FLUID METERING, INC.




Valveless Metering Pumps & Dispensers





ACCURACY + PRECISION = FMI PUMPS

Solutions for...

- Analytical
- Laboratory
- Process
- Industrial
- Instrumentation
- Medical
- OEM

2012 Catalog

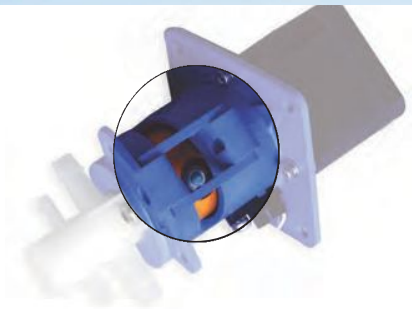
www.fmipump.com / 800-223-3388

What's New at FMI?

"STH" 200 ul Pump
See page 21

Precision Dispensing up to 200 ul. Ideal for reagent dispensing on clinical chemistry instrumentation.

"STF" Economical Fixed Displacement Pump
See page 21



Used extensively to recirculate dialysate in hemodialysis equipment.

"STH-W" Isolation Gland "H" Pump
See page 21

Precision dispensing and metering of saline, crystalizing fluids, & slurries.

"Tri-Clamp" Sanitary Pump Head
See page 25

Industry standard "quick-connect" sanitary flange. Ideal for food beverage and pharmaceutical process applications.

"Q1CV" & "Q2CV" PVC Pump Heads
See page 25

Offers superior chemical resistance for metering water treatment chemicals at elevated pressures.

200 PSI "Q1" Pump Head
See page 25

Significantly extends the operating pressure. Ideal for medium pressure liquid chromatography.

Programmable Dispensing "PDS100"

Valveless, Programmable, Dispensing & Metering System

The PDS100 uses precision stepper motors to control a variety of FMI's patented valveless piston pumps.

- All models feature FMI's Patented CeramPump® No-Valve Fluid Control Technology.
- Pump heads are integrally mounted to control unit, which includes precision stepper motors, drivers and programmable electronics housed in a rugged, anodized, aluminum enclosure.
- Intuitive menu-driven programming uses front panel membrane switches with 2.75" x 1.5" LCD display.
- Available in single and dual pump head configurations in all FMI pump head sizes.
- Dual pump head configurations can be programmed for independent pump control.
- Universal Power Input accepts 100-240 VAC 50/60 Hz.

CE cULus

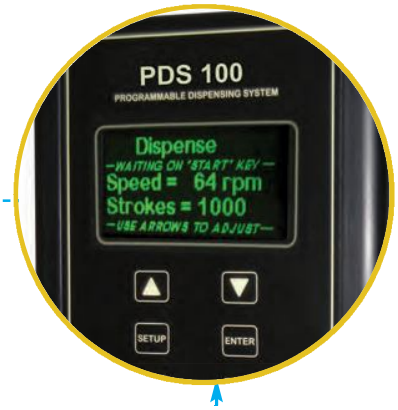
PDS100

Dimensions:
7 1/4" x 5 1/8" x 6 1/4" wide
(182 x 128 x 159 mm)

Electrical:
RS485, 4-20mA, 0-10V, 0-5V interface for connection to process sensors, PLC and PC controllers.

Shipping weight :
7.5 lb. (3.41 kg)

Selectable RS485
4-20 mA, 0-5 VDC,
& 0-10 VDC input
for automatic
control.



LCD Menu Display

	Displacement per Rev.		Flow per Minute		
Piston Size Code	Minimum	Maximum	Minimum[1]	Maximum[2]	Pressure (psig) Maximum
RH00	1.25 µl	0.025 ml	7.5 µl	18.75 ml	100
RH0	2.5 µl	0.05 ml	15 µl	37.5 ml	100
Q0	4.0 µl	0.08 ml	24 µl	48 ml	40
RH1	5.0 µl	0.1 ml	30 µl	75 ml	100
Q1	16.00 µl	0.32 ml	96 µl	192 ml	40
Q2	36.00 µl	0.72 ml	216 µl	432 ml	20
Q3	64.00 µl	1.28 ml	384 µl	768 ml	10

1) Minimum Flow Rates for RH and Q Pump Heads calculated at 6 RPM.
2) Maximum Flow Rates for RH Pump Heads calculated at 750 RPM.
Maximum Flow Rates for Q Pump Heads calculated at 600 RPM.

Note: All Dispense and Flow Rates based on single pump head.

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

"V" Variable Speed

Variable Flow Rate to 2300 ml/min

"V300" Variable Speed Controller

QV, QVG50, RHV and Q2V Pump Drive Modules

- Selectable 4-20 mA, 0-5 VDC, & 0-10 VDC Input for automatic control.
- Membrane Switches for manual Flow Rate settings and Start / Stop functions.
- Start, Stop & Reverse Flow while maintaining flow settings.
- Large 3 Digit LCD Flow Display.
- Universal Power Input accepts 100-240 VAC 50/60 Hz.
- Rugged, Anodized Aluminum Enclosure designed for both bench-top & wall mounting.

Dimensions: 7 1/4" x 5 1/8" x 6 1/4" wide
182 mm x 128 x 159 mm

V300

Selectable 4-20 mA, 0-5 VDC, & 0-10 VDC input for automatic control for QV, QVG50, RHV & Q2V Pump Drive Modules.

Digital LCD Flow Display

RATIO:MATIC®

Proportional Dual Head Pump Drive Module

Q2V

Dimensions :
15" x 4 7/8" x 5 1/8"wide
(381 x 124 x 130 mm)

Shipping weight:
Q2V: 15 lb (6.75 kg)
V300: 5 lb (2.25 kg)

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

*See page 31 "Pump Head Materials Configuration" for additional information.

Variable Speed "V"

Ideal for Automated Process Control

- Adjustable from 90 to 1800 strokes per minute for the **QV,** and 5 to 50 strokes per minute for the **QVG50.**
- **Q2V Ratio-Matic®** duplex for proportional metering using a single drive.
- **Q2V Ratio-Matic®** duplex reduces pulsation by 50%
- Quick connect to V300 Controller (included).

Best Value! Most Versatile!

	Drive	+	Pump Head	=	Complete Pump
Example:	QVG50	+	Q3CKC	=	

QV/QVG50/Q2V PDM (Includes V300)

MAX. Flow/Pressure				PDM	Piston Code
ML/MIN	GAL/HR	PSIG	BAR		
1.25	.019	100	6.90	QVG50	RH00
2.50	.039				RH0
4.00	.063				Q0
5.00	.079				RH1
16.00	.252				Q1
36.00	.568				Q2
64.00	.998	25	1.72		Q3
45.00	.71	100	6.90	QV	RH00
90.00	1.4				RH0
144	2.2				Q0
180	2.8				RH1
576*	9.1			Q2V	Q1
1296*	20.4	50	3.45		Q2
2304*	35.9	25	1.72		Q3

*See Page 33 for General Specification notes

Drive Options
Dial Indicator (pg.29)
Part Number: **- Q485**
Mounting Base (pg.8)
Part Number: **- MB**

Call Us. We Have The Answers.

QV/QVG50

QV
Motor Electrical: 1800 RPM, TENV.

Dimensions:
10" x 4 5/8" x 4 7/8" wide
(254 x 117 x 124 mm)

Shipping weight:
QV : 10 lb (4.5 kg)
V300: 5 lb (2.25 kg)

QVG50
Motor Electrical: 50 RPM, TENV.

Dimensions:
11" x 5" x 5 3/4" wide
(279 x 127 x146 mm)

Shipping weight:
15 lb (6.75 kg)

Low Flow "RHV" (0-180 ml/min)

- No Valves to clog, hang up or service.
- Ceramic and PVDF standard wetted materials - Tefzel available.
- One moving part - piston.
- Accuracy better than ± 1 % = Drift Free Operation.
- Drift-free flow ranges up to 180 ml/min, pressures from -10 to 100 psig.
- Easy grip flow control ring graduated in 450 divisions.
- Instant adjustment of flow while running.
- Adjustable from 90 to 1800 strokes per minute.
- Quick connect to V300 Controller (included).

RHV Pumps (Includes V300)

MAX. Flow/Pressure			Complete Pump	Wetted Parts	MAX. Fluid Temp
ML/MIN	PSIG	BAR			
45	100	6.90	RHV00SKY	316 SS/PVDF/Carbon	140° F
90			RHV0CKC	Ceramic / PVDF	212° F
180			RHV1CKC		
45			RHV00CTC	Ceramic / Tefzel	212° F
90			RHV0CTC	Ceramic / Tefzel	212° F
180			RHV1CTC		

RHV

Dimensions:
8" x 3"x 3" wide
(181 x 76 x 76 mm)

Shipping weight:
RHV: 7 lb (3.15 kg)
V300: 5 lb (2.25 kg)

Electrical:
1800 RPM, TENV.

"QP" Motorless Pedestal

High Flow - Rugged Duty

- No Valves to clog, hang up or service.
- One Moving Part - Piston.
- Drift-Free accuracy of better than ± 1 %.
- Ideal for OEM applications up to 1800 RPM.
- Used extensively in laboratory, industrial, and OEM applications for both dispensing & metering up to 2300 ml/min continuous flow.
- Typically driven by belt, chain or shaft coupling connected to your special motor drive, e.g. air, hydraulic, stepper, etc.
- Minimal torque requirement of 35 inch ounces.

	Drive	+	Pump Head	=	Complete Pump
Example:	QP	+	Q1CKC	=	

QP

Model QP with CKC PHM

Dimensions:
6 3/8" x 4 3/8 x 5 1/8"
(162 x 111 x 130 mm)

Shaft extension:
5/16" dia. x 1 3/16"
(8 mm dia. x 30 mm)

Shipping weight:
5 lb. (2.25 kg)

Q485 Dial Indicator for ultra fine flow adjustment (pg 29 for more info)

Rotational Sensors
See (pg 26 for more info)

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

QP PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure			PDM	Piston Code
ML/Rev.	PSIG	BAR		
.025	100	6.90	QP	RH00
.05				RH0
.08				Q0
.10				RH1
.32				Q1
.72				Q2
1.28	25	1.72		Q3

Drive Options

Dial Indicator (pg. 29)
Part Number: **- Q485**

P56C Face Adapter (pg. 27)
Part Number: **- P56C**

Masterflex Adapter (pg. 27)
Part Number: **- QP/M**

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

*See page 31 "Pump Head Materials Configuration" for additional information.

Miniature Motorless "RH"

Low Flow - High Precision

- Ceramic and PVDF standard wetted materials - also available in Tefzel.
- 0 to100 microliters per stroke.
- Precision stroke to stroke = 0.5% or better.
- Pressures from -10 to 100 psig.
- Needs only 17 inch ounces of torque.
- Requires only 2 1/4" panel space.
- Standard 1/4" O.D. tubing or 1/4-28 female.
- Adjustable while running or at rest.
- 0 to 100% stroke length adjustment for maximum flow rate flexibility.
- Easy grip flow control ring graduated in 450 divisions.
- Linear speed vs. flow rate from 0 to 3600 RPM (360 ml/min).
- Standard and low flow configurations.

FMI Lab Pump Jr

Actual Size

RH-LF

RH-LF features integrally molded ¼-28 female low dead volume ports. This allows for quick connections to 1/16" & 1/8" O.D. micro bore tubing and fittings (FMI Q661 pg. 26).

Dimensions:
2 1/4" O.D. x 3 1/2"
(57 O.D. x 89 mm)

Shaft Extension:
5/16" dia. x 3/4" long
(8 mm dia. x 19 mm long)

Shipping weight:
2 lb (0.9 kg)

RH Pumps

MAX. Flow/Pressure			Complete Pump Assembly	Wetted Parts
ML / Stroke	PSIG	BAR		
0 - .025	100	6.90	RH00SKY	316 SS/PVDF/Carbon
0 - .025			RH00STY	316 SS /E-TFE Carbon
0 - .025			RH00CTC	Ceramic E-TFE
0 - .05			RH0CKC	Ceramic / PVDF
0 - .10			RH1CKC	Ceramic / PVDF

See page 30 & 31 for pump head codes and materials of construction.

