                    | 12-pk             | SC0305    | 6-pk                 | —         | —                                    | —        | 0.51 <sup>3</sup>                  | Orange-Yellow | 0.027 | 2.7                                  | 0.017 | 1.7                                   | 0.34        | 1.0         | 0.34        | 0.67  |
| SC0056                    | 12-pk             | SC0307    | 6-pk                 | SC0711*   | 6-pk                                 | —        | 0.76 <sup>4</sup>                  | Black-Black   | 0.058 | 5.8                                  | 0.036 | 3.6                                   | 0.73        | 2.2         | 0.73        | 1.5   |
| SC0059                    | 12-pk             | SC0309    | 6-pk                 | —         | —                                    | —        | 1.02 <sup>4</sup>                  | White-White   | 0.10  | 10                                   | 0.063 | 6.3                                   | 1.3         | 3.8         | 1.3         | 2.5   |
| SC0062                    | 12-pk             | —         | —                    | —         | —                                    | —        | 1.22 <sup>4</sup>                  | Red-Grey      | 0.14  | 14                                   | 0.088 | 8.8                                   | 1.8         | 5.3         | 1.8         | 3.5   |
| SC0065                    | 12-pk             | SC0313    | 6-pk                 | SC0713*   | 6-pk                                 | —        | 1.52 <sup>4</sup>                  | Yellow-Blue   | 0.20  | 20                                   | 0.13  | 13                                    | 2.6         | 7.7         | 2.6         | 5.1   |
| SC0068                    | 12-pk             | SC0315    | 6-pk                 | —         | —                                    | —        | 1.85 <sup>4</sup>                  | Green-Green   | 0.28  | 28                                   | 0.17  | 17                                    | 3.5         | 10          | 3.5         | 7.0   |
| SC0071                    | 12-pk             | SC0318    | 6-pk                 | —         | —                                    | —        | 2.54 <sup>4</sup>                  | Purple-Orange | 0.44  | 44                                   | 0.27  | 27                                    | 5.5         | 16          | 5.5         | 11    |
| SC0072                    | 12-pk             | SC0319    | 6-pk                 | SC0715*   | 6-pk                                 | —        | 2.79 <sup>4</sup>                  | Purple-White  | 0.50  | 50                                   | 0.31  | 31                                    | —           | —           | —           | —     |
| SC0224                    | 12-pk             | —         | —                    | —         | —                                    | —        | 3.17 <sup>4</sup>                  | Black-White   | 0.57  | 57                                   | 0.35  | 35                                    | 7.1         | 21          | 7.1         | 14    |

EXTENSION TUBING FOR 2- AND 3-STOP TUBING

| Tygon ST<br>R-3603/R-3607 |      | PharMed<br>Ismaprene |      | Tubing ID<br>(mm) |
|---------------------------|------|----------------------|------|-------------------|
| Order No.                 | Qty. | Order No.            | Qty. |                   |
| SC0226                    | 10 m | —                    | —    | 0.13 <sup>3</sup> |
| SC0025                    | 10 m | —                    | —    | 0.19 <sup>3</sup> |
| SC0026                    | 10 m | SC0337               | 3 m  | 0.25 <sup>3</sup> |
| SC0029                    | 10 m | SC0339               | 3 m  | 0.51 <sup>3</sup> |
| SC0032                    | 10 m | SC0341               | 3 m  | 0.76 <sup>3</sup> |
| SC0035                    | 10 m | SC0343               | 3 m  | 1.02 <sup>4</sup> |
| SC0038                    | 10 m | —                    | —    | 1.22 <sup>4</sup> |
| SC0041                    | 10 m | SC0347               | 3 m  | 1.52 <sup>4</sup> |
| SC0044                    | 10 m | SC0349               | 3 m  | 1.85 <sup>4</sup> |
| SC0047                    | 10 m | SC0352               | 3 m  | 2.54 <sup>4</sup> |
| SC0048                    | 10 m | SC0353               | 3 m  | 2.79 <sup>4</sup> |
| SC0223                    | 10 m | —                    | —    | 3.17 <sup>4</sup> |

STANDARD (NO-STOP) TUBING

| Tygon ST<br>R-3603/R-3607 |      | PharMed<br>Ismaprene |       | Tubing ID<br>(mm)   | Single-Channel (page 146) |                           |      |                          |
|---------------------------|------|----------------------|-------|---------------------|---------------------------|---------------------------|------|--------------------------|
| Order No.                 | Qty. | Order No.            | Qty.  |                     | Pump                      | REGLO Quick<br>(page 140) |      | Ecofluidic<br>(page 140) |
|                           |      |                      |       | Channels            | 1                         |                           | 1    |                          |
|                           |      |                      |       | Rollers             | 4                         |                           | 3    |                          |
|                           |      |                      |       | Speed (rpm)         | 3.2                       | 160                       | 80   | 670                      |
|                           |      |                      |       | mL/min <sup>5</sup> | Min.                      | Max.                      | Min. | Max.                     |
| MF0030                    | 15 m | MF0012               | 7.5 m | 3.2 <sup>7</sup>    | 2.1                       | 103                       | 100  | 750                      |
| SC0379                    | 15 m | MF0011               | 7.5 m | 4.8 <sup>7</sup>    | 4.6                       | 230                       | 210  | 1450                     |
| MF0031                    | 15 m | MF0013               | 7.5 m | 6.4 <sup>7</sup>    | 360 2500                  |                           |      |                          |
| MF0032                    | 15 m | MF0014               | 7.5 m | 8 <sup>7</sup>      | 550 3800                  |                           |      |                          |

<sup>1</sup> Each piece of tubing in the pack is 400 mm in length.

<sup>2</sup> Each piece of tubing in the pack is 381 mm in length.

<sup>3</sup> Tubing wall thickness is 0.91 mm.

<sup>4</sup> Tubing wall thickness is 0.86 mm, except Tygon MHLL tubing, which are 0.91 mm.

<sup>5</sup> Approximate values, determined with Tygon tubing and water at 23°C, with no differential pressure.

<sup>6</sup> Each piece of tubing in the pack is 300 mm in length.

<sup>7</sup> Tubing wall thickness is 1.6 mm.

\* These tubes are only equipped with 2 stoppers.

Distributor: