



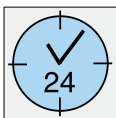
Rotary Piston Pumps

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



3



Safe and easy to use

- Developed for continuous duty, 24 hrs./day, 7 days/week
- Positive displacement
- No valves to clog
- Precision better than $\pm 1\%$
- 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
<ul style="list-style-type: none"> - Biotechnology - Chemistry - Industry - Electronic - Food and Dairy - Perfume/Cosmetics - Rubber/Plastics - Glass / Ceramic - Pulp and Paper - Medical 	<ul style="list-style-type: none"> - Accurate dispensing e.g. into bioreactors - Emulsion and slurry dosing - Medical diagnostics production - Milk and beverage enrichment - Plating bath replenishment - Titration equipment 	<ul style="list-style-type: none"> - 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 $\pm 1\%$
- 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

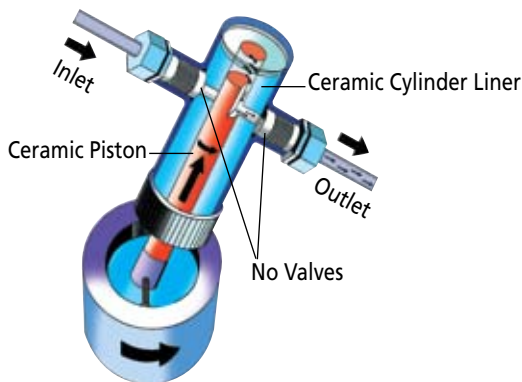
For accurate metering and mixing of paint and pigment additives, catalyst for foundry resins, plating bath regeneration, petroleum additives, photo chemicals, inks, monomers and adhesives.

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.



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.



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

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 ProgEdit 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

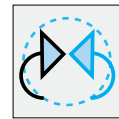
(You'll find dispensing rotary piston pumps on pages 53, 56)

- 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)

3



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	rpm, resolution 0.1rpm
Flow rate setting	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



Rotation direction reversible



REGLO-CPF *Digital*
6-button membrane key-pad, LED display
Flow rate setting in $\mu\text{l}/\text{min}$ and ml/min



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



Dispensing and calibrating
function see Page 51

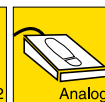
REGLO-CPF *Digital*
with dispensing functions
0.1–180 ml/min
Microprocessor controlled

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



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 <i>Analog</i>	ISM 1014	0.045 – 180	1	18 to 1800
REGLO-CPF <i>Digital</i>	ISM 321	0.1 – 180	1	40 to 1800
Foot switch				
REGLO-CPF <i>Analog</i>	ISM 891	see Page 61		
REGLO-CPF <i>Digital</i>	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)



3

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	RH00.CKC-LF	RH00.SKY-LF	RH00.STY-LF	RH00.CTC-LF
Order No.	FMI 009	FMI 010	FMI 011	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 1/4"-28 (female)	Kynar UNF 1/4"-28 (female)	UNF 1/4"-28 (female)	UNF 1/4"-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 1/4"-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 1/4"-28 ferrule fittings	FMI 053
5 H476K for tubing with 3.2 mm o.d.	FMI 054

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 1/4"–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 1/4"–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 1/4"–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 1/4"–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

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- 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

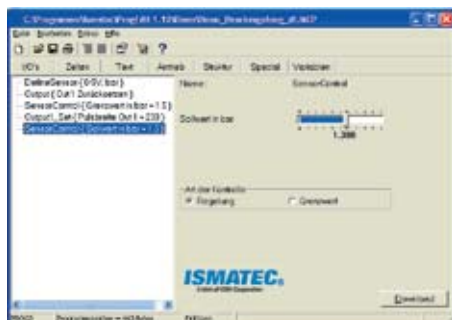
Motor type	DC motor
Speed	10.0 to 1800 rpm
Speed setting	rpm, resolution 0.1 rpm
Flow rate setting	µl/min, ml/min, liters/min
Power consumption	100 W
Mains connection	100 – 230 V _{AC} / 50 – 60 Hz
Protection rating	IP 65
Depth/Width/Height	220 x 155 x 260 mm (without pump-head)
Weight	6.9 kg (without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

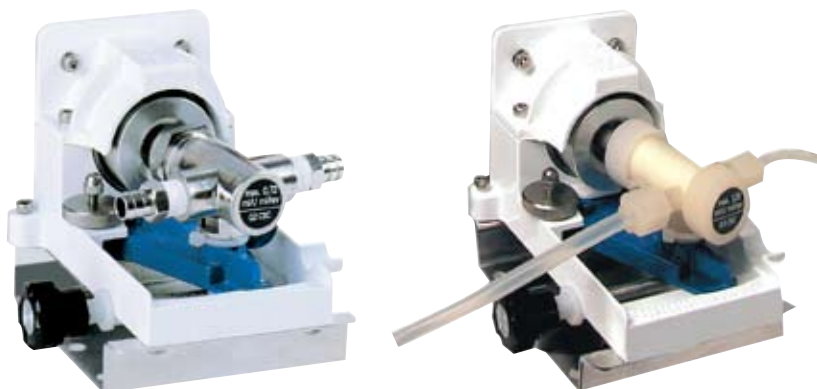


Software ProgEdit
LabVIEW drivers
Free download on
www.ismatec.com



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

Type	Flow rates ml/min	Stroke volumes 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 ml/min	Stroke volumes 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

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



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	1/4 NPT (female) <u>Included:</u> 2 stainless steel adaptors with thread 1/4 NPT (male) and fitting for tubing with 6.4 mm i.d.	for tubing up to 12.7 mm i.d. <u>Included:</u> 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. <u>Included:</u> 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	Tubing Tygon ST R-3603 12.7 mm i.d. Order No. SC 0382	Tubing Tygon ST R-3603 12.7 mm i.d. Order No. SC 0382
	Accessories Low Flow Kit R 479 (see below) Order No. FMI 056	PTFE Tubing 4 mm i.d. / 6 mm o.d., 3.6 m long Order No. MF 0336	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 1/4-28 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 1/4-28 (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

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 Order No.	QP Q1.CSC FMI 205	QP Q2.CSC FMI 212	QP Q1.CSC-W FMI 320	QP Q2.CSC-W FMI 321	QP Q1.CSC-WT FMI 219	QP Q2.CSC-WT 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		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	
Cylinder liner	Ceramic		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.		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.	
Lip seals	Rulon® AR		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)	
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.					
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					

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'/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'/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)