Drive Options
Low Dead Volume Pump Head (pg. 26)
Part Number: **-LF**
Adapter for Q (PDM) (pg. 29)
Part Number: **- RH/Q**
Masterflex Adapter (pg. 29)
Part Number: **- RH/M**

"RH/Q" Adapter See page 27

Actual Size

RH

OEM version

"QD" High Speed - High Flows

For General Lab and Industrial Use

- No Valves to clog, hang up or service.
- Ceramic and fluorocarbon standard wetted materials.
- One Moving Part - Piston.
- Drift-Free accuracy better than ± 1 %.
- Flow rate infinitely adjustable from 0 to 2208 ml/min in either direction.
- Convenient multi-position tilt stand for wall or counter mounting.
- Rugged, long life, fan cooled, thermally protected, ball bearing motor.

	Drive	+	Pump Head	=	Complete Pump
Example:	QD	+	Q3CKC	=	

QD CE

Dimensions:
9 3/4"x 4 3/4" x 5 3/8"
(248 x 121 x 137mm)

Shipping weight:
10 lb (4.5 kg)

Electrical:
115 VAC, 60Hz, 1Ø, 1.25 amps, 1/25 HP, 1725 RPM, shaded 4 pole, TEFC, sparkless, thermally protected with 3 prong power cord.
"Motor is UL recognized" CE

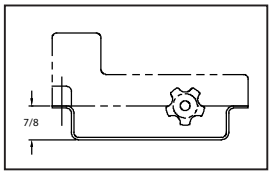
QD PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure				PDM	Piston Code
ML/MIN	GAL/HR	PSIG	BAR		
43.13	0.681			QD	RH00
86.25	1.3				RH0
138.0	2.1				Q0
172.50	2.7	100	6.9		RH1
552	8.6				Q1
1242*	18.9	50	3.45		Q2
2208*	30.0	25	1.72		Q3

*See General Specifications note (pg 33)

Drive Options
230 VAC (50/60 Hz)*
Part Number: **-2**
Mounting Base (pg.8)
Part Number: **-MB**
Dial Indicator (pg.29)
Part Number: **-Q485**
Hazardous Duty (pg.9)
Part Number: **QDX**

Q485 Dial Indicator for ultra fine flow adjustment see (pg 29) for more info



"Q" FIXED MOUNTING BASE KIT MB

Sturdy mounting base accessory for "Q" Line metering pumps. Allows pumps to be firmly bolted to surface in horizontal or vertical operating position. Hardware for attaching base to pump and instructions included.

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

*See page 31 "Pump Head Materials Configuration" for additional information.

Industrial Variable Speed Pump "IVSP"

- Flow Rates from 0 to 2300 mL/min ±1%.
- Rugged, 1/4 HP, 3 phase High Torque Motor, ideal for viscous fluids.
- Space-Saving, DIN Mount Controller ideal for process control panels.
- Local Keyboard & Remote Control.
- Remote Speed Control: 0-20 mA, 4-20 mA, 0-10 VDC.
- Multi-function I/O connector for forward, reverse, jog, emergency stop, & reset.
- Complete System includes drive motor, pump head, variable speed controller, & cables.
- All electronic components.

CE c UL us

Hazardous-Duty "X"

QDX PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure			PDM	Piston Code
ML/MIN	PSIG	BAR		
43.13	100	6.90	QDX	RH00
86.25				RH0
138				Q0
172.50				RH1
552*				Q1
1242*				Q2
2208*	25	1.72		Q3

*See General Specifications note (pg 33)

Drive Options
Dial Indicator (pg.29)
Part Number: **- Q485**

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

*See page 31 "Pump Head Materials Configuration" for additional information.

IVSP

Dimensions:
17 3/4" x 6 7/8" x 8 1/2" wide
(451 x 175 x 216 mm)

Shipping weight:
43 lb (19.35 kg)

Electrical:
Controller:

Input: 115 VAC, 1Ø, 50/60 Hz.
Output: 230 VAC, 3Ø 50/60 Hz

Speed adjustment
0 to 20 mA
4 to 20 mA
0 to 10 VDC

Motor:

230 VAC, 3Ø, 50/60 Hz.
Variable Speed, 1800 RPM max.

QDX

Fixed Speed
The **QDX** High Flow Hazardous-Duty Class I,Group D; Class II, Group E, F, G

Dimensions:
17 3/4" x 6 7/8" x 8 1/2" wide
(451 x 175 x 216 mm)

Shipping weight:
43 lb (19.35 kg)

Electrical:
115/230 VAC, 60 Hz, 1Ø, 1/3 hp, ball bearing UL. listed motor, 1725 RPM, pigtail leads for conduit connection. Motor is totally enclosed fan cooled. 6.6 amps @ 115 VAC and 3.3 amps @ 230 VAC.

"QG" Low Speed - Low Flows

For General Lab and Industrial Use

- No Valves to clog, hang up or service.
- One Moving Part - Piston.
- Drift-Free accuracy better than ± 1 %.
- Can be combined with all RH and Q Pump Head Modules.
- Flow rate infinitely adjustable from 0 to maximum in either direction.

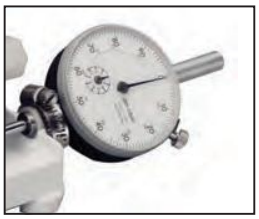
	Drive	+	Pump Head	=	Complete Pump
Example:	QG6	+	Q1CSC	=	

QG6,20 CE

Dimensions:
10 3/4" x 4 7/8" x 5 3/4" wide
(273 x 124 x 146 mm)

Shipping weight:
10 lb (4.5kg)

Electrical:
115 VAC, 60 Hz, 1Ø, 1 amp, 6, 20 RPM, shaded 2 pole, enclosed ventilated, thermally protected, with 3 prong power cord - UL,CE.



Q485 Dial Indicator for ultra fine flow adjustment (see pg 29) for more info

Rotational Sensors
(see pg 26 for more info)

Have questions?
Chat live with an FMI application specialist at **www.fmipump.com**

QG PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure				PDM	Piston Code
ML/MIN	GAL/HR	PSIG	BAR		
0.15	.002	100	6.90	QG6	RH00
0.30	.004	100	6.90		RH0
0.48	.007	20	1.38		Q0
0.60	.009	100	6.90		RH1
1.92	.030	75	5.17		Q1
4.32	.068	50	3.45		Q2
7.68	.119	25	1.72		Q3
0.50	.007	100	6.90	QG20	RH00
1.00	.015	100	6.90		RH0
1.60	.025	20	1.38		Q0
2.00	.031	100	6.90		RH1
6.40	.101	50	3.45		Q1
14.40	.227	40	2.76		Q2
25.60	.399	25	1.72		Q3

Drive Options
230 VAC (50/60 Hz)*
Part Number: **-2**
24 VAC (50/60 Hz)*
Part Number: **-3**
Mounting Base (pg.8)
Part Number: **-MB**
Dial Indicator (pg.29)
Part Number: **-Q485**

*Flow Rates are reduced approximately 18% when operating on a 50 Hz electrical supply.

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

*See page 31 "Pump Head Materials Configuration" for additional information.

Low Speed - Low Flows "QG"

For General Lab and Industrial Use

- A choice of five different drive speeds.
- Ceramic and fluorocarbon standard wetted materials.
- Long-life, fan cooled, thermally protected, ball bearing gear motors.
- Convenient multi-position tilt stand for wall or counter mounting.

QG50,150,400

Dimensions:
10 3/4" x 4 7/8" x 5 3/4"wide
(273 x 124 x 146 mm)

Shipping weight:
10 lb (4.5 kg)

Electrical:
115 VAC, 60 Hz, 1Ø, 1 amp, 50, 150, 400 RPM, shaded 2 pole, enclosed ventilated, thermally protected, with 3 prong power cord - UL, CE.

QG PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure				PDM	Piston Code
ML/MIN	GAL/HR	PSIG	BAR		
1.25	.019			QG50	RH00
2.50	.039				RH0
4.00	.063				Q0
5.00	.079	100	6.90		RH1
16.00	.252				Q1
36.00	.568				Q2
64.00	.998	25	1.72		Q3
3.75	.059			QG150	RH00
7.50	.118				RH0
12.00	.189				Q0
15.00	.237	100	6.90		RH1
48.00	.758				Q1
108.00	1.706				Q2
192.00	2.995	25	1.72		Q3
10.00	.158			QG400	RH00
20.00	.316				RH0
32.00	.505				Q0
40.00	.632	100	6.90		RH1
128.00	2.022				Q1
288.00*	4.550				Q2
512.00*	7.987	25	1.72		Q3

*See Page 33 for General Specification notes

Drive Options
230 VAC (50/60 Hz)*
Part Number: **-2**
24 VAC (50/60 Hz)*
Part Number: **-3**
Mounting Base (pg.8)
Part Number: **-MB**
Dial Indicator (pg.29)
Part Number: **-Q485**

PD-60-LF
Pulse Dampener Accessory
(see pg 29) for more info.

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

*See page 31 "Pump Head Materials Configuration" for additional information.

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

"RHB" Direct Current
Instrumentation Pumps

- 12, 24, 90 VDC motors with close-coupled RH Pump Heads.
- Widely used to inject discrete quantities of additive fluids into main discharge lines of tank trucks and pest control vehicles.
- Ideal for environmental sampling & injection.
- Offers the advantage of mechanical adjustment of stroke length, plus electrical control of stroke rate by voltage variation.
- Extended motor shaft accepts FMI HES/PRS Rotational Sensors or user supplied rotational sensor (see page 26 for more info).

RHB

Dimensions:
8" x 3" x 3" wide
(203 x 76 x 76 mm)

Shipping weight:
7 lb (3.15 kg)

Electrical:
12 VDC, 4 amps, 2600 RPM, totally enclosed, with 6" pigtail leads. Shaft extension: 5/16" dia. x 1" long with flat.

RHB Pumps

MAX. Flow/Pressure			Complete Pump Assembly	Wetted Parts	MAX. Fluid Temp
ML/MIN	PSIG	BAR			
65	100	6.90	RHB00SKY	316 SS/PVDF/Carbon	140º F
130			RHB0CKC	Ceramic / PVDF	212º F
260			RHB1CKC		

Drive Options
24 VDC (3 amps) for RHB
Part Number: **-4**
90 VDC (0.41 amps) for RHB
Part Number: **-5**

"QB" Direct Current
For Mobile, and Remote Applications

- No Valves to clog, hang up or service.
- One Moving Part - Piston.
- Drift Free accuracy better than ± 1 %.
- Offers the advantage of mechanical adjustment of stroke length, plus electrical control of stroke rate by voltage variation.
- Extended motor shaft accepts FMI HES/PRS Rotational Sensors or user supplied rotational sensor (see page 26 for more info).

QB

QB PUMPS: Rated at 1800 RPM (or approximately 8 volts for 12 VDC models.)

Dimensions:
10 1/2"x 5"x 4 1/2" wide
(267 x 127 x 114 mm)

Shipping weight: 8 lb (3.6kg)

Electrical:
12 VDC, 4 amps; 24 VDC, 3 amps
90 VDC, 0.41 amps, totally enclosed with 6" pigtail leads.
Shaft extension: 5/16" dia. x 1" long with flat.

	Drive	+	Pump Head	=	Complete Pump
Example:	QB	+	Q1CKC	=	

QB PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure			PDM	Piston Code
ML/MIN	PSIG	BAR		
45	100	6.90	QB	RH00
90				RH0
144				Q0
180				RH1
576*	70	4.38		Q1
1296*	30	2.07		Q2
2304*	25	1.72		Q3

Drive Options
Dial Indicator (pg.29)
Part Number: **-Q485**
Mounting Base (pg.8)
Part Number: **-MB**
90 VDC (0.41 amps)
Part Number: -5

*See Page 33 for General Specification notes

Low Current DC "QBG"

Ideal for extended 12/24 volt battery operation in remote locations. They are rated 60 RPM at 12 VDC and 120 RPM at 24 VDC.

