

# CeramPump®

## Valveless DISPENSERS & METERING PUMPS

- 💧 **Laboratory**
- 💧 **Industrial**
- 💧 **Process**
- 💧 **OEM**

# 2002



**FLUID METERING, INC.**  
800-223-3388 [www.fmipump.com](http://www.fmipump.com)



U.S. Patents:  
4,941,809  
5,015,157  
5,020,980  
5,044,889  
5,246,354  
5,279,210

U.K. (EC)  
043 65 210

Other patents pending

401-2002



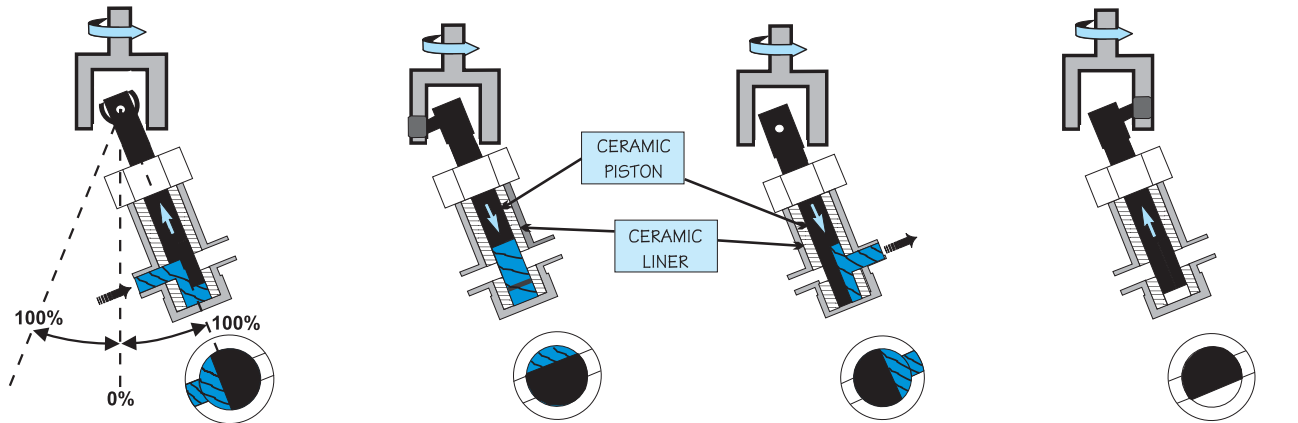
# Ceramic Dispensers & Metering Pumps Since 1959!

- No Valves to clog, hang up or service.
- One moving part - piston.
- Accuracy of better than  $\pm 1\%$  = Drift Free Operation.
- Precision Dispensing - CV of 0.5% or better.
- Flow rates from microliters to 4600 ml/min (71.8 gal/hr).
- Positive Displacement up to 100 psig of back pressure.
- Viscosity Independent - Unaffected by viscosity of fluids.
- Millions of Maintenance Free Cycles.
- Inert and corrosion resistant fluid path, ceramic & fluorocarbon standard.
- Self-priming to 15 feet.
- Instant Reversibility - will pump in either direction.
- Large Selection of drives, fixed, variable, pneumatic, stepper, and explosion proof.
- 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. Piston always bottoms for maximum fluid and bubble clearing.



### SUCTION STROKE



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

### CROSSOVER POINT



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.**

### DISCHARGE STROKE



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

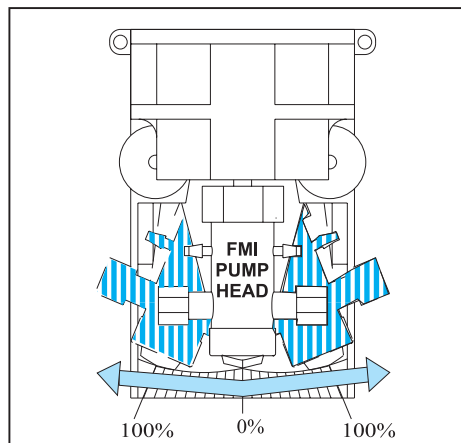
### CROSSOVER POINT



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.



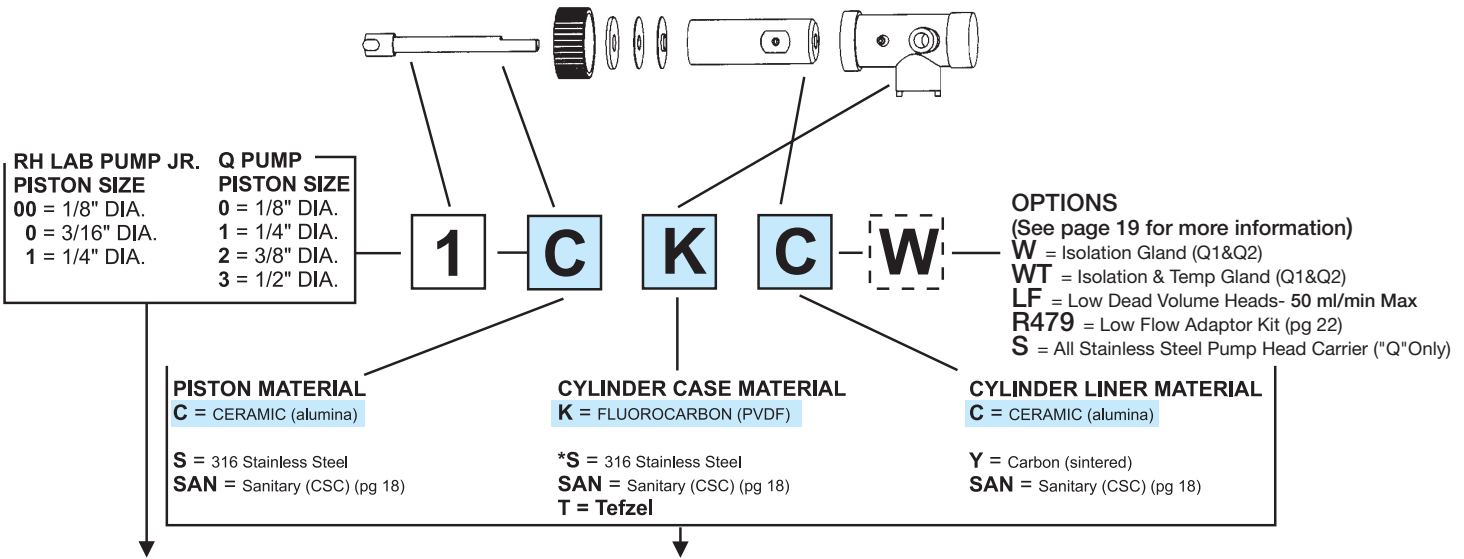


# Pump Head Codes & Materials

The table below provides codes and prices for all available Pump Head Modules (PHM). After selecting the appropriate Pump Drive Module and Piston Size Code, (refer to Drive Section, pages 6-17) 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



PUMP HEAD MODULE CODES									
PISTON SIZE CODE	MATERIALS OF CONSTRUCTION								
	CKC	CKY	CSC	CSY	SAN	SKY	SSY	STY	CTC
RH00		N/A	N/A	N/A	N/A		N/A		
RH0		N/A	N/A	N/A	N/A	N/A	N/A	N/A	
RH1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>RH Pump Heads: 1) Require an RH/Q kit (\$20) for use with Q drives (page 21) 2) STY, CTC maximum pressure to 20 psig.</b>									
Q0	N/A	N/A	N/A	N/A	N/A			N/A	N/A
Q1								N/A	N/A
Q2								N/A	N/A
Q3		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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 TEFLON CARBON	CERAMIC TEFLON
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.19)	N/C	N/C	N/A	N/A	N/A	N/C	N/A	N/C	N/C
W (PG.19)		N/A		N/A	N/A	N/A	N/A	N/A	N/A
WT (PG.19)	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
R479 (PG.22)	N/A	N/A			N/A	N/A		N/A	N/A
S("Q" Only)								N/A	N/A

See Materials of Construction section for more information on wetted parts (pg.23)

\*316 Stainless Steel cylinder cases accept 1/4 NPT male fittings.

When ordering specify:

Piston Size Code + Material of Construction + Option Code

(Q1 + CKC + W = Q1CKC-W- \$235 +\$25 = \$260)





# How To Order Metering Pumps

1. Determine your flow rate in ml/min. or GPH, and your pressure requirements in PSIG.
2. Use the "SELECT-A-PUMP" guide on page 5 to find a suitable Pump Drive Module.
3. Check that the drive power fits your application, i.e. AC, DC, etc.
4. Check the Piston Size Code for your flow rate and select a Pump Drive Module plus options.
5. Go to page 3 and select a Pump Head Module 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): HES-6  
**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: \_\_\_\_\_ \$ \_\_\_\_\_  
 + Option: \_\_\_\_\_ \$ \_\_\_\_\_  
**Cost:** \_\_\_\_\_ \$ \_\_\_\_\_

Pump Head: \_\_\_\_\_ \$ \_\_\_\_\_  
 + Option: \_\_\_\_\_ \$ \_\_\_\_\_  
**Cost:** \_\_\_\_\_ \$ \_\_\_\_\_

**= Total Cost: \$ \_\_\_\_\_**

### \*GENERAL SPECIFICATION NOTES FOR ALL PUMPS\*

**1.** Physical characteristics of your pumped fluid may effect the rating/capacity relationships shown in the performance tables for each FMI unit. **2.** The maximum flow rates shown in the tables are for **H<sub>2</sub>O** at 2 psig. **3.** Flow rates are infinitely variable from zero to maximum capacities shown. **4.** Pumping capacities are reduced approximately 18%