	Drive	+	Pump Head	=	Complete Pump
Example:	QBG	+	Q1CKC	=	

QBG PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure			PDM	Piston Code
ML/MIN	PSIG	BAR		
1.5	60	4.1	QBG	RH00
3.0				RH0
4.8				Q0
6.0				RH1
19.2	30	2.07		Q1
43.2	20	1.38		Q2
76.8	10	0.70		Q3

Note: Flow rates shown for QBG are based on 12 VDC, 60 RPM operation.

Drive Options
Dial Indicator (pg. 29)
Part Number: **-Q485**
Mounting Base (pg. 8)
Part Number: **-MB**

QBG

Dimensions:
9 3/4" x 5 1/4" x 6 3/4" wide
(246 x 135 x 171 mm)

Shipping weight:
7 lb (3.15kg)

Electrical:
12/24 VDC, 60-120 mA (depending on load), with 6" pigtail leads.

Pneumatic "PD"
For Non-Electric Operation

- Provides a compact, variable speed, air powered drive.
- Ideal power alternative when electrical power source not available.
- **SPD** up to 1800 RPM.
- **GPD** up to 400 RPM.

	Drive	+	Pump Head	=	Complete Pump
Example:	SPD	+	Q1CKC	=	

SPD PDM (PUMP DRIVE MODULE)

MAX. Flow/Pressure			PDM	Piston Code
ML/MIN	PSIG	BAR		
45	100	6.90	SPD	RH00
90				RH0
144				Q0
180				RH1
576	70			Q1
1296	50	3.45		Q2
2304	25	1.72		Q3

*See Page 33 for General Specification

Drive Options
Dial Indicator (pg. 29)
Part Number: **-Q485**
Price:
FMI Pulse Dampener (pg. 29)
Part Number: **"58003"**

SPD
GPD

Dimensions:
8" x 3" x 3" wide
(203 x 76 x 76 mm)

Specification:
SPD: Air requirements
9-10 CFM at 40 psig.
Air Inlet size: 1/8" (F) NPT.

GPD: Heavy-duty gear box
Air requirements:
14-16 CFM at 40 psig.
Air Inlet size: 1/8" (F) NPT
Shipping weight: 9 lb (4.05 kg).

Specialty Pumps

PDS100 SFSTH

Dimensions:
7 1/4" x 5 1/8" x 6 1/4" wide
182 mm x 128 x 159 mm

Electrical:
RS485, 4-20mA, 0-10V, 0-5V interface for connection to process sensors, PLC and PC controllers

Smooth-flo "PDS100" Valveless, Pulse-Free Dispensing & Metering System

The Smooth-flo PDS100 is a unique valveless dispensing and metering system which utilizes dual FMI pumps, precisely synchronized, to eliminate pulsation typically present in other piston pump designs.

- Pulse-Free fluid delivery down to 15 µl/min continuous flow.
- Precision dual stepper control, factory calibrated for your flow range.
- RS485, 4-20 mA, 0-5 V, 0-10 V electronic control interface for connection to process sensors, PLC and PC control systems.
- Rugged, anodized aluminum enclosure is suitable for wall mounting or bench top installations.
- Includes tubing, fittings, and configuration instructions for Smooth-flo operation.
- Universal Power Input accepts 100-240 VAC 50/60 Hz.

VMP OEM

Dimensions:
8.97" x 3.0" x 4.44"
(228 x 76 x 113 mm)
Shipping weight : 4 lbs

"VMP OEM" Electronic Variable Displacement & Variable Speed Dispense System

- Independently control both stroke rate and displacement volume.
- Forward, Reverse, Suck-back, & Quick Prime all adjustable.
- Up to 100 customer designed programs let you change setups on the fly for different applications.
- 3 different pump head sizes dispense volumes of 0.01 to 0.320 ml/disp , 0.05 to 0.720 ml/disp or 0.10 to 1.28 ml/disp at dispense speeds from 1 to 400 dispenses/min are achievable.
- Touch Screen Interface (TSI) provides intuitive setup of all fluid control parameters and communicates with up to 16 pump drives simultaneously.
- RS232 and RS485 interface enables simultaneous computer or PLC control of up to 128 pump modules
- FMI's Patented CeramPump® No-Valve Design.

TSI

"TSI" Touch Screen Interface

Provides quick and easy programming of VMP products and can control up to 16 individual VMP Pump drives. It is capable of programming volume, speed, dwell, number of dispenses and accommodates up to 100 customer designed programs.

Small Solutions

Synchronous Pumps "RHSY"
The Ultimate in Low Flow Metering Accuracy

- Drift-Free accuracy better than ± 1 % independent of load variations or fluctuations in line voltage.
- Compact design "RH" pump with synchronous motor assembly.
- Micrometer-like fine adjustment using an easy grip flow control ring graduated in 450 divisions.
- Choice of 150, 300, and 600 RPM through a simple and safe belt arrangement change.
- Forward-Off-Reverse switch for instant flow direction control.
- Available with low dead volume pump head and low flow tubing kit.

CE

RHSY Pumps

MAX. Flow/Rates			Complete Pump Assembly	Wetted Parts	MAX. Fluid Temp
@150 RPM ml/min	@300 RPM ml/min	@600 RPM ml/min			
3.75	7.5	15	**RHSY00SKY**	316 SS / PVDF / Carbon	140º F
7.5	15.0	30	**RHSY0CKC**	Ceramic / PVDF	212º F
15.0	30.0	60	**RHSY1CKC**		

RHSY

Dimensions:
5" x 5" x 4" wide
(127 x 127 x 102 mm)

Shipping weight:
4 lb (1.8kg)

Electrical:
115 VAC, 60 Hz, 1Ø, .08 amps, with 3 prong power cord, CE.

Drive Options
230 VAC (50Hz.,.04 amp) *
Part Number: **-2**
Price:

*Flow Rates are reduced approximately 18% when Pump Drive Module is operating on a 50 Hz electrical supply.

Precision Dispenser "PiP"
Pipetting, Syringing and Diluting

- Ideal for repetitive and volumetric dispensing of acids, solvents and aqueous solutions.
- Features FMI's unique low dead-volume pump heads, and synchronous motor drives.
- Can act as a single shot dispenser using the hand/foot switch or as a single metering pump in the continuous mode.
- Using a combination of forward and reverse modes, dilutions can easily be accomplished.

PiP

Dimensions:
5" x 5" x 4" wide
(127 x 127 x 102mm)

Shipping weight:
5 lb (2.25 kg)

Electrical:
115 VAC, 60 Hz, 1Ø, .08 amps, 150, 300, 600 RPM with 3 prong power cord.

PiP Pumps micro π-petter®

MAX. Dispense Rates	Complete Pump Assembly
Microliters / Revolution	
0 - 25 µl	**PiP00SKY**
0 - 50 µl	**PiP0CKC**
0 - 100 µl	**PiP1CKC**

+

Pump Options
Low Dead-Volume
Pump Head (pg 29)
Part Number: **-LF**

Chemical Treatment Systems

Ideal For Metering Water & Wastewater Chemicals

CT1, CT2

Dimensions:
15 1/2" x 13 3/8" x 6 3/4"

Shipping weight:
18.6 lbs. (8.4 kg.)
Electrical: 0-90 VDC

"CT1, CT2" Chemical Treatment Systems

The "CT1 & CT2" Valveless Chemical Treatment System are ideal for metering caustic soda & soda ash for pH control in municipal drinking water, as well as treatment chemicals used in municipal and industrial wastewater applications.

- No Valves or Diaphragms to Service.
- Self Priming Against 125 psi.
- No Loss of Prime…Ever!
- 1% Drift-free Accuracy – Never Need to Recalibrate.
- Ceramic Internal Components.
- Low Energy Consumption.
- Space-saving Wall Mount Design.
- Includes Protective Enclosure.
- Flows up to 15 gal/hr.

CL1, CL2

Dimensions:
15 1/2" x 13 3/8" x 6 3/4"

Shipping weight:
18.6 lbs. (8.4 kg.
Electrical: 0-90 VDC

"CL1, CL2" CHLORITROL®
Valveless Hypochlorite Injection

The Pump that Never Loses Prime!

The Chloritrol is the solution for Sodium and Calcium Hypochlorite injection. Totally new patented technology & field tested, perfect for high and low demand applications, including Ultra Low Volume.

- No Valves or Diaphragms to Service.
- No Loss of Prime... Ever!
- Ability to Prime Against 125 psi Line Pressure.
- Months of "no touch" service = fast payback.
- Low Energy Consumption.
- Space-Saving Wall Mount Design.
- Includes Protective Enclosure.

C100A

Dimensions:
5.53" W x 7.25" H x 3.5" D

Electrical:
Power Input: 120 VAC
Control Input: 4-20 mADC
Control Output: 0-90 VDC (I.R. Compensated, Current limiting)

"C100A" Variable Speed DC Controller

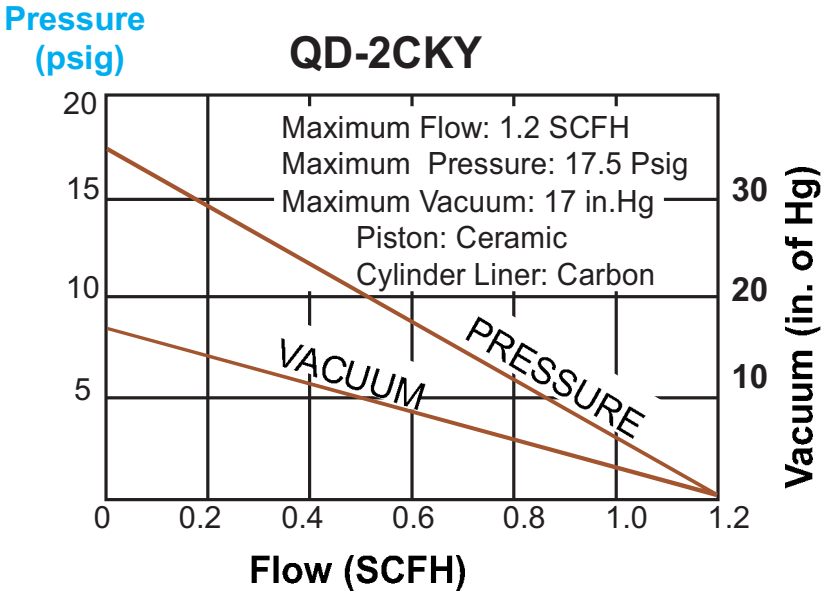
Ideal for Use with CL+ CT Systems.

- Provides 0-90 VDC power to FMI variable speed 90 VDC metering systems.
- Selectable Manual or Electronic 4-20 mA input speed Control.
- Maintains & Resumes Output Settings following power interruptions.
- Gasketed NEMA 4/12 Enclosure.