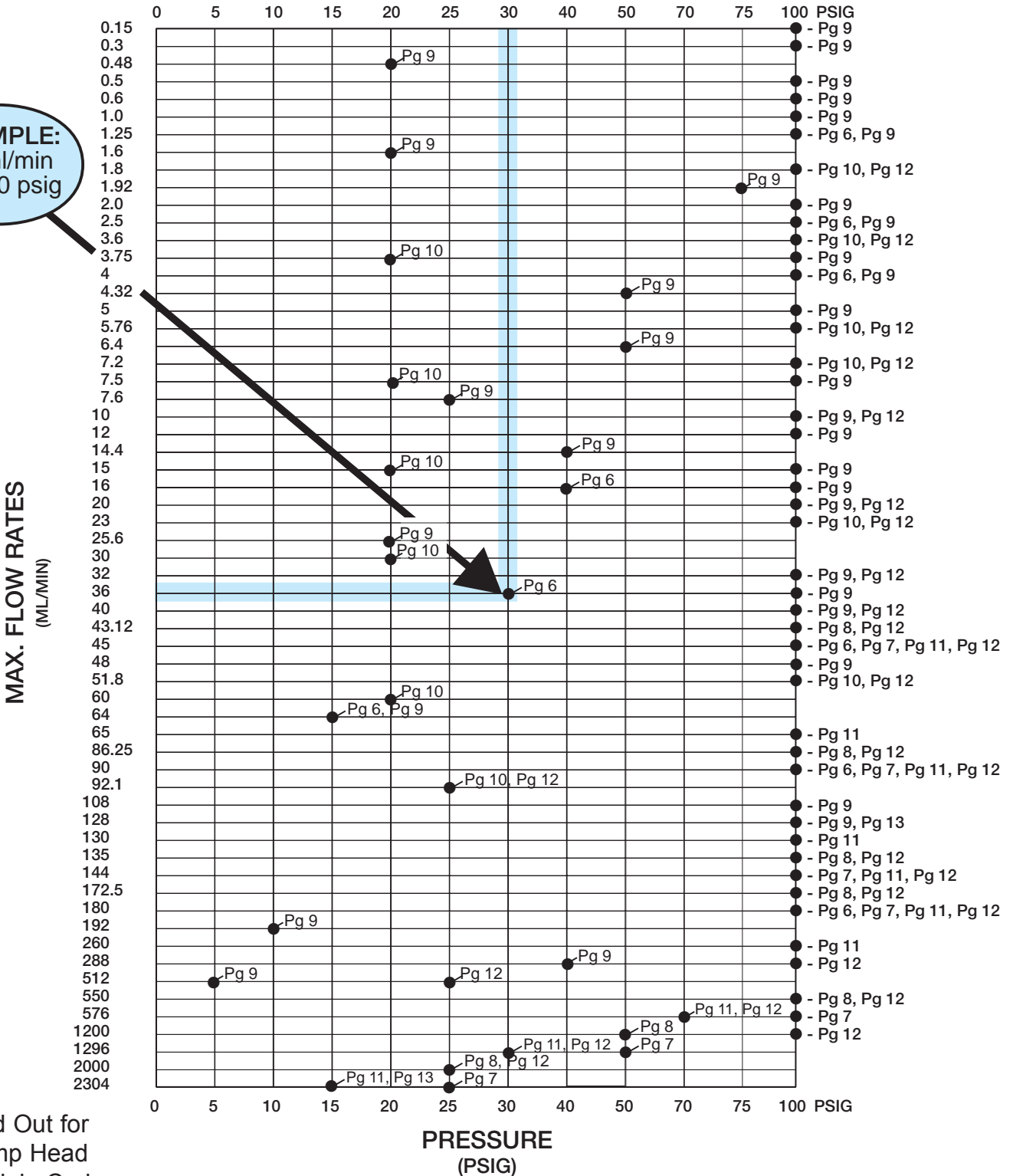
when the Pump Drive Module is operating on a 50 Hz electrical supply. **5. Fluorocarbon cylinder cases (Q line only) are rated for a maximum pressure of 60 psig or the lower pressure shown in the charts.** **6.** 3/8" I.D. tubing or greater is required for flows higher than 500 ml/min. **7.** 1/2" I.D. tubing or greater is required for flows higher than 1200 ml/min.



# Select-A-Pump

- Select the flow pressure closest to your requirements.
- Refer to the pages indicated for information on available models.
- Flow Rates shown are maximum milliliters per minute.
- All FMI pumps are infinitely adjustable from zero to their maximum flow rate.

**EXAMPLE:**  
36 ml/min  
@ 30 psig



MAX. FLOW RATES  
(ML/MIN)

PRESSURE  
(PSIG)

Fold Out for  
Pump Head  
Module Codes



# Variable Speed Drives "V" For Adjustable Stroke Rate And Process Control

## MODEL V200 CONTROLLER

### FOR QV, QVG50, RHV AND Q2V PUMP DRIVE MODULES

- Digital push-button adjustment of stroke rate in 0.1% increments
- Quick toggle between manual and external 4-20 mA input connection
- Simple connection to process controls and instrumentation
- Instant forward/reverse of flow while running
- Convenient multi-position tilt stand for wall or counter mounting
- Quick connect cable to all FMI RHV, QVG50, QV and Q2V Pump Drive Modules

4-20mA  
Input



Model V200

Best Value!  
Most  
Versatile!

V200 Electrical: 115 VAC, 50/60 Hz, .75 amp, output to motor 0 to 90 Volts DC, 6 foot, 3 prong power cord.

V200 4-20 mA Interface Electrical: Typical input impedance of 500 OHMS.

Dimensions: 7 1/2" x 2 1/4" x 4 3/4" wide  
190 x 57 x 121 mm

**QV**

**QVG50**



Model QV  
with CKC PHM  
and Dial Indicator

**QV** Motor Electrical: 1800 spm, totally enclosed non-vented.  
Dimensions: 10" x 4 5/8" x 4 7/8" wide  
254 x 117 x 124 mm  
Shipping weight: 12 lb (5.4 kg)

**QVG50** Motor Electrical: 50 spm, totally enclosed non-vented.  
Dimensions: 11" x 5" x 5 3/4" wide  
279 x 127 x 146 mm  
Shipping weight: 15 lb (6.75 kg)

### QV - HIGH FLOW / HIGH SPEED QVG50 - LOW FLOW / LOW SPEED

- Drift-free flow ranges up to 2304 ml/min for the **QV** & 64 ml/min for the **QVG50**, pressures to 100 psig
- Easy fine flow adjustment via stroke length adjustment knob
- Instant forward/reverse of flow while running
- Adjustable from 90 to 1800 strokes per minute for the **QV** & 5 to 50 strokes per minute for the **QVG50**
- Simple quick connect cable to V200 controller

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE PRICE ONLY
		ML/MIN	GAL/HR	PSIG	BAR	
QV	RH00	45	.71	100	6.90	
	RH0	90	1.4			
	Q0	144	2.2			
	RH1	180	2.8			
	Q1	576*	9.1			
	Q2	1296*	20.4	50	3.45	
	Q3	2304*	35.9	25	1.72	
QVG50	RH00	1.25	.019	100	6.90	
	RH0	2.50	.039			
	Q0	4.00	.063			
	RH1	5.00	.079			
	Q1	16.00	.252			
	Q2	36.00	.568			
	Q3	64.00	.998	25	1.72	

**To Order:** Specify **QV** or **QVG50** price includes V200 Controller. For Pump Head Module select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.

See page 3 for pump head codes, prices & material of construction

\* See Gen. Specs. on page 4.

DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg.20)	-Q485	
MOUNTING BASE for QV & QVG50 (pg.19)	-MB	

# Variable Speed Drives "V" For Adjustable Stroke Rate And Process Control



## RHV - LOW FLOW

- Drift free flow ranges up to 180 ml/min, pressure -10 to 100 psig
- Easy grip flow control ring graduated in 450 divisions
- Instant adjustment of flow while running
- Ceramic and Kynar standard wetted materials - Cylinder case also available in Tefzel
- Adjustable from 90 to 1800 strokes per minute
- Simple quick connect cable to V200 controller

4-20mA Input



RHV

Model V200

Best Value!  
Most Versatile!



Model RHV

Motor Electrical: 1800 spm, totally enclosed non-vented

Dimensions: 7 1/8" x 3" x 3" wide  
181 x 76 x 76 mm

Shipping weight: 8 lb (3.60 kg)

COMPLETE PUMP ASSEMBLY	MAX. FLOW				PRICE
	ML/MIN	GAL/HR	PSIG	BAR	
RHV00SKY	45	.71	100	6.90	
RHV0CKC	90	1.4	100	6.90	
RHV1CKC	180	2.8			

Price includes V200 controller and Pump Head Module

## RATIO:MATIC®

### PROPORTIONAL DUAL HEAD, PUMP DRIVE MODULE

- Exceptional proportional metering of two fluids - obtainable ratios up to 1:500
- Drift free flow ranges up to 4600 ml/min, pressures to 100 psig
- Individual easy fine flow adjustment via stroke length adjustable knob
- Variable speed, dual head, pumping using a single drive
- Pulsation reduced by 50% when pump heads set 180 degrees out of phase
- Instant forward/reverse of flow while running
- Adjustable from 90 to 1800 strokes per minute
- Simple quick connect cable to V200 controller

Model Q2V with CKC PHM and Dial Indicator

Q2V



Price Q2V with V200 Controller

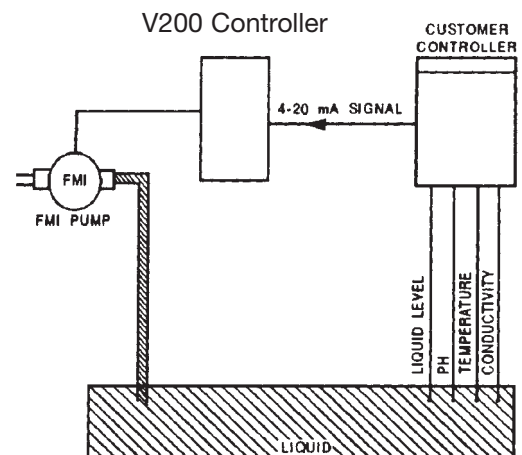
Order Example: Q2V + Q1CKC + Q2CKC

(Also available in 12 and 90 VDC models without controller)

Dimensions Q2V: 15" x 4 7/8" x 5 1/8" wide  
381 x 124 x 130 mm

Shipping weight: 15 lb (6.75 kg)

See page 3 for pump head codes, prices & material of construction





# High Speed Drives "D" - High Flows For General Lab and Industrial Use



Best selling pump for general lab and industrial applications

**Model QD with  
CKC PHM  
and Dial Indicator**

- Most widely used pumps for general laboratory and industrial metering for flows up to 2208 ml/min.
- Flow rate infinitely adjustable from 0 to maximum range in either direction.
- Can be combined with all RH and Q Pump Head configurations.
- Ceramic and fluorocarbon standard wetted materials - other materials available.
- Rugged, long life, high speed, fan cooled, thermally protected motor to handle a wide variety of applications.
- Convenient multi-purpose tilt stand for wall or counter mounting.
- Dial Indicator available for ultra-precise flow adjustment.
- Hazardous Duty models available (see page 12).

Electrical: 115 VAC, 60Hz, 1Ø, 1.25 amps, 1/25 Hp, 1725 spm, shaded 4 pole, totally enclosed fan cooled, sparkless thermally protected ball bearing, with 3 prong power cord. UL, CE. Also available with Hazardous-Duty motor (see page 12).