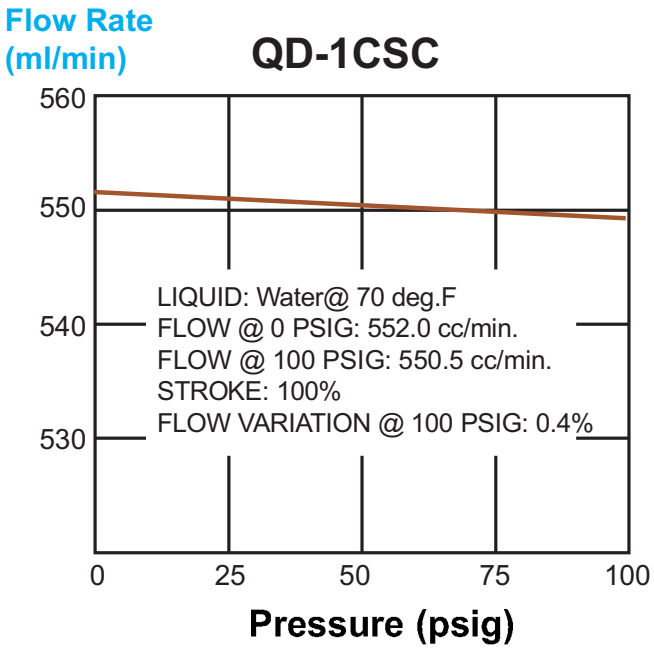
“Q” Typical Performance Curves

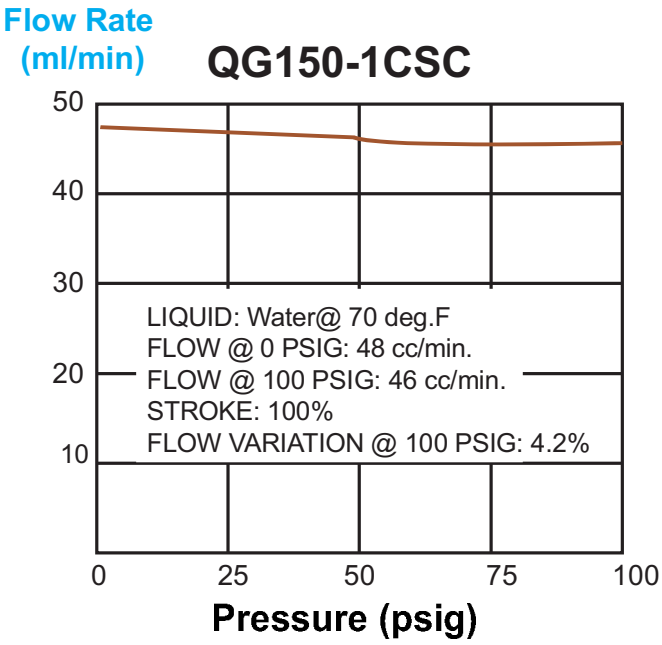
Performance curves shown below are applicable to the “Q” line of metering pumps.

Performance Curve shown represents a test run on an FMI LAB PUMP handling ambient air at 70°F with CKY Pump Head Module.



PERFORMANCE FLOW CURVES: Typical flow “curves” for FMI LAB PUMPS with “CSC” pump heads handling water at a pump setting of 100% full stroke. Internal fluid slip (decrease in flow with increased pressure) is least at 100% and increases as stroke displacement is decreased. Always select a pump with maximum output nearest your actual requirement.

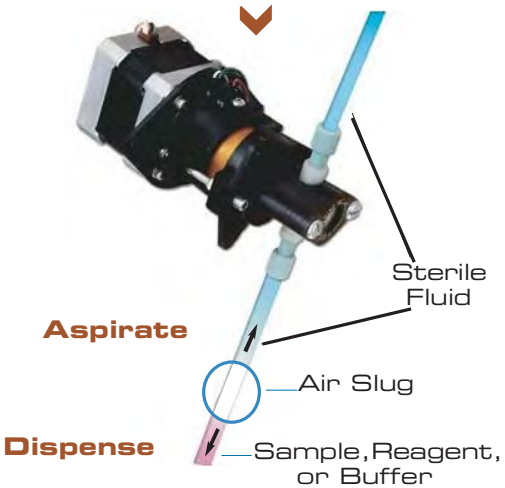




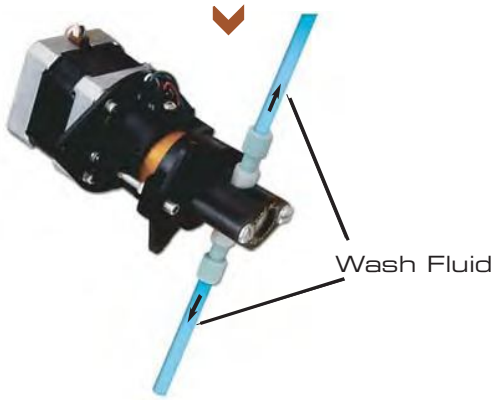
Over 50 years of pump and dispensing knowledge. Tell us your needs- we have the answers.

One OEM Dispenser / Pump
For All Your Applications

Valveless Syringing
Aspirate & Dispense

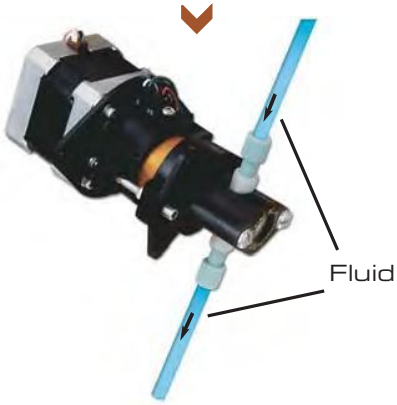


Fast Prime
Flush & Wash



Continuous Dispensing

Continuous Metering



Let us Help you make a selection

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

OEM Dispensers/Pumps

High Precision Stepper Motor Pumps for OEM Applications

- No Valves to clog, hang up or service.
- One Moving Part - Piston.
- Drift-Free accuracy better than ± 1 %.
- Precision - CV of 0.5% or better.
- Ceramic and fluorocarbon fluid path.
- Displacement of 0 to 1280 microliters (1.28 ml) per revolution.
- 1.8° stepper motors with opto sensors.
- Excellent chemical resistance.
- 6 standard models and custom models.
- Special OEM pricing available upon request.

Model as Shown with 17 frame motors

STH

Dimensions:
4 5/8" x 3 1/8" x 2 1/8" wide
(117 x 79 x 53 mm)

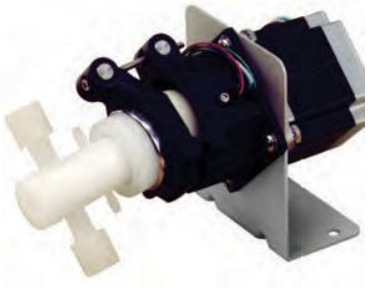
Shipping weight :
2 lb. (0.9 kg)

Low Flow "STH"

MAX. Dispense Rates Microliters / Revolution	Complete Pump Assembly	Wetted Parts
0 - 25 µl	STH00CKCLF	Ceramic PVDF
0 - 50 µl	STH0CKCLF	
0 - 100 µl	STH1CKCLF	
0 - 200 µl	STH200CKC	

High Flow "STQ"

MAX. Dispense Rates Milliliters/Revolution	Complete Pump Assembly	Wetted Parts
0 - .32 ml	STQ1CKC	Ceramic PVDF
0 - .72 ml	STQ2CKC	
0 - 1.28 ml	STQ3CKC	



STQ

Dimensions:
6 1/2" x 3 5/8" x 3 1/4" wide
(166 x 91 x 82 mm)

Shipping weight :
3 lb. (1.35 kg)

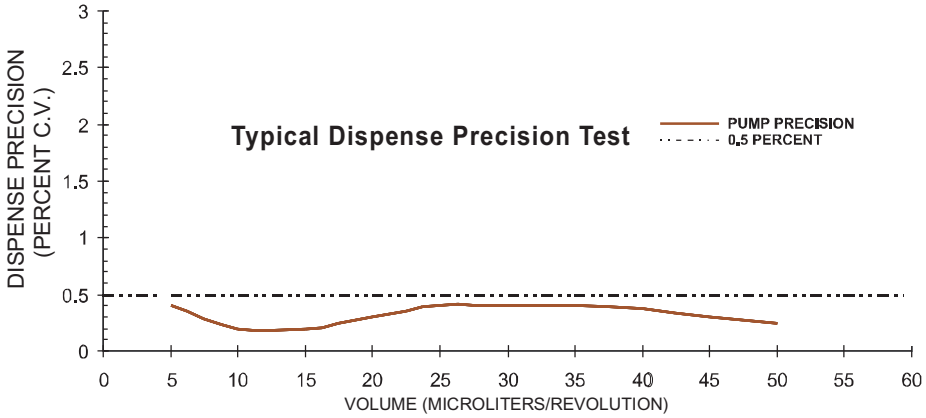
Over 50 years of OEM pump and dispensing knowledge. Tell us your needs- we have the answers!

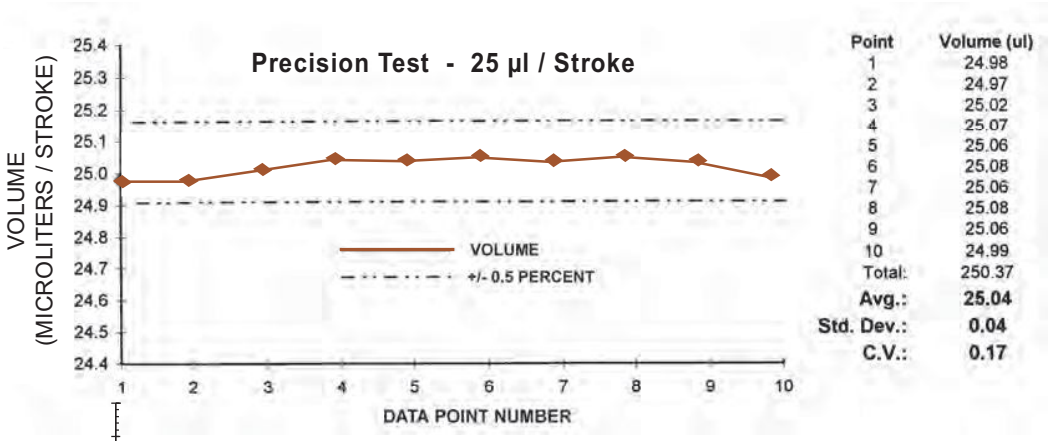
Economical Wash / Waste Pump "RO"

- Economical, fixed displacement.
- Reciprocating, Oscillating Ceramic Piston.
- Valveless, Reversible, Self Priming
- Transfer, Wash, Aspirate, Flush.
- Compact design.

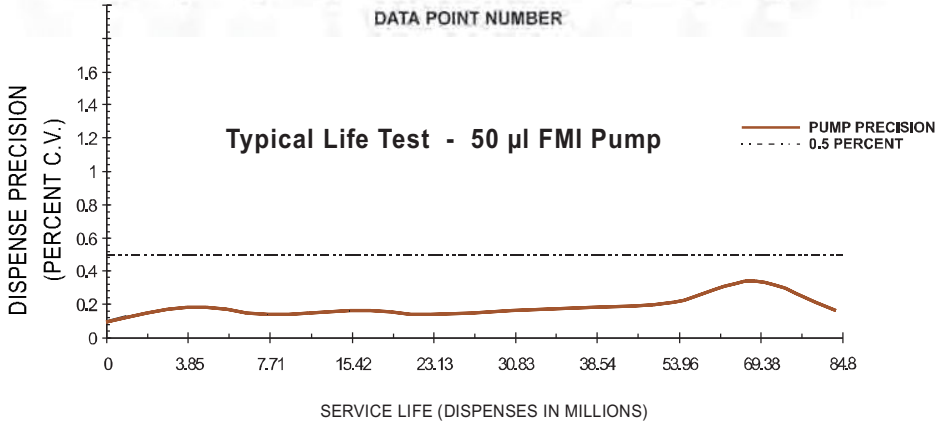
RO

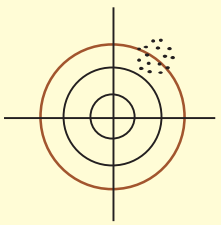
Typical Flow / Dispense Data



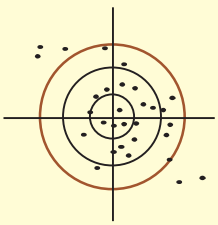


Point	Volume (ul)
1	24.98
2	24.97
3	25.02
4	25.07
5	25.06
6	25.08
7	25.06
8	25.08
9	25.06
10	24.99
Total:	250.37
Avg.:	25.04
Std. Dev.:	0.04
C.V.:	0.17

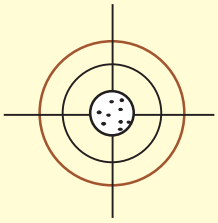




Precision
Repeatability and degree of variation of a set of values



Accuracy
How close the average value is to the true value



FMI Pumps
Accuracy: 1%
Precision: 0.5% (% C.V.)

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OEM Dispensers/Pumps

Our Newest OEM Additions

Fixed Displacement Pump "STF"

Ideal for waste, wash, and flush fluid control in medical instrumentation.

- Economical design with fixed displacement link.
- Displacement link can be customized for individual requirements.
- Precision stepper motors with opto sensors.
- Used extensively to recirculate dialysate in hemodialysis equipment.
- Available in 25µl, 50µl, 100µl, & 200µl versions
- Isolation Gland available for crystallizing fluids.

New

STF

200µl STH Pump "STH200"

Ideal for reagent dispensing in clinical chemistry applications.

- Extended dispense and flow range in a compact OEM design.
- Precision, high-torque 17 frame stepper.
- High performance, extended-life, seal configuration.

New

STH200

Isolation Gland "H" Pump

Miniature OEM Pump with Isolation gland ideal for low volume fluid control of crystal forming fluids.

- Easily handles saline, slurries, particulates and abrasives.
- Isolates main process fluid from seal area & atmosphere
- Barbed fittings provide quick connections to gland ports.

New

STH-W

Let us Help you make a selection

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

Lab-OEM-Production

"STRH" Adjustable Low Flow Stepper Pump

Ideal for Prototyping

STRH

- Meter, Dispense, Aspirate, Flush.
- Precision RH adjustable pump with stepper motor.
- Valveless, Reversible, Self priming.
- Ceramic and fluorocarbon, low dead-volume fluid path.
- Ideal for Prototyping.
- Optical Sensor.

MAX. Dispense Rates Microliters / Revolution	Complete Pump Assembly	Wetted Parts
0 - 25 µl	STRH00CKCLF	Ceramic PVDF
0 - 50 µl	STRH0CKCLF	
0 - 100 µl	STRH1CKCLF	

"STQP" Adjustable High Flow Stepper Pump

STQP

- Precision, variable displacement "Q" Pump with integral stepper motor.
- Accommodates all "Q" style pump heads and RH pump heads (with RH/Q adaptor).
- Ideal for OEM applications where accurate & frequent displacement changes are expected.
- Available in ST2QP Duplex Ratio:Matic® configurations.
- Ideal for prototyping.
- Can be driven by FMI's SCST-01, or a variety of commercially available stepper driver boards.

"SCST-01" FMI Stepper Control Kit

SCST-01

KIT SCST-01 includes: Power supply, cables and controller.

- Quick start control for all FMI stepper pumps.
- Stroke rate to 1200 RPM maximum.
- 7 dispense modes.
- 0 - 5 VDC input control.
- Automatic current reduction.
- Stall detection & restart.
- Easy hook-up.
- Small size (board only 3 1/2" x 3 1/4" x 1 1/4" high).
- Forward/reverse, dispense/aspirate function.

Over 50 years of pump and dispensing knowledge. Tell us your needs- we have the answers.

Ratio:Matic® Duplex Stepper Pumps

Low Flow Ratio:Matic® Duplex Stepper Pump "ST2RH"

Ideal for high throughput production dispensing in the manufacture of disposable medical components.

- Dual, variable displacement RH pumps with integral stepper motor.
- Each pump head is independently adjustable using easy-grip flow control ring.
- Ideal for precision low volume dispensing of solvents, adhesives, lubricants, electrolytes, and more….
- Ratio:Matic® proportional dispensing of ratios up to 100:1.

ST2RH

Low Volume Fixed Displacement Stepper Pump "ST2H"

New

Compact, dual channel fluid control ideal for OEM Medical and Analytical instrumentation.

- Fixed displacement for dual channel or proportional fluid control.
- Proportional fluid control ideal for mixing and diluting.
- Each pump head individually factory calibrated to your specifications.
- Accommodates all combinations of RH piston sizes for dispense ratios up to 100:1.

ST2H

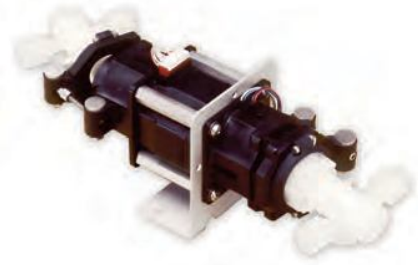
High Flow Ratio:Matic® Duplex Stepper Pump "ST2QP"

- Dual, STQ high flow pump heads for proportional metering using a single stepper motor.
- Each pump head displacement is independently field adjustable.
- Ideal for proportional, as well as dual channel dispensing and metering.
- Accommodates all combinations of "Q" pump sizes.

ST2QP

Ratio:Matic® Duplex Stepper Pump "ST2Q"

- Dual, STQ high flow fixed displacement pump heads for proportional metering using a single stepper motor.
- Each pump head displacement is factory calibrated.
- Ideal for proportional, as well as dual channel dispensing & metering.



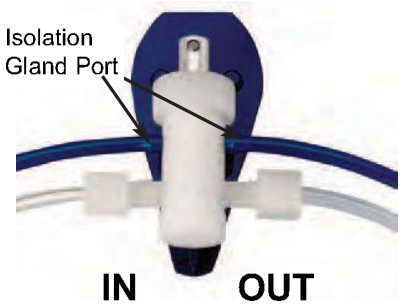
ST2Q

Options

"CSC-W" Stainless Steel

- Gland Design temperature to **350° F.**
- Pressure to 100 psig.
- Ceramic piston and liner in 316 SS case.
- Main flow 1/4" NPT female; Gland Ports: 10-32 female.

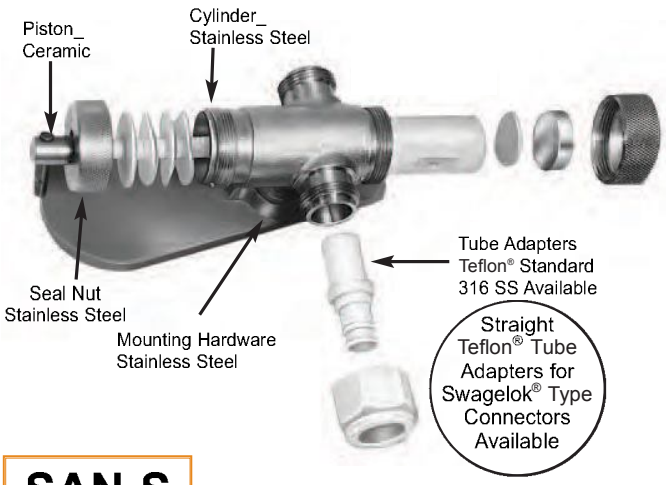
CSC-W



"W", "WT" Isolation Gland Pump Head Modules

- For saline, slurries, abrasives, particulates, anaerobics, and crystal forming fluids.
- Isolates main pumped fluid from seal area and atmosphere.
- 2 extra ports for Gland "Barrier" liquid or gas.
- For Q1/Q2CKC, Q3CKC, CKC-LF, & CSC Pump Head Modules.

CKCW



"SAN" Sanitary Pump Heads

- Ideal for accurate and dependable handling of discrete fluid streams in sanitary applications.
- No internal threads or blind holes to harbor bacterial growth.
- Easily dismantles for scrubbing, brushing, & sterilization.
- 316 SS and Teflon® fluid surfaces highly resistant to chemical & biological attack.
- Ideal for Food, Dairy, Brewery, Pharmaceutical, & Biotech applications.

SAN-S

DESIGNED FOR QUICK DISASSEMBLY FOR MAXIMUM CLEANING

ALL STAINLESS STEEL VERSION AVAILABLE WITH SS PORT NUTS, TUBE ADAPTERS & CARRIER -"SAN-S"

"Tri-Clamp" Flange kit

"Tri-Clamp" Flange Kit

for "SAN" Sanitary Pump Heads

- Easily changes barbed fittings supplied with "SAN" to "SAN-TC" type.
- Fitting size is compatible with both ½" and ¾" standard tube sizes.
- Kit consists of 316SS Tri-Clamp flange and Teflon port seal.

Options

Tri-Clamp Sanitary Pump Head “SAN-TC”

New

- “SAN” Type Sanitary Pump Heads with 316SS Tri-Clamp flange fittings.
- Tri-Clamp fittings are an industry standard for applications which require “quick-connect” fittings for easy sanitizing and/or sterilization.
- Flange will accommodate both ½” and ¾” standard tube sizes.
- Ideal for food, beverage, biotech, and pharmaceutical process applications.

SAN-TC

200 PSI “Q” Pump “Q1CSC-200”

New

- Significantly increases the operating pressure up to 200 PSI for applications requiring flow rates up to 500 mL/min.**
- Ideal for Medium Pressure Liquid Chromatography.
- New, high performance, extended-life seal configuration.

**Consult factory for drive selection.

Q1CSC-200

High Temperature “CSC-WT”

- For maintaining process fluid temperatures and pumping viscous fluids
- High temperature to 350°F
- Accepts 2 standard 1/4” x 1” cartridge heaters & thermocouple.
- Pressure to 100 psig.
- Ceramic piston and liner in 316 SS cylinder case.
- Main flow 1/4” NPT female ports; Gland Ports 1/8” NPT female.

CSC-WT

PVC Pump Head “Q1CV & Q2CV”

New

- Offers superior chemical resistance for metering concentrated water treatment chemicals.
- Extended pressure range of 125 psi.
- Wetted parts of ceramic and PVC.

Q1CV, Q2CV

Let us Help you make a selection

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

Options

Q-LF RH-LF

"LF" Pump Heads

- For low flow (under 50 ml/min), and Zero Dead Volume Applications.
- Direct connection to 1/4-28 low flow fittings.
- **RH-LF** & **Q-LF*** pump heads feature integrally molded 1/4-28 female low dead volume ports. This allows for quick connections to 1/16" or 1/8" O.D. micro bore tubing and fittings such as FMI Q661.
- Add suffix "LF" after Pump Head configuration.

* polypropylene case

Q661

"Q661" Small Bore Tubing Kit

1/4-28 Fittings and 1/16", 1/8" O.D. Teflon Tubing

Designed for **all LF Pump Heads** and to complement the **FMI R479**, **R412-5K**, and **PD-60-LF**. The **Small Bore Tubing Kit** has a flangeless design that eliminates the need for special tools and assures leak-free, zero dead-volume connections. They provide Tefzel® and Teflon® wetted surfaces.