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

Shipping weight: 10 lb (4.5 kg)

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE ONLY PRICE		
		ML/MIN	GAL/HR	PSIG	BAR			
QD	RH00	43.13	0.681	100	6.90			
	RH0	86.25	1.3					
	Q0	138.0	2.1					
	RH1	172.50	2.7					
	Q1	552*	8.6					
	Q2	1242*	18.9				50	3.45
	Q3	2208*	30.0				25	1.72



DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg.20)	-Q485	
230 VAC (50 Hz)*	-2	
MOUNTING BASE (pg.19)	-MB	
X-PROOF (pg.12)	QDX	

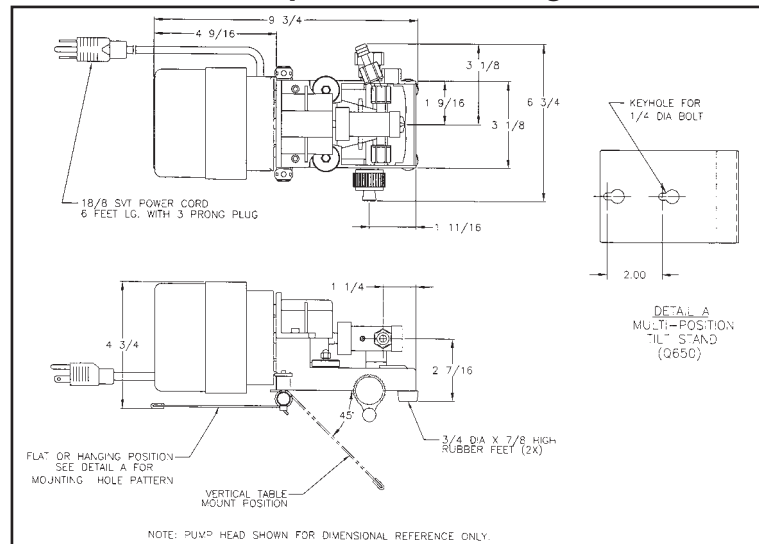
For options specify Drive Code and option part number, i.e. QD with 230 VAC is a QD-2  
+ =

Rotational Sensors also available (see pg. 20)  
\*Flow Rates are reduced approximately 18% when Pump Drive Module is operating on a 50 Hz electrical supply.

**To Order:** Specify **QD** For Pump Head Module select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.  
\* See Gen. Specs. on page 4.

Piston size code is for flow rate information only.

## QD Pump Outline Drawing



See page 3 for pump head codes, prices & material of construction



# Low Speed Drives "G" - Low Flows

## For General Lab and Industrial Use



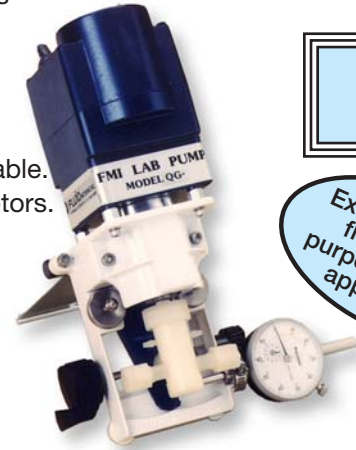
Most widely used pumps for general purpose low flow metering applications up to 512 ml/min.

- A choice of five different drive speed configurations.
- Flow rate infinitely adjustable from 0 to maximum range in either direction.
- Can be combined with all RH and Q Pump Head configurations.
- Ceramic and fluorocarbon standard wetted materials - other materials available.
- Super-tough fan cooled, thermally protected, ball bearing output geared motors.
- Convenient multi-position tilt stand for wall or counter mounting.
- Dial indicator available for ultra-precise flow adjustment.

Electrical: 115 VAC, 60 Hz, 1Ø, 1 amp, 6, 20, 50, 150, 400 spm, shaded 2 pole, enclosed ventilated, thermally protected, with 3 prong power cord - UL, CE.

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

Shipping weight: 10 lb (4.5 kg)



**QG**

Excellent for low flow general purpose metering applications



PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE PRICE ONLY		
		ML/MIN	GAL/HR	PSIG	BAR			
QG6	RH00	.15	.002	100	6.90			
	RH0	.30	.004					
	Q0	.48	.007	20	1.38			
	RH1	.60	.009	100	6.90			
	Q1	1.92	.030	75	5.17			
	Q2	4.32	.068	50	3.45			
	Q3	7.68	.119	25	1.72			
QG20	RH00	.50	.007	100	6.90			
	RH0	1.00	.015					
	Q0	1.60	.025	20	1.38			
	RH1	2.00	.031	100	6.90			
	Q1	6.40	.101	50	3.45			
	Q2	14.40	.227	40	2.76			
	Q3	25.60	.399	25	1.72			
QG50	RH00	1.25	.019	100	6.90			
	RH0	2.50	.039					
	Q0	4.00	.063					
	RH1	5.00	.079					
	Q1	16.00	.252					
	Q2	36.00	.568					
	Q3	64.00	.998				25	1.72
QG150	RH00	3.75	.059	100	6.90			
	RH0	7.50	.118					
	Q0	12.00	.189					
	RH1	15.00	.237					
	Q1	48.00	.758					
	Q2	108.00	1.706					
	Q3	192.00	2.995				25	1.72
QG400	RH00	10.00	.158	100	6.90			
	RH0	20.00	.316					
	Q0	32.00	.505					
	RH1	40.00	.632					
	Q1	128.00	2.022					
	Q2	288.00*	4.550				40	2.76
	Q3	512.00*	7.987				25	1.72

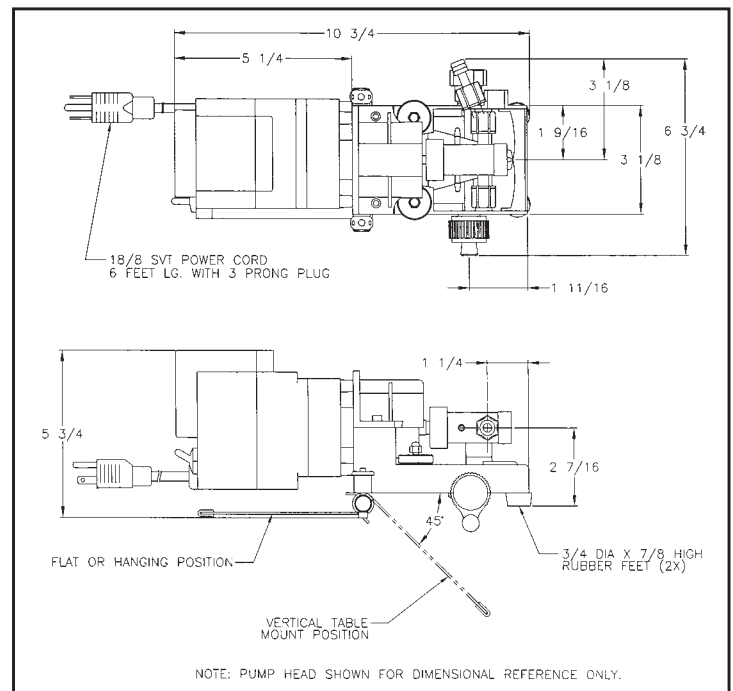


DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg.20)	-Q485	
230 VAC (50/60 Hz)*	-2	
24 VAC (50/60 Hz)*	-3	
MOUNTING BASE (pg.19)	-MB	

For options specify Drive Code and option part number, i.e.QD with 230 VAC is a

Rotational Sensors also available (see pg. 20)  
\*Flow Rates are reduced approximately 18% when Pump Drive Module is operating on a 50 Hz electrical supply.

### QG Pump Outline Drawing



To Order: Specify **QG** . For Pump Head Module select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.

\* See Gen. Specs. on page 4.

Piston size code is for flow rate information only.

See page 3 for pump head codes, prices & material of construction



# Synchronous Drives "SY" - Low Flows

## The Ultimate In Metering Accuracy

### RHSY

Model RHSY

High accuracy,  
Compact design



- Provides exceptional stroke rate 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 strokes per minute through a simple and safe belt change arrangement.
- Forward-Off-Reverse switch for instant flow direction control.
- Available with low dead volume pump head and low flow tubing kit.
- Quiet performance, long life motor can be stalled infinitely without damage.

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

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

Shipping weight: 4 lb (1.8 kg)

COMPLETE PUMP ASSEMBLY	MAX. FLOW						PRICE
	@150 SPM		@300 SPM		@600 SPM		
	ml/min	gal/hr	ml/min	gal/hr	ml/min	gal/hr	
RHSY00SKY	3.75	.06	7.5	12	15	.24	
RHSY0CKC	7.5	.12	15	.24	30	.47	
RHSY1CKC	15	.24	30	.47	60	.95	



PUMP OPTIONS	PART NUMBER	PRICE
230 VAC (50Hz. .04amp)*	-2	
LOW DEAD VOLUME PUMP HEAD (pg. 19)	-LF	N/C

### QSY

Model QSY  
with CKC PHM and  
Dial Indicator

Ideal for low  
and medium  
pressure preparative  
chromatography



- Provides exceptional stroke rate accuracy better than 1% independent of load variations or fluctuations in line voltage.
- Synchronous drive operating at a consistent 72 strokes per minute can be combined with all RH and Q Pump Head configurations for a maximum flow of 92 ml/min.
- Convenient multi-position tilt stand for wall or counter mounting.
- Dial Indicator Kit available for ultra-precise adjustment of flow settings.
- Also available as Chromatography Kit "LCK" (see pg. 18).
- Hazardous-duty models available.

Electrical: 115 VAC, 60 Hz, 1Ø, .04 amps, totally enclosed, ball bearing, with 3 prong power cord - UL, CE.

Dimensions: 10 1/2" x 4 3/4" x 5 3/8" wide  
267 x 121 x 137mm

Shipping weight: 9 lb (4.05 kg)



PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE ONLY PRICE
		ML/MIN	GAL/HR	PSIG	BAR	
QSY	RH00	1.8	.03	100	6.90	
	RH0	3.6	.06			
	Q0	5.76	.09			
	RH1	7.20	.11			
	Q1	23.0	.36			
	Q2	51.8	.81			
	Q3	92.1	1.44			



DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg.20)	-Q485	
230 VAC (50/60 Hz)*	-2	
MOUNTING BASE (pg.19)	-MB	
X-PROOF (pg.12)	QSYX	

For options specify Drive Code and option part number, i.e.QSY with 230 VAC is a **QSY-2**

Rotational Sensors also available (see pg. 20)  
\*Flow Rates are reduced approximately 18% when Pump Drive Module is operating on a 50 Hz electrical supply.

**To Order:** Specify **QSY** For Pump Head Module select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.

**Piston size code is for flow rate information only.**



# Direct Current Drives "B"

## For Field Work And Other Mobile Operations



- Ideal for vehicle, boat, or remote applications.
- Widely used to inject discrete quantities of additive fluids into main discharge lines of tank trucks and pest control vehicles, as well as 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 a user supplied tachometer for closed loop circuit process application, as well as, other rotational controls.(RHB and QB only)



**RHB**

Model RHB

**RHB PUMPS** consist of a close coupled RH Pump Head with "B" motor (described below). Available in 12, 19, or 90 VDC.

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

Dimensions: 8" (203mm) x 3" (76mm) x 3" (76mm) wide  
Shipping weight: 5 lb (2.25 kg)

COMPLETE PUMP ASSEMBLY	MAX. FLOW/PRESSURE				PRICE
	ML/MIN	GAL/HR	PSIG	BAR	
RHB00SKY	65	1.02	100	6.90	
RHB0CKC	130	2.0			
RHB1CKC	260	4.1			

**QB PUMPS** are rated at 1800 spm or approximately 8 volts for 12 VDC models.

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

Dimensions: 10 1/2" (267mm) x 5" (127mm) x 4 1/2" (114mm) wide  
Shipping weight (with std. CKC Pump Head): 8 lb (3.6 kg)

**QB**

**QBG**

**QBG LOW CURRENT DC PUMPS** are ideal for extended 12/24 volt battery operation in remote locations. They are rated 60 spm at 12 VDC and 120 spm at 24 VDC.

Electrical: 12/24 VDC, 60-120 mA (depending on load), with 6" pigtail leads.  
Dimensions: 9 3/4" (246mm) x 5 1/4" (135mm) x 6 3/4" (171mm) wide  
Shipping weight: 7 lb (3.15 kg)



Model QB with CKC PHM and Dial Indicator



Model QBG with CSC PHM

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE ONLY PRICE		
		ML/MIN	GAL/HR	PSIG	BAR			
QB	RH00	45	.71	100	6.90			
	RH0	90	1.4					
	Q0	144	2.2					
	RH1	180	2.8	70	4.83			
	Q1	576*	9.1					
	Q2	1296*	20.4				30	2.07
	Q3	2304*	35.9					
QBG	RH00	1.5	.024	60	4.1			
	RH0	3.0	.047					
	Q0	4.8	.076					
	RH1	6.0	.095					
	Q1	19.2	0.30				30	2.07
	Q2	43.2	0.68					
	Q3	76.8	1.21				10	0.70

**Note:** Flow rates shown for QBG are based on 12 VDC, 60 spm operation.  
**To Order:** Specify **QB** . For Pump Head Module select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.

**Piston size code is for flow rate information only.**  
\*See general specs on page 4.

DRIVE OPTIONS	PART NUMBER	PRICE
Dial Indicator for QB & QBG (pg.20)	-Q485	
19 VDC (3.3 amps) for RHB & QB	-4	
90VDC (0.41 amps) for RHB & QB	-5	
Mounting Base for QB & QBG (pg.19)	-MB	

For options specify Drive Code and option part number, i.e. QB with 19 VDC is a **QB-4**



# Hazardous-Duty Drives "X"

## QSYX



**Model QSYX  
with CSC PHM  
and Dial Indicator**

The **QSYX LOW FLOW HAZARDOUS-DUTY** pump is coupled to Class I, Group D, synchronous motor for the ultimate in stroke to stroke accuracy.

Electrical: 230 VAC, 60 Hz, 1Ø, 0.4 amps, 72 spm, totally enclosed, ball bearing, with 3 #18 leads 12" long which exit through 1/2" straight pipe-tap hole for conduit. UL listed motor. **WARNING:** Supplied resistor and capacitor required for operation of this motor must be mounted in a control unit located outside of the hazardous area.

Dimensions: 10 1/4" x 6 3/4" x 6"wide  
260 x 171 x 152mm

Shipping weight: 24 lb (10.80 kg)

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE ONLY PRICE
		ML/MIN	GAL/HR	PSIG	BAR	
QSYX2	RH00	1.8	.03	100	6.90	
	RH0	3.60	.06			
	Q0	5.76	.09			
	RH1	7.20	.11			
	Q1	23.0	.36			
	Q2	51.8	.82			
	Q3	92.1	1.44	25	1.72	

### CLASS I GROUP D



DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg.20)	-Q485	
230 VAC (50 Hz)* for QSYX		

## QDX

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE				DRIVE ONLY PRICE
		ML/MIN	GAL/HR	PSIG	BAR	
QDX	RH00	43.12	.681	100	6.90	
	RH0	86.25	1.3			
	Q0	138	2.1			
	RH1	172.50	2.7			
	Q1	552*	8.6			
	Q2	1242*	18.9			
	Q3	2208*	31.2	25	1.72	

**To Order:** Specify For Pump Head Module, select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.

**Model QDX  
with CSC PHM  
and Dial Indicator**



### The QDX HIGH FLOW HAZARDOUS-DUTY CLASS I, GROUP D; CLASS II, GROUP E, F, G

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

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

Shipping weight: 43 lb (19.35 kg)

# Variable Speed Pneumatic Drives "PD"

## SPD GPD



**Model SPD  
with CKC PHM  
and Dial Indicator**

**SPD and GPD Pneumatic Pump Drive Modules** provide a compact, rugged, variable speed, air powered drive for Q or RH Pump Head Modules (pg. 5). Compressed air has proven to be an ideal power alternative when an electrical hook-up would be hazardous or is not readily available.

**SPD Specifications:** Up to 1800 strokes per minute. Air Requirements: 9-10 CFM at 40 psig. Air Inlet size: 1/8" (F) NPT. See QB for specifications.

**Price:**

**GPD Specifications:** Up to 400 strokes per minute. Heavy duty gear box Requirements: 14-16 CFM at 40 psig. Air Inlet size: 1/8" (F) NPT. See QG400 for flow specifications.

**Price:**

See page 3 for pump head codes, prices & material of construction



# IDS 2000 Industrial Dispenser For Industrial Process Environments



**IDS2000**

## APPLICATIONS INCLUDE:

- Battery Manufacturing
- Food Processing
- Pharmaceutical Production
- Precision Lubrication
- Electronic Assembly
- Adhesive Dispensing

## INTEGRATED SYSTEM INCLUDES:

- FMI's patented CeramPump® Valveless Piston design - **ONE MOVING PART!**
- Dispense or continuous metering
- Fixed or variable speed
- Precision long life stepper motor and controller
- PLC compatible
- Dispense volume: 0.008 to 1.28 cc/shot up to 7 shots/dispense at 0.5% precision
- Rugged stainless steel splash-proof wall mount design

Designed for  
24/7/365  
Operation



**Model IDS 2000  
with CSC PHM**

PUMP DRIVE MODULE	PISTON SIZE CODE	MAXIMUM FLOW	DRIVE ONLY PRICE
		MILLILITERS PER DISPENSE	
IDS2000	RH00	.025	
	RH0	.05	
	Q0	.08	
	RH1	0.1	
	Q1	.32	
	Q2	.72	
	Q3	1.28	

**To Order:** Specify \_\_\_\_\_ For Pump Head  
Module select Piston Size Code (i.e. Q1) & see page 3 for  
complete Pump Head Module selection codes & prices.

**Piston size code is for flow rate information only.**

\*See general specs on page 4.

## SPECIFICATIONS

Modes of Operation: Dispense or Continuous  
Strokes per Dispense: Field selectable from 1 to 7 strokes  
per signal

Drive Speed (RPM):  
1) Field selectable presets from 10 to 1200 RPM  
2) Analog 0-5 VDC input control from 6 - 1200 RPM

Mechanical:  
Weight: 7.1 lb/3.2 kg  
Size: 11.4" x 5.2" x 4.3"  
(28.98cm x 13.21cm x 10.92cm)  
Enclosure: NEMA 12, Stainless steel

Electrical:  
Power Input: 24-32 VDC, 2.0 A minimum  
Analog Input: 0-5 VDC  
Start Signal: + Side sinking, Opto-Isolated LED Input,  
12 - 30V @ 20 mA max Input  
Dispense/Run signal: + Side sinking, Opto-Isolated  
LED Input, 20V @ 20 mA max  
Input  
Dispense Verification: + Side sinking Open collector,,  
10V Typical @ 20 mA max  
Protection: Internal 2.5 Amp replaceable plug in fuse  
Temperature: + 20°C to + 60°C  
Connection: 6 ft. shielded cable with connector



# “QP” Motorless Pedestal Drives

## High Flow - Rugged Duty

“QP”



### IDEAL FOR OEM APPLICATIONS

0 to 2304 ml per minute

Up to 1800 rpm

QP Pedestal pumps are used extensively in industrial, laboratory, and OEM applications including instrumentation, gluing, marking, lubricating, spraying and dispensing equipment. Using the FMI valveless pumping principle you can easily handle slurries, suspensions, emulsions, solvents, viscous concentrates, gases, etc.

The pedestal pump can easily be driven by belt, chain or shaft coupling in response to rotating machine elements or connected directly to your special motor drive, e.g. air, hydraulic, stepper, etc.

Having flat sealed ball bearings these units have minimal torque requirement of 35 inch ounces.

Dimensions: 6 3/8" x 4 3/8" x 5 1/8" wide  
 with a 5/16" dia. x 13/16" long shaft extension  
 162 x 111 x 130 mm  
 with an 8 mm dia. x 3 mm long shaft extension  
 Shaft height from base is 2 3/4" (70 mm)

Shipping weight: 5 lb (2.25 kg)

Model QP  
 with CKC PHM  
 and Dial Indicator

Up to 100 psig  
 Only 4 3/4" x 4 1/8" wide panel  
 space needed

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. FLOW/PRESSURE			DRIVE ONLY PRICE
		MILLILITERS PER DISPENSE	PSIG	BAR	
QP	RH00	.025	100	6.90	
	RH0	.05			
	Q0	.08			
	RH1	0.1			
	Q1	.32			
	Q2	.72			
	Q3	1.28	25	1.72	



DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg.20)	-Q485	
P56C FACE ADAPTER	-P56C	
MASTERFLEX ADAPTER (pg.21)	QP/M	

For options specify Drive Code and option part number, i.e. QP with P56C is a Rotational Sensors available (See pg. 20)

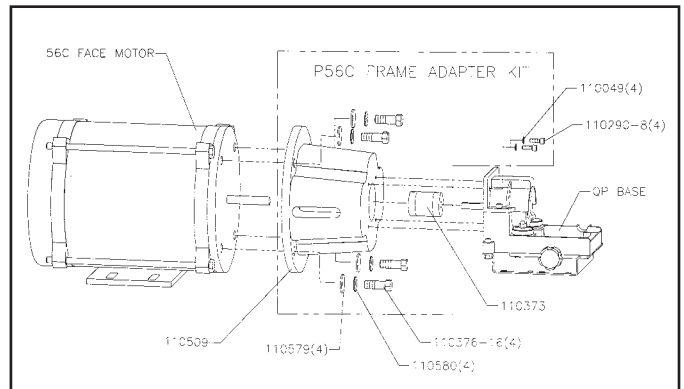
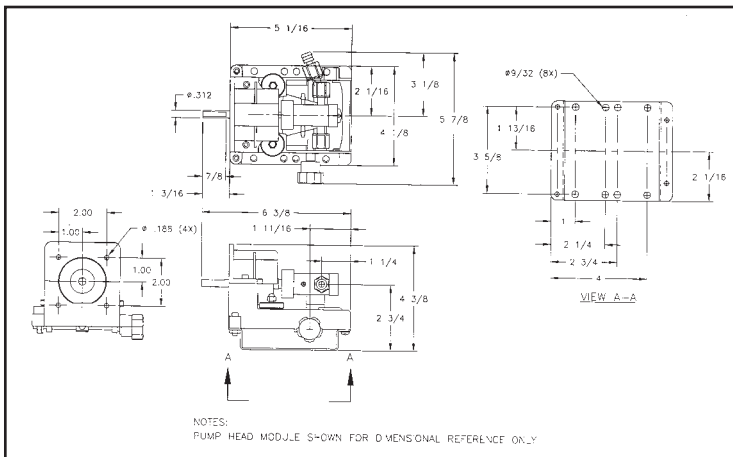
See page 3 for pump head codes, prices & material of construction

### HAVE A 56C FACE MOTOR?

Use the FMI P56C Adapter Kit for easy hook-up to your NEMA 56C FACE Foot Mount motor. **Specify P56C \$135.**

Shipping Weight: 4 lb (1.80 kg)

### QP Pump Outline Drawing







# Precision Dispensers For Pipetting, Syringing And Diluting

## PiP



Model PiP

The PiP, QC72 and QC216 Dispensers provide a low cost means of dispensing fluids accurately, to better than 1 %. They are ideal for repetitive and volumetric dispensing of acids, solvents and aqueous solutions. All feature FMI's unique low-dead-volume, valveless pump heads and synchronous motor drives.