Kit Q661A - 1/16"

10' - 1/16"O.D. x 1/32" I.D. TFE Tubing
10 - Delrin Nuts (Black)
10 - Tefzel Ferrules (Blue)

Kit Q661B - 1/8"

10' - 1/8"O.D. x 1/16" I.D. TFE Tubing
10 - Delrin Nuts (Green)
10 - Tefzel Ferrules (Yellow)

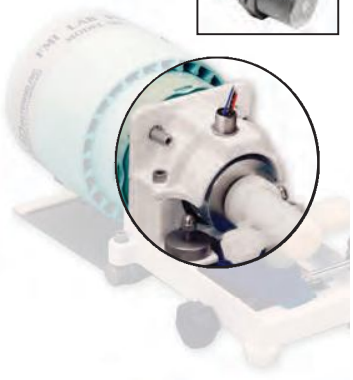
Kit Q661C - 1/8"

10' - 1/8"O.D. x 1/16" I.D. TFE Tubing
10 - Teflon Nuts (White)
10 - Tefzel Ferrules (Yellow)

Kit Q661 - 1/16" & 1/8"

Contains both Q661A and Q661B

Hall Effect Sensor



Proximity Type Rotational Sensor

PART NO.	FORM	CONTACT RATING	MAX RPM
PRS-1	SPST-N.O.	10 Watts, Max.	1000

Life: 50 Million Operations at 5 VDC, 10 mA

Order **PRS-1**

Hall Effect Electrical Specification

PART NO.	Supply Voltage (VDC)	Supply Current (mA max.)	Output Type	Output Voltage (V)	Output Current (Max.)	6" Leadwires
HES-6	4.5 TO 24	10.0	Sink	0.4	40mA	22 gauge teflon insulated

Life: Indefinite

Order **HES-6**

Accessories

FMI Masterflex® Kits QP/M & RH/M

Enhance your Existing Masterflex Pump Drives

- Move to state-of-the-art valveless piston technology.
- Extend operating pressure to 100 psig.
- Improve your long term accuracy to better than ± 1 %.
- Add precise mechanical flow adjustment to your L/S™ drives.
- Ceramic and fluorocarbon standard wetted materials.
- Installs in minutes to your L/S™ standard pump head, L/S™ EASYLOAD™ pump head, or directly to any L/S™ drive.
- Flow rates from microliters to 768 ml/min.

QP/M

Order KIT # QP/M

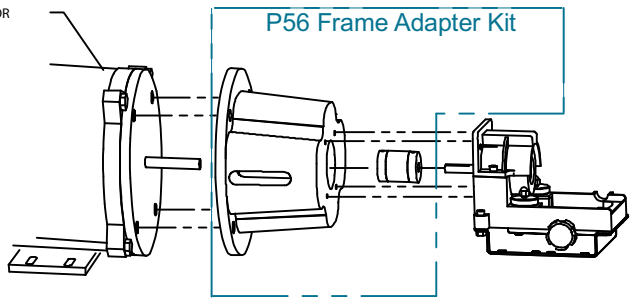
Masterflex- Reg TM of Cole-Parmer Instrument Co.
L/S - Reg TM of Cole-Parmer Instrument Co.
EASY-LOAD - Reg TM of Cole-Parmer Instrument Co.

Adapter Kit "P56C"

- Adapter Kit for easy hook-up to your NEMA 56C FACE Foot Mount motor.
- Requires Pump Drive Module QP.
- Kit includes adapter, coupling and hardware.

Shipping Weight: 4 lb (1.80 kg)

Order **P56C**

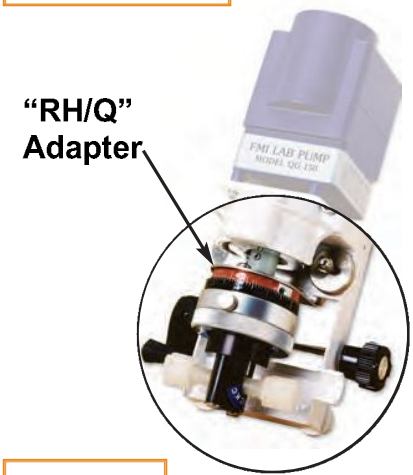


P56C

Adapter "RH/Q"

- Adds versatility to your RH pump head by adapting it to any "Q" pump drive.
- Simple installation of adapter to RH pump head using only 3 screws.
- Pump assembly can easily be slipped onto the Drive Module in seconds without tools.

Kit #RH/Q



RH/Q

Let us Help you make a selection

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

Accessories

Low Flow Barb Adapters for 1/16” and 1/8” I.D. Tubing

Threaded 1/4-28 UNF fitting to PVDF barb bottom sealing, rotating adapters consisting of a white nylon 1/4-28 fitting with 5/16" hex nut and PVDF (fluid path) insert barb.

#110873A for use with 1/8” (3.2 mm) I.D. tubing. Pkg. of 10

#110874A for use with 1/16” (1.6 mm) I.D. tubing. Pkg. of 10

#110847-01 for use with 1/8 Flexible tubing connection to isolation gland stainless steel “Q” Pumps

“PD-HF” In-Line Pulse Suppressor

(For High Flow Applications)

New InLine Pulse Suppressor for high flow systems of 50 ml/min or greater and stroke rates higher than 150 against head pressures of 10 to 65 psig. Unique encapsulated polyethylene bellows design that eliminates tubing vibrations and cavitation problems. Easy to connect 1/4” compression fittings. Best results achieved when installed on both suction and discharge lines.

PD-HF

Model PD-HF

Corrugated Teflon® Tubing Pulse Suppressor

(For High Flow Applications)

Highly flexible no kink tubing for high flow, (50 ml/min or greater), high pressure (100 psig) applications. Eliminates cavitation and mechanical stress. Best results when used on both suction and discharge lines. Slips over 3/8” barbed fitting. 3/8”I.D. x 12” long

#58003

Tubing Adapters

(For Plastic Case Pump Heads)

The integrally molded port fittings on the standard FMI Type K pump heads accept all 1/4” O.D. tubing. For other tubing arrangements, special port adapters are required.

#R412-0K	Adaptor for 1/8” I.D. Tubes
#R412-1K	Adaptor for 1/4” I.D. Tubes
#R412-2K	Adaptor for 3/8” I.D. Tubes
#R412-6K	Adaptor for 1/2” I.D. Tubes
#R412-5K	Adaptor for 1/4-28 ferrule fittings
#H476K	Adaptor for 1/8” O.D. Tubes
#110949	Adaptor for 6 mm O.D. Tubing

Accessories

Low Flow Isolation Kit “R479”

- Low flow adapter for stainless steel "Q" pump heads (except SAN).
- Isolates stainless steel cylinder case from process fluid for maximum chemical inertness.
- 1/4-28 female thread provides minimal system dead volume.
- Typically used with FMI "Q661" Small Bore Tubing Kit.
- Ideal for chromatography applications when used with "PD-60-LF" Pulse Dampener.
- For flows up to 50 ml/min and pressures to 100 psig.

#R478 Consists of ten spare ferrules

Kit #R479 Consisting of four ferrules, two adapters & assembly/removal tools

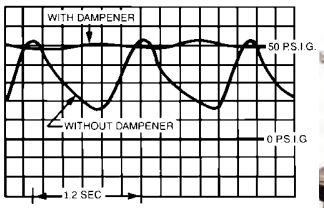
R479

R479 Kit for LOW FLOW APPLICATIONS (Replaces R412, when used)

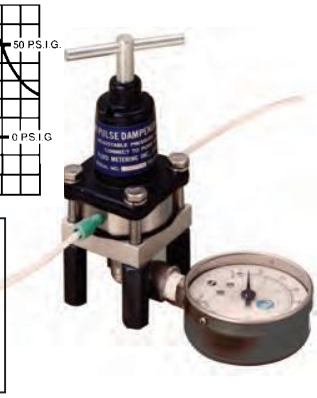
Pulse Dampener “PD-60-LF”

- Provides pulseless flow for low flow metering applications
- Suppresses approximately 90% of pulse magnitude.
- Corrosion resistant 316 SS and Teflon®wetted surfaces.
- Excellent reduction of baseline drift & noise in feeding low pressure LC systems.
- For flows up to 50 ml/min & stroke rates up to 150 RPM against head pressures of 10 to 65 psig.
- Accepts standard 1/4-28 low flow tubing accessories.
- Includes isolated pressure gauge.

PD-60-LF



Actual Recorded Pulse Pattern of an FMI LAB PUMP with and without the PD-60-LF

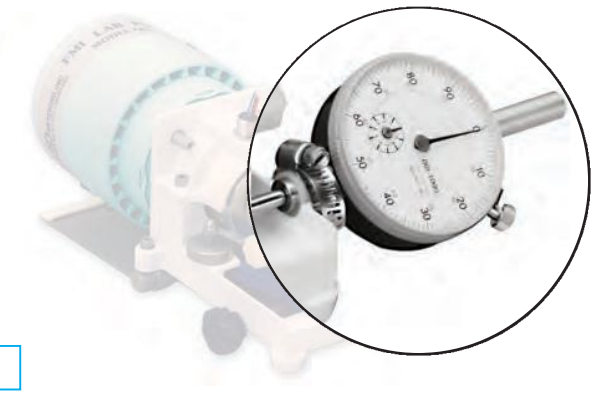


PD-60-LF

Dial Indicator Kit “Q485”

- Ultra-precise flow adjustment for "Q" pumps.
- Responds to the slightest adjustment of the "Q' pump adjusting knob.
- Each increment on direct reading dial represents 1/1000 of maximum flow.
- Easily attaches to all "Q" Pump bases.
- Can be ordered with pump or separately.

KiT #Q485



Q485

Materials of Construction

FMI fluid contact components are fabricated of carefully selected materials. Each one has discrete characteristics of physical strength, abrasion resistance, and dimensional stability under varying conditions of pressure, temperature, and resistance to attack by certain chemicals. Since no one material possesses all of the characteristics required to handle all chemicals under all possible conditions, FMI offers a selection of materials of construction for each pump component that fluids contact during the pumping process. These components and materials are identified below by code designation, common usage names and trade names.

General Characteristics are as follows:

C - Ceramic

Ceramic is used in most of the pumps for piston and/or cylinder liners. Ceramic pistons may be used with ceramic and carbon cylinder liners. Ceramic cylinder liners can only be used with ceramic pistons.
Sapphire hard, fused crystalline Ceramic Al_2O_3, excellent chemical resistance, thermal stability and mechanically resistant to common abrasives.

Z - Zirconia

YTZP pistons for H00 ceramic liners in very low dispense/flow apps . Max fluid temp 80 deg C (176 deg F)

Caution: Subject to binding or freezing when stored after improper cleaning - brittle and subject to fracture under sudden impact loading - not suitable for very “dry” fluids such as hexane.

K - Fluorocarbon PVDF

Fluorocarbon PVDF, is used for some **cylinder cases and tubing fittings.** Autoclavable @ 240°F maximum. Good chemical tolerance to most fluids.

Caution: Sensitive to degrading effects of some organic solvents, esters, and ketones.

S - Stainless Steel 316

Stainless Steel 316 is used for some **pistons, cylinder cases and/or tube fittings**. Not to be used as piston with ceramic cylinder liner.
Excellent chemical, and physical strength characteristics.

Caution: Subject to attack by some halides, strong acids, and bases - subject to surface abrasion and wear in piston application.

Y - Carbon

Carbon is used for some **cylinder liners**. Suitable for use with stainless steel and ceramic pistons.
Hard crystalline stage, ingot sintered, pure carbon chemically resistant to most commonly used fluids.

Caution: Sensitive to strong oxidants and all abrasive materials.

T - Tefzel, Dupont.

Fluoropolymer E-TFE - Used for **cylinder cases** in some FMI Pump Head Modules. Excellent chemical resistance to most acids, bases and solvents. Autoclavable @ 240°F maximum.

Rulon®AR, Saint-Gobain
Fluorocarbon, filled PTFE - Used for **lip seals** in some FMI pump heads. Excellent chemical resistance, - physically soft, resilient and wear resistant - abrasive to soft metals and should therefore not be used with “S” pistons in high stroke rate applications.

Rulon®J, Saint-Gobain
Fluorocarbon, filled PTFE - Used for **lip seals** in some FMI pump heads. Good chemical resistance, sensitive to some organic solvents, strong acids and bases - physically soft, resilient and non-abrasive.

Teflon®, Dupont Co.
Fluorocarbon PTFE - Used for **seals and fittings** in some FMI pump head modules - excellent chemical resistance characteristics - soft, pliable, easily cut, nonstick surface chemically stable over wide thermal range, dimensionally sensitive to temperature change -not suitable for structural components.

Application Tips

PRESSURE: In most FMI pump models, motor starting torque is the limiting factor in the stated pressure rating. Fluids such as oils, creams and gels that are good lubricants are more easily pumped than aqueous or “dry” fluids and therefore require less motor torque and may be pumped against pressures considerably greater than those given in the rating charts.