Units can act as single shot dispensers using the hand/foot switch or as single metering pumps in the continuous mode. By using a combination of forward and reverse modes, dilutions can easily be accomplished.

The PiP micro  $\pi$ -petter® dispense range is from 0 to 0.1 ml (100  $\mu$ l), at pressures from 50 psig at low speeds and 20 psig at high speeds (see page 10, RHSY, for continuous flow specifications).

### Typical Data for PiPCKC

Sample data at various settings

Media: tap water - room temperature - not degassed  
Measurement: samples weighed to nearest 0.0001 gram

PUMP SETTING				PUMP SETTING			
100%	75%	50%	25%	100%	75%	50%	25%
0.0997	0.0762	0.0512	0.0260	0.1004	0.0765	0.0513	0.0258
0.1006	0.0766	0.0511	0.0259	0.1006	0.0766	0.0513	0.0261
0.1003	0.0763	0.0513	0.0259	0.1006	0.0766	0.0512	0.0259
0.1003	0.0765	0.0512	0.0258	0.1005	0.0767	0.0515	0.0295
0.1005	0.0772	0.0516	0.0259	0.1004	0.0766	0.0515	0.0259
0.1004	0.0772	0.0513	0.0258	0.1001	0.0767	0.0515	0.0260
0.1005	0.0774	0.0514	0.0258	0.0998	0.0772	0.0512	0.0260
0.1007	0.0774	0.0513	0.0259				

Electrical: 115 VAC, 60 Hz, 1 $\emptyset$ , .08 amps, synchronous, 150, 300, 600 rpm with 3 prong power cord.

COMPLETE PUMP ASSEMBLY	MAX. DISPENSE RATES MICROLITERS PER DISPENSE	PRICE
PiP00SKY	0 - 25 $\mu$ l	
PiPC0KC	0 - 50 $\mu$ l	
PiP1CKC	0 - 100 $\mu$ l	

PUMP OPTIONS	PART NUMBER	PRICE
LOW DEAD VOLUME PUMP HEAD (pg. 19)	-LF	N/C

Rotational Sensors also available (see pg. 20)

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

Shipping weight: 5 lb (2.25 kg)

## QC72 QC216

Model QC216  
with CKC PHM  
and Dial Indicator



THE QC72 & QC216 dispense ranges are 0 to 1.28 ml per dispense at pressures up to 100 psig. An air-activated hand/foot switch controls the dispense rate in the dispense mode. The stroke rate in the pumping mode is 72 spm for the QC72 and 216 spm for the QC216.

Electrical: 115 VAC, 60 Hz, 1 $\emptyset$ , 0.4 amps, 72 spm (QC72) and 216 spm (QC216), synchronous, totally enclosed, ball bearing with 3 prong power cord.

Dimensions: 8 1/8" x 8 1/4" x 5 1/4" wide  
206 x 210 x 133mm

Shipping weight: 10 lb (4.5kg)

PUMP DRIVE MODULE	PISTON SIZE CODE	MAX. DISPENSE RANGE		DRIVE ONLY PRICE
		MILLILITERS PER DISPENSE		
QC72 QC216	RH00	0	- .025	
	RH0	0	- .05	
	Q0	0	- .08	
	RH1	0	- .10	
	Q1	0	- .32	
	Q2	0	- .72	
	Q3	0	- 1.28	

To Order: Specify QC216 For Pump Head Module, select Piston Size Code (i.e. Q1) & see page 3 for complete Pump Head Module selection codes & prices.



DRIVE OPTIONS	PART NUMBER	PRICE
DIAL INDICATOR (pg. 20)	-Q485	

For options specify Drive Code and option part number, i.e. QC216 with Q485 is a QC216-Q485

Rotational Sensors also available (See pg. 20)  
Piston size code is for flow rate information only.  
\*See Gen. Specs. on page 4.

See page 3 for pump head codes, prices & material of construction

# OEM Dispensers & Pumps

## High Precision Step Motor Drives



### “STH” OEM Pump Line - Low Flow

### “STQ” OEM Pump Line - High Flow

**STH**

- Ceramic and fluorocarbon fluid path
- Displacement of 0 to 1280 microliters (1.28 ml) per revolution
- 1.8° stepper motors with opto sensors
- Precision - CV of 0.5% or better
- Accuracy of 1% or better
- Excellent chemical resistance
- 6 standard models and custom models
- Special OEM pricing available upon request



Model STH

COMPLETE PUMP ASSEMBLY	MAX. DISPENSE RATES	PRICE
	MICROLITERS PER REVOLUTION	
STH00CKCLF	0 - 25 µl	
STH0CKCLF	0 - 50 µl	
STH1CKCLF	0 - 100 µl	

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

Shipping weight: 12 oz. (336 g)

**STQ**

**NEW**



Model STQ

COMPLETE PUMP ASSEMBLY	MAX. DISPENSE RATES	PRICE
	MILLILITERS PER REVOLUTION	
STQ1CKC	0 - .32 ml	
STQ2CKC	0 - .72 ml	
STQ3CKC	0 - 1.28 ml	

Dimensions: 6 1/2" x 3 5/8" x 3 1/4" wide  
166.5 x 91.4 x 82.6 mm

Shipping weight: 3 lb (1.35 kg)

### FMI Stepper Control Kit “SCST-01”

- Quick start control for FMI stepper pumps STH & STQ
- Stroke rate to 1200 spm 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)

**NEW**



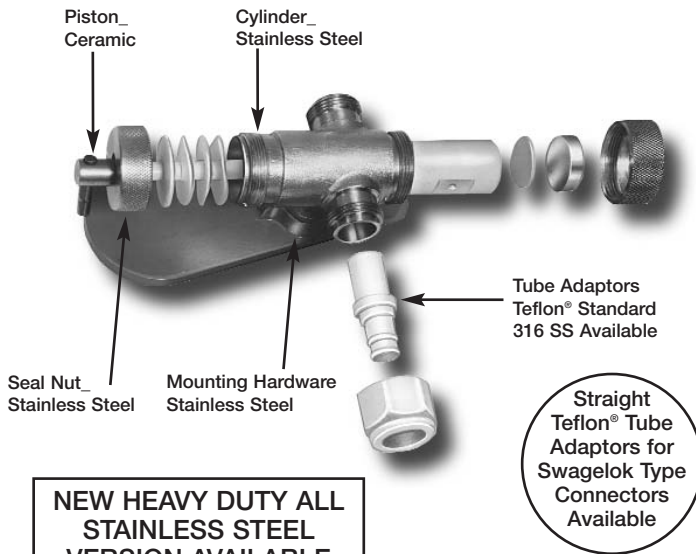
Model SCST-01

KIT SCST-01 INCLUDES:  
POWER SUPPLY, CABLES  
AND CONTROLLER  
PRICE



# Special Applications

DESIGNED FOR QUICK DISASSEMBLY FOR  
MAXIMUM CLEANING



**NEW HEAVY DUTY ALL  
STAINLESS STEEL  
VERSION AVAILABLE  
WITH SS PORT NUTS,  
TUBE ADAPTORS &  
CARRIER - "SAN-S"**

**SAN PRICE  
SAN-S PRICE**

## A3 PUMP HEADS FOR SANITARY APPLICATIONS

FOR ACCURATE AND DEPENDABLE HANDLING  
OF DISCRETE FLUID STREAMS IN SANITARY  
APPLICATIONS: FOOD, DAIRY, DRUG,  
PHARMACEUTICAL, BIOLOGICAL, ETC.

Suffix "SAN" designates FMI Pump Head Modules designed specifically to conform with the Milk Ordinance and Code recommended by the U.S. Public Health Service for equipment employed in sanitary applications. These Pump Head Modules may be used with any standard Pump Drive Module to provide any desired flow rate range within the scope of the FMI Product Line.

All fluid contact surfaces in "SAN" series pump heads are highly resistant to chemical and biological attack and are easily dismantled for scrubbing, sterilizing, brushing or other cleaning procedures. There are no internal threads or blind holes in "SAN" pump head components, and all pump heads are readily interchangeable with one another. Thus, sanitary procedures may be fastidiously followed without loss of system operating efficiency.

In "SAN" Pump Head Modules, sapphire-hard piston and cylinder components, fitted to a clearance of 50 millionths of an inch, promise minimal wear (even in the presence of mild abrasives). In short "SAN" Pump Head Modules are the ultimate in sanitation ease, rugged dependability and outstanding accuracy at realistic prices.



## LIQUID CHROMATOGRAPHY KIT "LCK"

FMI PUMP Models QSY-1CSC and QSYX2-1CSC have proven well suited for solvent delivery on preparative chromatographic columns and for new high-performance pre-packed columns for flows up to 1380 ml/hr. where pressure does not exceed 100 psig. Unlike conventional valved pumps, the valveless FMI LAB PUMPS do not exhibit random flow deviations. The unique directly coupled valveless piston design and synchronous motor drive assure long-term drift-free flow and mechanical stroke stability. Solvent compatibility is excellent, because the fluid contacts only chemically inert materials.