All pump head components are designed to withstand backpressures up to 100 psig at room temperatures, though pump heads with fluorocarbon cylinder cases may exhibit some loss of pumping capacity at pressures over 60 psig.

ACCURACY: FMI pump accuracy is based on a simplified positive displacement mechanism. The valveless design provides an accuracy of better than 1% when handling medium viscosity fluids (50 to 500 centipoise). Aqueous solutions and light solvents work well but may exhibit some sensitivity (fluid slip) to variations in discharge head pressure. Gums, gels and non-abrasive semi-solids are handled with a high degree of accuracy... a direct result of the valveless design.

Viscous, tacky solutions, semi-solids and heavy slurries which tend to resist (cavitate) suction flow into a pump head can be handled with ease by selecting an FMI pump employing a relatively slow reciprocation rate.

The principal flow rate deviations of an FMI pump are fluid slip and stroke repetition rate. These two factors in turn are related to load factors such as viscosity, differential pressure, and drive motor voltage. When these two factors are controlled, the FMI pump will handle most fluids with reproducibility of better than 0.5%.

GAS PUMPING: Due to the valveless design of the FMI pump “CKY” and “CSY” pump heads are able to perform accurate gas transfers. With no valves to introduce random compression errors, gas sample flow in bagging, scrubbing and transit operation can be accurately preset based on actual piston displacement.

IMPORTANCE OF CLEAN FLUIDS: While a certain amount of caution must be exercised in the use of abrasive fluids in any metering pump, the “CKC” and”CSC” tend to be more tolerant of suspended solids than other metering pumps. To assure fluid compatibility, consult the Materials of Construction information above.

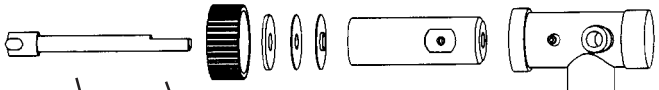
FOR BEST PUMPING RESULTS: Select an FMI PUMP having a maximum flow rate as near to the desired flow rate as possible.

Pump Head Codes & Materials

The table below provides codes for all available Pump Head Modules (PHM). After selecting the appropriate Pump Drive Module (PDM) and Piston Size Code, (refer to Drive Section, pages 3-23) select a PHM and available options below. FMI pump heads are made from various materials of construction for use in most applications. All FMI pumps are modular in design.

The Pump Head Modules can be easily removed for cleaning or replaced with a spare pump head for use with different fluids. Some customers have separate pump heads for use with each fluid handled or flow rate desired. When ordered together, Pump Drive Modules, Pump Head Modules, and options are mounted, tested and shipped as one unit.

Pump Head Materials Configuration



RH LAB PUMP JR. PISTON SIZE
00 = 1/8" DIA.
0 = 3/16" DIA.
1 = 1/4" DIA.

Q PUMP PISTON SIZE
0 = 1/8" DIA.
1 = 1/4" DIA.
2 = 3/8" DIA.
3 = 1/2" DIA.

1 – **C** – **K** – **C** – **W**

OPTIONS
(See page 20 for more information)
W = Isolation Gland (Q1, Q2 & Q3)
WT = Isolation & Temp Gland (Q1&Q2)
TC = Sanitary Flange
LF = Low Dead Volume Heads- 50 ml/min Max
R479 = Low Flow Adaptor Kit (pg 22)
S = All Stainless Steel Pump Head Carrier ("Q"Only)

PISTON MATERIAL
C = CERAMIC (alumina)
S = 316 Stainless Steel
SAN = Sanitary (CSC) (pg 19)

CYLINDER CASE MATERIAL
K = FLUOROCARBON (PVDF)
S = 316 Stainless Steel
SAN = Sanitary (CSC) (pg 19)
T = Tefzel

CYLINDER LINER MATERIAL
C = CERAMIC (alumina)
Y = Carbon (sintered)
SAN = Sanitary (CSC) (pg 19)

Let us Help you make a selection

Have questions?
Chat live with an FMI application specialist at
www.fmipump.com

PHM (PUMP HEAD MODULE)

Piston Size Code	Materials of Construction								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00									
RH0									
RH1									
Q0									
Q1									
Q2									
Q3									
Wetted Parts	Ceramic PVDF	Ceramic PVDF Carbon	Ceramic 316 SS	Ceramic 316 SS Carbon	Ceramic Teflon	316 SS PVDF Carbon	316 SS Carbon	316 SS Tefzel Carbon	Ceramic Tefzel
MAX.Temp	212° F	212° F	350° F	350° F	350° F	140° F	140° F	140° F	212° F
Options (add Option Code & cost to Pump Module for complete price and part number)									
LF (pg.29)	N/C	N/C				N/C		N/C	N/C
W (pg.25)									
WT (pg.25)									
TC (pg.24)									
R479 (Pg.29)									
S ("Q" Only)									

See Materials of Construction section for more information on wetted parts - pg 30.

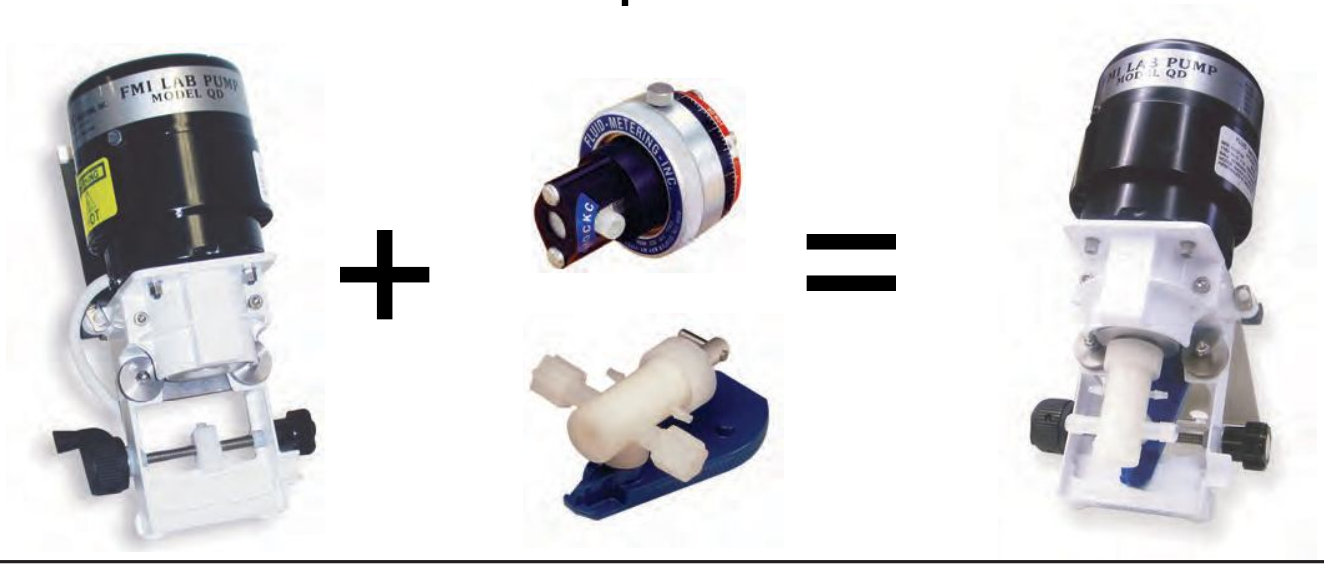
Selection Guide for FMI's Pump Heads

 QCKC	**QCKC** Pump Heads offer excellent chemical resistance to most acids, caustics, and solvents (with the exception of acetone, methyl ethyl ketone [MEK], & methylene chloride). These pump heads are rated to 212 deg F, autoclaved to 240 deg F (non-operating), and for pressures to 60 psig. **QCKC-W** Same as above with the addition of flush gland for isolating air sensitive, crystal forming fluids from atmosphere. **Fluid Path:** Ceramic and PVDF fluorocarbon.
 QCSC, QCSC-200, QCSC-W	**QCSC** Pump Heads offer excellent chemical resistance to almost all solvents. They have an extended temperature & pressure range of 350 deg F and 100 psig. **QCSC-W** Same as above with the addition of flush gland for isolating air sensitive, crystal forming fluids from atmosphere. **QCSC-200** Similar to QCSC with the addition of extended pressure capability of 200 psi. **Fluid Path:** 316 SS, Ceramic and Teflon standard.
 QSAN, QSAN-TC	**QSAN** Pump Heads are designed for sanitary applications ideal for food, biotech, & pharmaceutical applications. These pump heads contain no internal threads, are highly resistant to chemical and biological attack, and are easily dismantled for cleaning and sterilizing. (Model QSAN-S shown) **QSAN-TC** Same as the above with the addition of "Tri-Clamp® quick connect sanitary flanges. **Fluid Path:** Ceramic and Teflon standard.
 QCSC-WT	**QCSC-WT** "Hi Temp Gland" Pump Heads are designed for applications, which require temperature control of the pump head. These pump heads provide space for two standard 1" x 1/4" cartridge heaters and a 1/8" thermocouple, as well as an "isolation gland". Pump heads are rated for 350 deg F and 100 psig. **Fluid Path:** 316 SS, Ceramic and Teflon standard.
 QCLV	**Q1CV, Q2CV** Offers superior chemical resistance for metering concentrated water treatment chemicals (Ideal for Sodium Hypochlorite and Caustic Soda). Extended pressure range of 125 psi. **Fluid Path:** ceramic and PVC.
 RHLF	**RHLF** "Low Flow" Pump Heads feature 1/4-28 female low dead volume ports as well as excellent chemical resistance. Designed for flows to 50 ml/min or dispenses 100 µl or less. RHLF pump heads are rated to 212 deg F, autoclaved up to 240 deg F (non-operating), and can be used in applications up to 100 psig. **Flow Path:** Ceramic and PVDF fluorocarbon standard - other materials available. RH00SKYLF, RH0CKCLF, RH1CKCLF.
 RH	**RH** Pump Heads, 1/4" compression ports, and excellent chemical resistance to most acids, caustic, and solvents with some exceptions including acetone, methyl ethyl ketone (MEK), & methylene chloride. Designed for flows to 360ml/min. RH pump heads are rated to 212 deg F, autoclaved up to 240 deg F (non-operating), and pressure to 100 psig **Flow Path:** Ceramic and PVDF fluorocarbon standard - other materials available. RH00SKY, RH0CKC, RH1CKC

How To Order

1. Determine your flow rate in ml/min and your pressure requirements in PSIG.
2. Check that the drive power fits your application, i.e. AC, DC, stepper, etc.
3. Check the Piston Size Code for your flow rate and select a Pump Drive Module plus options.
4. Go to page 31 and select a Pump Head Module (PHM) compatible with your fluid and application.

Example



Q PUMP DRIVE MODULE	Q OR RH PUMP HEAD MODULE	COMPLETE PUMP ASSEMBLY
Pump Drive: QD +Option(s): Q485 **Cost:** _____	Pump Head: Q-1CKC Option(s) W **Cost:** _____	**= Total Cost:**

Pump Drive Modules, Pump Head Modules and options are mounted, tested and shipped as one unit when ordered together.

Pump Drive: _____	$_____	Pump Head:_____	$_____	
+ Option: _____	$_____	+ Option: _____	$_____	
Cost: _____	$_____	**Cost:** _____	$_____	**= Total Cost: $ _____**

Not Sure What you need? Chat with us!