Repeat flow setting of 0.1% are attained by the use of the Dial Indicator Kit #Q485. The instant reverse feature without having to change tube connections, allows easy and direct column backflush. The smooth sinusoidal output (72 pulses per minute) is easily damped in critical applications by use of an FMI Pulse Dampener PD-60-LF. To facilitate direct connection of 1/4-28 low "dead volume" fittings, we have included Low Flow Fitting Kit #R479. (see page 22)

**HOW TO ORDER:** Order your liquid chromatography solvent feed kit as follows:

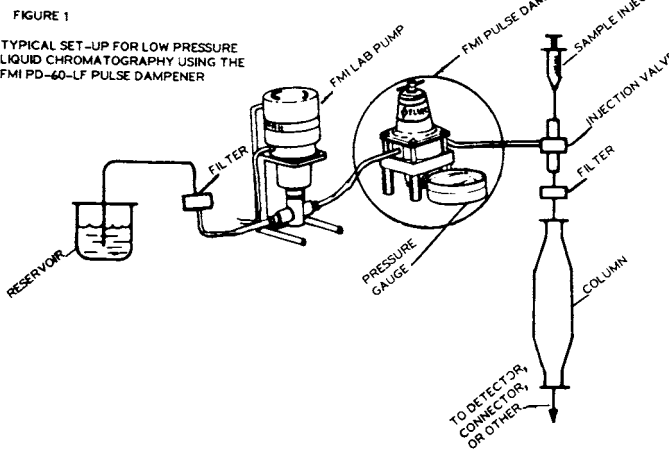


FIGURE 1  
TYPICAL SET-UP FOR LOW PRESSURE  
LIQUID CHROMATOGRAPHY USING THE  
FMI PD-60-LF PULSE DAMPENER

<b>TOTALLY ENCLOSED DRIVE (PG 10)</b> Consisting of: Model QSY-1CSC Dial Indicator Kit - Q485 Low Flow Kit - R479 Pulse Dampener - PD-60-LF Small Bore Tubing Kit - Q661 LCK PRICE	<b>HAZARDOUS-DUTY DRIVE (PG 12)</b> Consisting of: Model QSYX2-1CSC Dial Indicator Kit - Q485 Low Flow Kit - R479 Pulse Dampener - PD-60-LF Small Bore Tubing Kit - Q661 LCKX2 PRICE
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See pages 20 & 22 for details and prices of above accessories.  
NOTE: "CSC" Pump Head Modules NOT RECOMMENDED FOR  
PURE HEXANE.

# Options



## “W” ISOLATION GLAND PUMP HEADS for saline, photo, plating, and sterile applications.

Isolation gland option available for Q1, Q2, CKC, CKC-LF, & CSC Pump Head Modules.

In a special modification of certain FMI Pump Head Modules (designated by suffix “W” or “WT”), a pair of extra ports provide a barrier gland of liquid, gas, steam or whatever fluid required to isolate the pumped fluid from the seal area and atmosphere. Slurries, particulates, crystal formers, and anaerobics are easily handled at temperatures and pressures unattainable before.

### STANDARD CKC-W

- 💧 Temperature to 212°F
- 💧 Pressure to 60 psig
- 💧 Ceramic piston and liner in fluorocarbon cylinder case
- 💧 Main flow ports for tubing up to 1/2” I.D. using special adapters; Gland ports: 1/8” O.D. barbs for 1/8” I.D. tubing

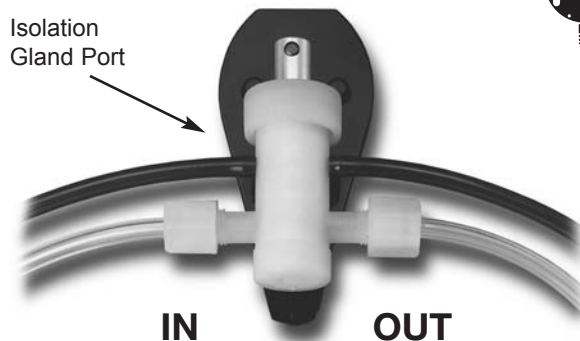
### NEW STAINLESS STEEL CSC-W

- 💧 High 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

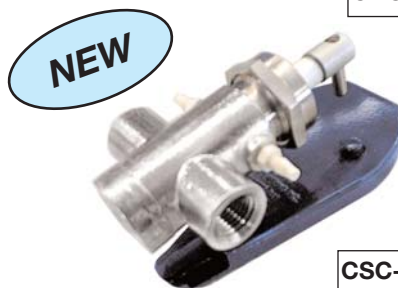
### NEW HIGH TEMPERATURE CSC-WT

For maintaining process fluid temperatures as well as 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



CKC-W PRICE



CSC-W PRICE



Shown with typical cartridge heaters installed (not included).

CSC-WT PRICE

## “LF PUMP HEADS for Zero Dead Volume Applications

Direct connection to 1/4-28 low flow fittings

New **RH-LF** and **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 (pg 21). “LF” Pump Heads are designed to be leak free, have low dead volume and are available with Pump Head Modules shown on page 3.

Add suffix “LF” after Pump Head configuration

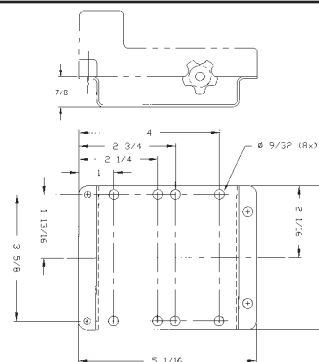


NOTE: FOR LOW FLOW (UNDER 50 ML/MIN) APPLICATIONS

## “Q” FIXED MOUNTING BASE KIT MB

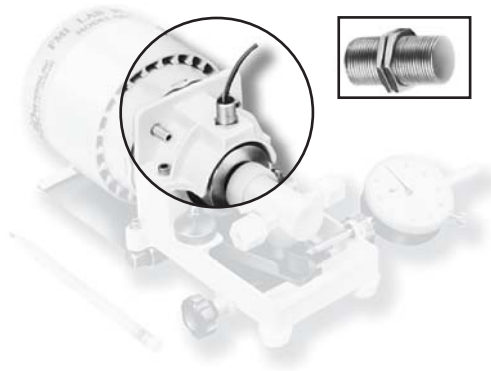
Sturdy mounting base accessory for “Q” Line metering pumps. Allows pumps to be firmly bolted to surface in horizontal or vertical operating position. Hardware for attaching base to pump and instructions included.

MB KIT PRICE





# Options



## ROTATIONAL SENSORS SENDS SIGNAL TO COUNT VOLUME STROKES DELIVERED

**FMI ROTATIONAL SENSORS** are factory installed options which provide a means of accuracy monitoring the rotation of FMI Pump Drive Modules for flow totalization. Each shaft rotation activates the sensor, creating one electrical output (Hall Effect Sensor) or switch closure (Proximity Switch) for each pump discharge stroke. Outputs can be fed to a process controller, computer, control monitor, or any type of electronic counting device with compatible electronic circuitry.

### HALL EFFECT TYPE ROTATIONAL SENSORS

Hall effect sensors are completely sealed in a threaded aluminum bushing, meeting NEMA 3, 3R, 3S, 4 4X, 6, 12 and 13 requirements.

#### Electrical Specifications

PART NO.	SUPPLY VOLTAGE (VDC)	SUPPLY CURRENT (mA max.)	OUTPUT TYPE	OUTPUT VOLTAGE (V)	OUTPUT CURRENT (Max.)	6" STRANDED LEADWIRES
HES-6	4.5 TO 24	10.0	Sink	0.4	40mA	22 gauge teflon insulated

Life: Indefinite

HES-6 PRICE

**FACTORY INSTALLED  
ONLY**

PRS-1 PRICE

### PROXIMITY TYPE ROTATIONAL SENSOR

#### Electrical Specifications

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

Life: 50 Million Operations at 5VDC, 10 mA

# ACCESSORIES



### "Q485" DIAL INDICATOR KIT (For Ultra Fine Adjustment)

**Q485 2" DIAL INDICATOR KIT** for fine adjustment of "Q" pump flow rate settings. A convenient dial indicator with direct reading count hands for precise flow rate setting. Responds to slightest turn of the "Q" pump adjustment knob. One revolution of primary pointer equals 10% of maximum flow rate (each increment on dial represents 1/1000 of maximum flow rate.) Secondary dial indicates each 10%. Easily attaches to all "Q" pump bases. Can be ordered with pump or separately.

KIT#Q485 PRICE

### 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
#R412-5K	Adaptor for 1/4-28 ferrule fittings
#H476-K	Adaptor for 1/8" O.D. Tubes

# Accessories



## “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 Q661 - 1/16” & 1/8”**  
Contains Both  
Q661A and Q661B

**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)

Price:

Price:

Price:

Price:

## LOW FLOW BARB ADAPTERS FOR 1/16” and 1/8” I.D. TUBING

Threaded 1/4-28 UNF Fitting to Kynar Barb  
Bottom sealing, rotating adapters consisting of a white nylon 1/4-28 fitting with 5/16” hex nut and Kynar (fluid path) insert barb.

For use with 1/16” (1.6 mm) I.D. tubing



#110874A  
Pkg. of 10      Price

For use with 1/8” (3.2 mm) I.D. tubing



#110873A  
Pkg. of 10      Price

# FMI MASTERFLEX® L/S™ KITS

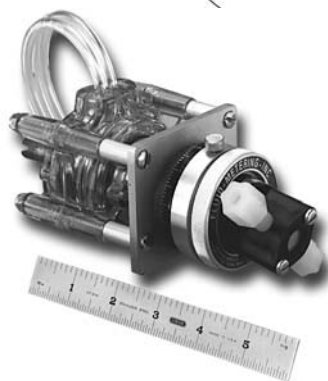
## ENHANCE YOUR EXISTING MASTERFLEX PUMP DRIVES

- 💧 Move to state of the art valveless piston technology
- 💧 Extend your pump’s operating pressure up to 100 psig
- 💧 Improve your long term accuracy to better than 1 %
- 💧 Add precise mechanical flow adjustment to your L/S drives
- 💧 Increase your pump’s efficiency by providing dual proportional fluid metering when adding FMI’s CeramPump® Technology to an existing L/S™ peristaltic pump head.
- 💧 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



RH/M



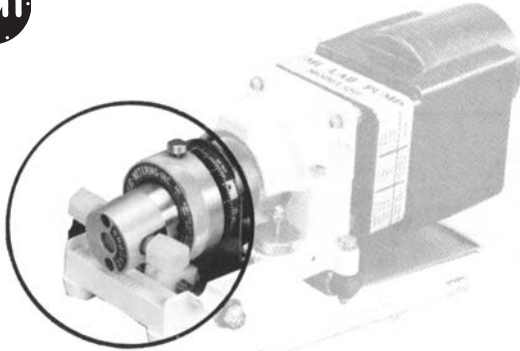
Masterflex - Reg TM of Cole-Parmer Instrument Co.  
L/S - Reg TM of Cole-Parmer Instrument Co.  
EASY-LOAD - Reg TM of Cole-Parmer Instrument Co.

KIT # RH/M (See Page 15)      Price  
KIT # QP/M (See Page 14)      Price



# Accessories

## “RH/Q” ADDS VERSATILITY TO YOUR RH HEAD BY ADAPTING IT TO ANY Q PUMP DRIVE



This is a complete adaptation system that **permits use of an RH miniature pump head on any Q drive module**. Once the RH pump head is fitted (3 screws) to the kit parts, it can be slipped into place on the drive module in seconds without tools. To remove it, simply loosen the two thumb nuts of the motor base and slip it off.

**Kit RH/Q PRICE**



**R479 KIT FOR LOW FLOW APPLICATIONS (REPLACES R412, WHEN USED)**

## “R479” LOW FLOW ISOLATION KIT FOR STAINLESS STEEL PUMP HEADS (EXCEPT SAN)

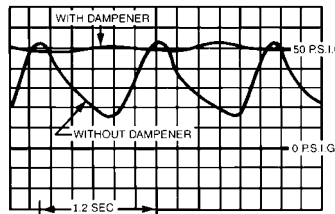
Kit #R479 is a Teflon adapter for FMI Stainless Steel (S) pump heads that are used in low flow (below 50 ml/min) applications where minimum system dead volume and maximum chemical inertness is required.

The kit provides 1/4-28 internal machine threads that are used with low flow tube fittings for small bore tubing of 1/8" O.D. or less, such as Kits Q661 (see pg 21). Particularly useful in chromatography applications and when using Pulse Dampener PD-60-LF (shown below).

#R478A Consists of ten spare ferrules **PRICE**

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

## FMI PULSE DAMPENER “PD-60-LF” (Low Flow Steady Flow Accessory)



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

The **FMI Pulse Dampener PD-60-LF** is designed to effectively suppress approximately 90% of the pulse magnitude generated by piston type metering pumps operating at flow rates up to 50 ml/min and stroke rates up to 150 per minute against head pressures of 10 to 65 psig. It features low internal volume, isolated pressure gauge, corrosion resistant wetted parts of type 316 stainless steel and TFE, flow-through (self-purging) design, excellent reduction of base line drift and noise in feeding low-pressure liquid chromatography systems, all in a small (2.7" x 5" x 6" high), lightweight (1.6 lbs net) package arranged to accept standard 1/4-28 tubing accessories.



**Model PD-60-LF PRICE**

## “PD-HF” IN-LINE PULSE SUPPRESSOR (For High Flow Applications)

**NEW IN-LINE PULSE SUPPRESSOR** for high flow systems of 50 ml/min or greater and stroke rates higher than 150 spm 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.



**Model PD-HF PRICE**

## 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 PRICE**



# 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 on page 3 of the catalog 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 alumina (99.5% aluminum oxide) - excellent chemical resistance, thermal stability and mechanically resistant to common abrasives.

**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

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, E.I. Dupont Co.

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, Furon Company

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, Furon Company

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®, E.I. 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 on a basis of actual piston displacement.

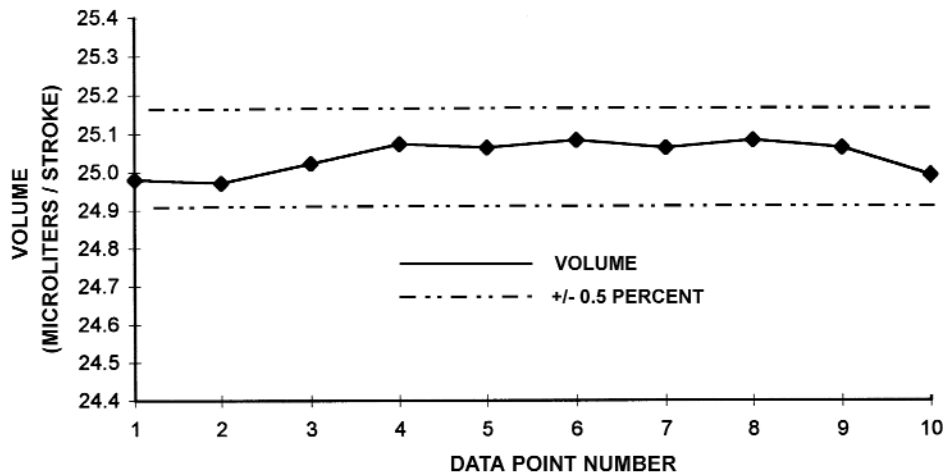
**IMPORTANCE OF CLEAN FLUIDS:** While a certain amount of caution must be exercised in the use of abrasive fluids in any metering pump, the "CKC" and "CSC" tend to be more tolerant of suspended solids than other metering pumps. To assure fluid compatibility, consult the Materials of Construction information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

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



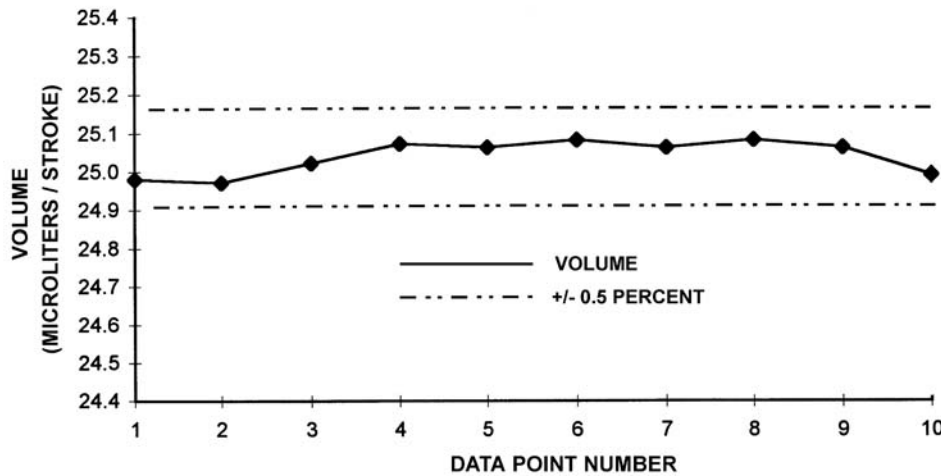
# Typical Flow Data "H" Style Pumps

## PRECISION TEST - 25 MICROLITERS / STROKE



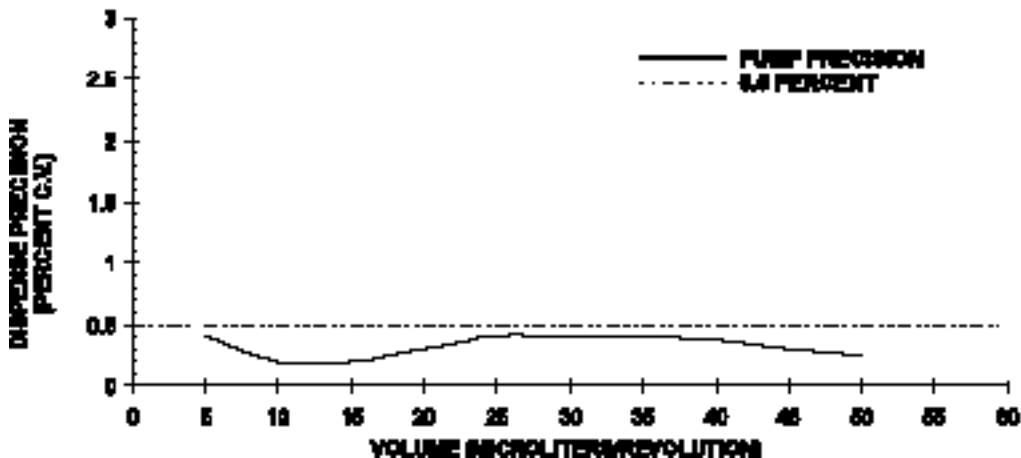
Point	Volume (ul)
1	24.98
2	24.97
3	25.02
4	25.07
5	25.06
6	25.08
7	25.06
8	25.08
9	25.06
10	24.99
Total:	250.37
Avg.:	25.04
Std. Dev.:	0.04
C.V.:	0.17

## TYPICAL LIFE TEST PRECISION 50 MICROLITER FMI PUMP



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

## TYPICAL DISPENSE PRECISION TEST FMI PUMP

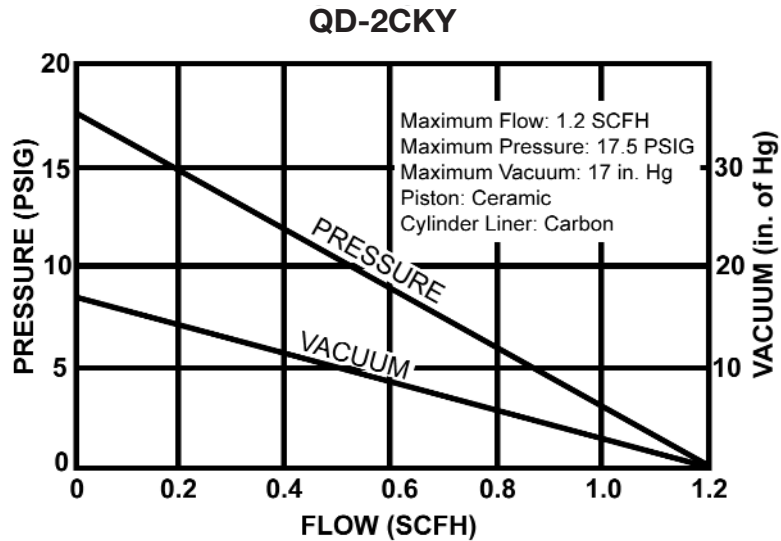


# Typical Performance Curves

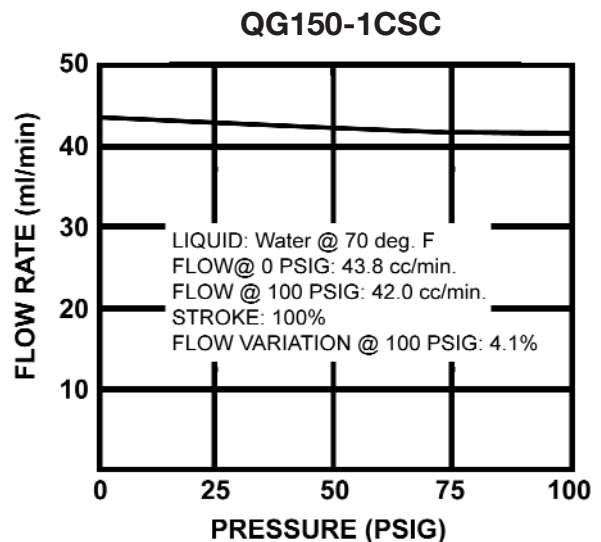
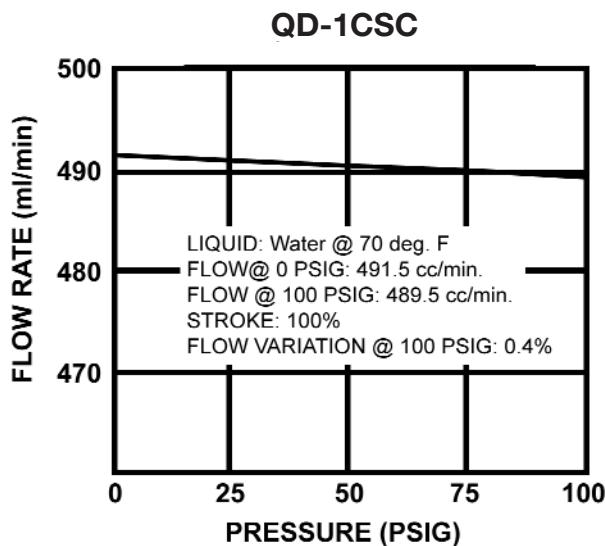


Performance curves shown below are applicable to the new “Q” line of metering pumps.

PERFORMANCE CURVE shown below 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.