GENERAL SPECIFICATION NOTES FOR ALL PUMPS*

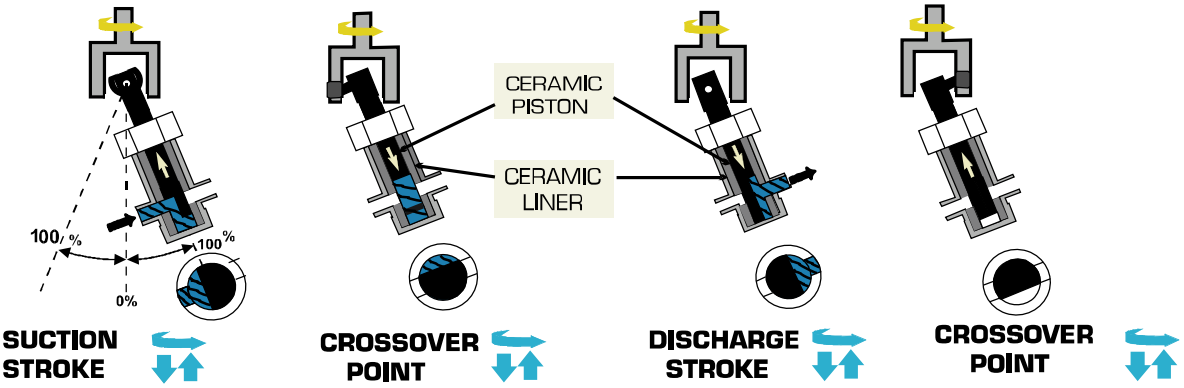
1. Physical characteristics of your pumped fluid may affect the rating/capacity relationships shown in the performance tables for each FMI pump.
2. The maximum flow rates shown in the tables are for H_2O at 2 psig.
3. Flow rates are infinitely variable from zero to maximum capacities shown.
4. Pumping capacities are reduced approximately 18% when the Pump Drive Module is operating on a 50 Hz electrical supply.
5. **Fluorocarbon cylinder cases (Q line only) are rated for a maximum pressure of 60 psig or the lower pressure shown in the charts.**
6. 3/8" I.D. tubing or greater is required for flows higher than 500 ml/min.
7. 1/2" I.D. tubing or greater is required for flows higher than 1200 ml/min.

Valveless Ceramic Dispensers & Metering Pumps Since 1959!

- No Valves, Drift-Free Operation.
- One moving part.
- Accuracy better than ± 1 %.
- Precision Dispensing - CV of 0.5% or better.
- Flow rates from microliters to 4600 ml/min.
- Positive Displacement up to 200 psig.
- Viscosity Independent - Unaffected by viscosity of fluids.
- Millions of Maintenance-Free Cycles.
- Inert, corrosion resistant fluid path - ceramic & fluorocarbon standard.
- Self-priming to 15 feet, vertical lift.
- Instant Reversibility - While running.
- Large Selection of Drives - Fixed, variable, pneumatic, stepper, hazardous duty and OEM.
- Delivery from Stock - No waiting time.

OPERATION

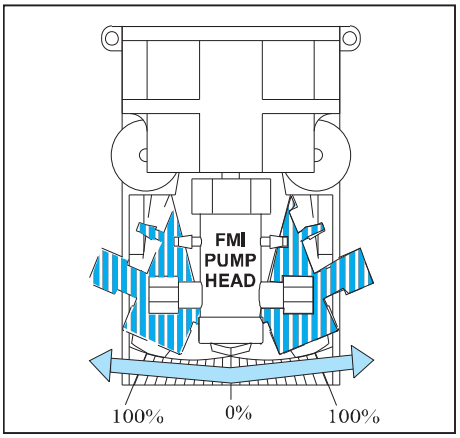
The valveless pumping function is accomplished by the synchronous rotation and reciprocation of the ceramic piston in the precisely mated ceramic cylinder liner. One complete piston revolution is required for each suction /discharge cycle as shown. The piston always bottoms for maximum fluid and bubble clearing.



The piston rotates and reciprocates. As the piston is pulled back and the piston flat opens to the inlet port, suction is created and fluid fills the pump chamber. As the piston reaches the highest point in the reciprocation cycle, the pump chamber is now at its maximum volume capacity. Continuing the rotation, the inlet port is then sealed and crossover occurs. As the inlet port is sealed and the pump chamber is full, the outlet port opens up. ***Only one port is open at any time and at no time are both ports interconnected.*** Continuing the rotation and reciprocation, the piston is forced down and the piston flat opens to the outlet port. Discharge is created and fluid is pumped out. The piston bottoms for maximum fluid and bubble clearing. Continuing the rotation, the outlet port is then sealed and crossover occurs. As the outlet port is sealed and the pump chamber is empty, the inlet port opens to start another suction stroke. ***Only one port is open at any time and at no time are both ports interconnected.***

EASY FLOW RATE ADJUSTMENT

- Moving the pump head position changes the piston stroke length and, in turn, the flow rate.
- Infinite fine flow adjustments between zero and 100% flow rate.
- Flow rate indicator provides for accurate and simple linear calibration.
- Flow rate can be changed while pump is operating or at rest.



On all FMI pumps, flow rates may be altered when operating or at rest. On the "Q" line this is done by turning the Flow Control Knob which moves the flow rate indicator along a fixed 20 unit scale linearly calibrated "10-0-10". The "10" equals 100% flow rate in that direction, "0" equals zero flow. To improve the fine adjustment of the flow rates on the "Q" line, there is an optional **Dial Indicator Kit Q485** which provides for 1000 discrete settings. The "RH" line flow adjustment is accomplished by turning an easy-grip Flow Control Ring graduated in 450 divisions from 0 to 100% flow.

FMI Terms & Conditions

ONE YEAR LIMITED WARRANTY

FMI LIMITED WARRANTY

FMI products are manufactured to a high level of mechanical precision from materials that are resistant to attack by many corrosive chemicals. These products, however, may be self-destructive when used with non-compatible fluids or when located in physically hostile environments or when operated under non-specification voltage or pressure conditions.

FMI, therefore, warrants only as follows:

Each pump has been test operated with water prior to shipment from the factory. The qualifying performance of each pump is recorded by serial number in a permanent record of the company. The Goods shall be free of liens, are new and unused, and perform in accordance with the published or agreed written specifications and be free from defects in materials and workmanship for a period of one year from FMI's invoice date. Goods not meeting specifications may be returned to FMI, freight prepaid, for repair or replacement at FMI's discretion. Prior to any such return, Customer must request and receive written approval from FMI. If, upon examination, FMI determines that abusive practices, non-compatible fluids, a destructive environment of operation or a combination of these factors is responsible for improper performance of the product, all labor and materials costs involved shall be at the expense of the customer. All such returns shall be redelivered Ex Works, Syosset, NY. Warranty returns may not be used to offset amounts owing for past or future deliveries.

FMI is not liable for special, indirect or consequential damages that may result from use, failure or malfunction of the product and any recovery against FMI may not be greater than the purchase price paid for the product.

No person or entity is authorized to change the terms of this warranty

1 Year Warranty.

PRODUCT STANDARDS

FMI products are certified and sold to comply with written FMI specifications. Only FMI is authorized to modify product claims and specifications. Products are subject to change without notice.

RETURNS FOR CREDIT

Standard FMI catalog products under most circumstances, may be returned to the FMI factory for credit when still in unused condition, packed in original shipping cartons, and meets current product speci fications. All such returns, must have prior FMI customer service authorization before returning. A restocking charge of 15% of original invoice price will be made on each to cover related restocking costs.

PRICES

Prices are subject to change without notice and prior to order confirmation.

QUANTITY DISCOUNTS

Quantity discounts on standard catalog products purchased in units of ten or more are available. Contact FMI sales department for details.

QUOTATIONS

Prices quoted in writing will remain in effect for 30 days or any other time period stated in the written quotation.

MINIMUM BILLING

Minimum billing for FMI products is $25.00 domestic and foreign invoice value per order, net of shipping costs and any applicable dis counts regardless of price list value of order.

SHIPMENTS

Catalog products are usually shipped within 24 hours of receipt of order.

ORDERS

Orders placed for Goods cannot be cancelled and will be shipped and invoiced by FMI per the confirmed delivery schedule.

FMI is not responsible for delays beyond its control, including but not limited to, component shortages, delays by its vendors, labor disputes, weather delays or military actions.

SHIPMENT TERMS

All goods are delivered Ex Works, Syosset, NY at which time title and risk of loss shall pass to the Customer.

FREIGHT POLICY

FMI will assist Customer with arranging transportation via pick-up, prepay and bill, or freight collect. Goods will be packed for domestic shipment unless other packaging arrangements have been mutually agreed upon in writing. All shipping costs and any special packaging are the responsibility of the Customer. Insurance is the responsibility of the Customer. All claims for damaged merchandise should be made with Customer's delivering carrier or insurance company.

PAYMENT TERMS

Open Account terms - 1% 10 days, net 30, International Sales - cash in advance. Credit Card Payments are accepted, Visa, Master Card, AMEX and Discover. Quoted prices are subject to change for payment terms other than those listed above. All bank charges related to wire transfers and ACH payments are the customer's responsibility.

OPEN ACCOUNT PRIVILEGES

Customers may establish an open account status by presenting FMI evidence of prompt payment history including: a) three general credit references, b) one or more bank references, c) Fluid Metering, Inc. reserves the right to obtain a credit report from a national reporting agency.

FMI Customer Service Representatives and Technical Support Staff are available Monday through Friday from 8:00 am to 5:30 pm EST. You can also FAX your specifications 24 hours a day to 516-624-8261 or Email us at: pumps@fmipump.com

Typical Applications

Analytical Instrumentation

- TOC Analyzers
- Particle Analyzers
- Viscosity Instrumentation
- Titration Equipment
- Liquid Chromatography
- Water & Wastewater Monitoring
- Stack Gas Monitoring
- Ground Water Monitoring

Medical

- Contact Lens Mfg. - Monomer Dispensing
- Dialysis Systems
- Immunoassays & MicroPlates
- Solvent Welding for Disposables
- Blood Analyzer Sample & Reagent Fluid Control
- Clinical Chemistry Instrumentation

Electronics

- Plating Bath Chemical Control
- PC Board Cleaning Systems
- Battery Manufacturing
- CMP & ECP Wafer Processing
- Flux Addition for Wave Soldering
- Wire Coating for Stators & Armatures
- Semiconductor Chemical Distribution

Food, Dairy, & Beverage

- Aseptic Packaging - Peroxide Dispensing
- Preservative Treatment of Meats & Poultry
- Nutrient & Color Addition
- Brewery Additives
- Vitamin Addition for Milk
- Color Addition for Yogurt
- Cottage Cheese Mfg.
- Candy Polishing

Industrial

- Agricultural & Pesticide Spraying Systems.
- On-Site Petroleum Additives
- Paints, Dyes, Inks, & Pigments
- Lubricant Dispensing
- Ferrofluid Dispensing for Speaker Mfg.
- Hydrogen Fuel Cell

FMI 2012 SHOW SCHEDULE

FMI will demonstrate its full line of Metering Pumps, Dispensers and Accessories at the following Trade Shows:

February	14 - 16	MD&M West '12	Anaheim, CA	Booth 2483
April	17 - 19	NYS AWWA	Saratoga Springs, NY	Booth 16
April	17 - 20	CMEF	Shenzhen, China	Booth N16 &18
May	01 - 03	Interphex '12	Javits Ctr., NYC	Booth 1576
May	22 - 24	MD&M East '12	Philadelphia, PA	Booth 509
June	10 - 13	ACE'12	Dallas, TX	Booth 2226
July	17 - 19	AACC '12	Los Angeles, CA	Booth TBA
September	17 - 19	Tifft Water Symposium	Liverpool, NY	Booth TBA
October	01 - 03	WEFTEC '12	New Orleans, LA	Booth 1255
November	14 - 17	Medica' 12	Düsseldorf, Germany	Booth TBA

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Codip Air Operated PTFE Diaphragm Pumps

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HNP Gear Pumps

WANNER
Hydra-Cell®
Seal-less Pump Technology

Hydra-Cell High Pressure Diaphragm Pumps

M PUMPS

M Pumps, Centrifugal,
Turbine and Vane Pumps

ISMATEC®

Ismatec Peristaltic Pumps

FMI FLUID METERING, INC.

Fluid Metering Piston Pumps