Let us put our more than forty years of pumping experience to work for you! FAX your specifications to 516-624-8261 - we will assist you with your selection of the right pump for your special application - fluid and material compatibility



# Typical Applications for FMI Dispensers and Pumps

## Medical

For precise dispensing, aspirating, rinsing, & 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 & pigment additives, catalyst for foundry resins, plating bath regeneration, petroleum additives, photo chemicals, inks, monomers and adhesives.

## Instrumentation

For all kinds of precision instruments and monitors including, titrators, TOC, SO<sub>2</sub> monitors, chromatographic systems, and humidity control.

## Precision Cleaning

For dispensing of concentrated cleaning agents used in automated washers for laboratory glassware & mechanical components, as well as the metering of ultra concentrated liquid car wash detergents.

## Automotive

Used extensively in hydrogen fuel cell research & development for both the humidification and fuel injection systems. For dispensing insulating and encapsulating coating materials in the manufacture of stators, armatures, and distributors. Also used in instrumentation to verify gasoline octane rating.

## Battery Manufacturing

Used for precision dispensing of electrolytes & slurries into batteries, as well as for lubrication of fine blanking machines used to form and stamp battery components.

## Cosmetic & Hygiene

Used for precision dispensing of pigments used in cosmetic color mixing systems. Also for moisture control and fragrance addition in the manufacture of diapers and sanitary napkins.

## 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 & etch solutions.

## Pilot Plant

For research, development, and testing of a wide range of process applications including chemical synthesis, water & waste treatment, power plants, pharmaceutical manufacturing, petroleum refining, photo finishing, and more.

## Environmental & Pollution Control

For sampling of stack gases, ground water, and wastewater, as well as injection of monomers, polymers, and treatment chemicals for water & waste, TCLP and more.

## Food & 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.

## Spraying Systems

For injection of insecticides, herbicides, and agricultural nutrients. Also used in ULV spray equipment for mosquito control.

## Dispensing Systems

For dispensing of solvents, UV adhesives, lubricants, reagents, and mercury in the manufacture of medical disposable components, electronics, pharmaceuticals, computers, and calibration equipment.



# RAPID RESPONSE Application Form

COMPANY NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRST NAME: \_\_\_\_\_ LAST NAME: \_\_\_\_\_ TITLE: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE/PROVINCE: \_\_\_\_\_ ZIP: \_\_\_\_\_

COUNTRY: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

1. FLUID NAME: \_\_\_\_\_ 2. DISPENSE VOL/FLOW RATE: \_\_\_\_\_ 3. PRESSURE: \_\_\_\_\_

4. TEMPERATURE: \_\_\_\_\_ 5. VISCOSITY: \_\_\_\_\_ 6. ELECT. VOLTAGE: \_\_\_\_\_

7. APPLICATION: \_\_\_\_\_

**Make a copy , Answer the above 7 application questions, Fax to (516) 624-8261**

## Additional Applications

Other typical areas of applications in research and development, pilot operations and production are shown below. Applications where ruggedness and day-to-day dependability are as important as accuracy and repeatability.

agrichem injection  
automatic lubrication  
biotechnology  
bottle manufacturing  
breweries  
chemical processing  
computer disk manufacturing  
cosmetics  
dispensing  
emulsion and slurry dosing  
fish farming  
flow injection analysis  
fluid control  
fluid hydraulics  
fluid sampling  
food processing  
foundries  
fuel oil additives

general laboratory use  
immunoassays  
insect control  
in-space research  
kidney dialysis  
liquid chromatography  
livestock feed supplements  
medical diagnostics production  
medical research  
milk and beverage enrichment  
monomer feeding  
pharmaceutical production  
pilot plant  
plating bath replenishment  
pollution control  
precise proportioning  
preservative and  
concentrate handling

production line dispensing  
quality control systems  
reactor feed  
reagent control  
robotics  
sanitary  
scientific instruments  
sewage treatment  
soil treatment  
solvent welding  
spectrophotometry  
spray systems  
titration equipment  
toxicology  
vitamin injection  
waste sampling  
water treatment  
wax dispensing

## Metric Conversion Formulas

TO CONVERT	INTO	MULTIPLY BY
Liters	CC (ml)	1,000.0
Milliliters	Liters	0.001
Milliliters	Microliters	1,000.0
Ounces	Liters	0.02957
Gallons	Liters	3.785
Quarts	Liters	0.9463
Pints	CC(ml)	473.2

TO CONVERT	INTO	MULTIPLY BY
Gallons	CC(ml)	3785.0
Inches	Millimeters	25.4
Pounds	Kilograms	0.45
Bars(kg/sq/cm)	PSIG	14.50
Centigrade	Fahrenheit	(C°X1.8)+32
Fahrenheit	Centigrade	0.555(F°-32)

## 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 to rated pressure prior to shipment from the factory. The qualifying performance of each pump is recorded by serial number in a permanent record of the company. If at any time within the first 1 year after any FMI product has been shipped to a customer (user), it fails to perform according to FMI literature, the product, with written explanation of the problem, may be returned, freight prepaid, to the FMI plant for examination, repair or replacement at FMI expense (labor and material). All such returns must have prior FMI customer service authorization before returning. If, upon examination, FMI determines that abusive practices, non-compatible fluids or 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 F.O.B. FMI factory.

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 is authorized to change the terms of this warranty.

## FMI TERMS AND CONDITIONS

### PRODUCT STANDARDS

FMI products are certified and sold to comply with written FMI specifications. Only the corporation 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 specifications. 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.

### 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 \$15.00 domestic and foreign invoice value per order, net of shipping costs and any applicable discounts regardless of price list value of order.

### SHIPMENTS

Shipments are usually made within 24 hours of receipt of order.

### F.O.B. SHIPPING POINT

All FMI prices are for delivery F.O.B. factory, Syosset, New York, packed for domestic shipment unless otherwise stated in writing.

### FREIGHT POLICY

Provisions are made for pick-up, prepay and bill, or freight collect delivery. All shipping costs other than those normal to FMI domestic

product packaging and F.O.B. policy are incurred at customer request and expense. Foreign orders are sent freight collect, unless otherwise specified.

### FREIGHT CLAIMS

All claims for damaged merchandise should be made with the delivering carrier.

### TERMS OF SALE

#### PAYMENT TERMS

There are no provisions for financing of customer orders. Invoices are considered due and payable when presented.

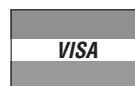
Foreign sales are cash in advance or irrevocable letter of credit payable through a U.S. bank in U.S. funds upon presentation of shipping documents. All charges related to letter of credit are to be paid by the buyer. A statement to this effect must appear on the letter of credit. Customers may establish 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) a suitable credit history with a national reporting organization.

### PROMPT PAYMENT DISCOUNT

1%, 10 days, net 30 for open account  
2% C.O.D. or cash with order.

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 visit our internet site at: [www.fmipump.com](http://www.fmipump.com)  
**WE have EDI at FMI - Give us a call.**

**We accept Visa, MasterCard and American Express**



# Over 40 Years Dedicated to Quality and Service



**David Francis - 3 Years**  
Office Supervisor



## The Vanguard

FMI pioneered the patented, valveless, rotating and reciprocating piston metering pump concept and has been delivering pumping excellence and precise fluid control for over 40 years. That pioneering spirit continues as new products, ideas and materials are constantly being tested and revised to ensure the best possible FMI pump for your application. All FMI products are made in the U.S.A.

**Johnnie Hayes - 8 Years**  
Assembler



## Our Commitment!

At FMI, quality is our number 1 goal. We are dedicated to providing all of our customers with the highest quality valveless metering pumps, the very best service and technical support. To further our quality goal FMI has certified its operations under ISO 9002 criteria.

**Fred Kaneblei - 9 Years**  
Production Supervisor Asst.



## Easy Ordering and Technical Support

It's not always easy to determine which pump is best for your application. At FMI our trained Technical Support staff is available to assist you in making the right choices for all your pumping applications. **Call us Toll-free at 800-223-3388** or call 516-922-6050. Visit our web site at [www.fmipump.com](http://www.fmipump.com).

**Herb Werner - 7 Years**  
Marketing Coordinator



## Our Large Inventory

FMI continues to maintain an extensive inventory for fast shipment of your orders - most catalog items are shipped via UPS within 24 hours of receipt of order.

**Need it faster? We can get it to you overnight** with UPS Next Day, Express Mail, or Federal Express Priority 1 service. Just let us know when placing your order.

## Our Mission Statement . . .

100% Quality, 100% On-Time Delivery .  
. . . is supported by our valued OEM  
supplier awards.

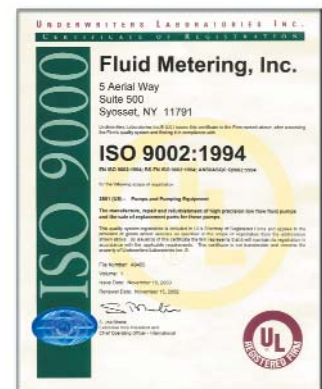


### 2001 Supplier of the Year

Every year, our list of distinguished supplier awards grows. Shown here is our recent award from Abbott Diagnostics, world leader of medical diagnostic test systems.

### ISO 9002

Fluid Metering, Inc. is proud to announce certification of operations under ISO 9002 criteria.



# OEM Dispensers & Pumps

*When Accuracy Really Counts - Count on FMI OEM Pumps*

FMI has over forty years of experience with a variety of OEM applications. Call us, we will be happy to solve your fluid control needs. Proven performance, service, and reliability enable us to fulfill your special pumping needs.



“RH” and “STH” OEM Pumps

A significant portion of our business for standard FMI pumps and accessories comes from a variety of biomedical, commercial, industrial and agricultural OEM applications. They are found in applications ranging from multi-dispense production systems to ultra sensitive analytical instrumentation.

The newly patented FMI “Living Hinge” STH series as described on page 17 and our new “STQ OEM” pumps offer a new dimension in high precision instrument quality metering pumps for OEM manufacturers.

If you don't see a specific product in this catalog to meet your needs or if you would like to discuss how we could assist you, please contact us. Of course, all information is confidential. See pages 24 & 25 for some typical flow data and pages 26 & 27 for a list of typical applications in which FMI pumps are being used.



New “Q” OEM Pumps

## FMI 2002 SHOW SCHEDULE

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

February 5-7	MD&M02	Anaheim Conv. Ctr.	Anaheim, CA	1766
March 18-21	PITTCO'02	E.N. Morial Conv. Ctr.	New Orleans, LA.	4330
April 15-17	Interphex 2002	Jacob Javits Ctr.	New York, NY	1848
April 23-26	Analytica 2002	Messe Munich	Munich, Germany	C-2, 514J
June 4-6	MD&M East 2002	Jacob Javits Ctr.	New York, NY	1366
June 16-19	IFT Food Expo'02	Anaheim Conv. Ctr.	Anaheim, CA	TBA
July 30 - August 1	American Assoc. of Clinical Chem.	Orlando Conv. Ctr.	Orlando, Fl.	TBA
August 19-22	American Chemical Society Fall	Hynes Conv. Ctr.	Boston, Ma	504

