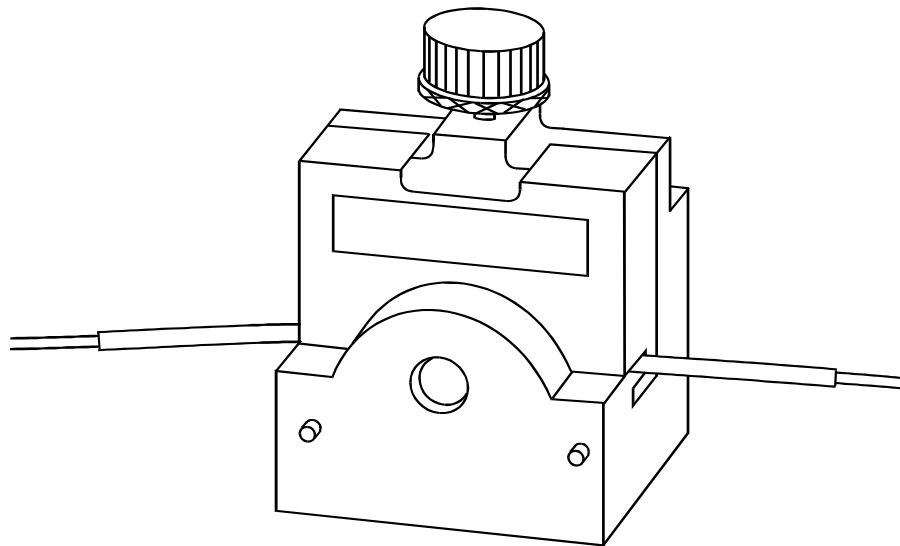


OPERATING MANUAL

MASTERFLEX[®] L/S[®] **PTFE TUBING PUMP**

Model 77390-00



Cole-Parmer Instrument Co.

1-800-MASTERFLEX (627-8373) (U.S. and Canada only)

11 (847) 549-7600 (outside U.S.)

(847) 549-7600 (Local)

www.masterflex.com

Barnant Company

1-800-637-3739 (U.S. and Canada only)

11 (847) 381-7050 (outside U.S.)

(847) 381-7050 (Local)

www.barnant.com



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This product is covered by one or
more of the following U.S. and
corresponding foreign patents:
5,468,129 and 5,482,447

SAFETY PRECAUTIONS

CAUTION:



Use only pre-formed MASTERFLEX® L/S® PTFE tubing. Use of other tubing may result in premature or unknown failure modes.

WARNINGS:



Turn drive off before removing or installing tubing. Fingers or loose clothing could be caught in the rollers.

Use recommended fittings only. Use of improper fittings and/or improper connection to fittings may result in leakage at the fittings.

Do not operate the pump without the following precautions:

Either of the following two conditions can result in sudden and/or extensive tubing failure. Tubing failure may result in liquid leaking from pump. In the event of tubing failure, operating pump at elevated speeds and pressures will result in accelerated liquid leakage. Use appropriate measures to protect operator and equipment from caustic liquids.

1. HIGH PUMP-generated pressures.

A PRESSURE RELIEF/BYPASS VALVE must always be installed in a potentially high pressure system to prevent the pump from exceeding the maximum rated pressure (100 psig; 6.8 bar).

- a. where the possibility of a blocked outlet occurs.*
- b. where occlusion setting is greater than recommended.*
- c. where higher pressure filters are used that do not have a built-in pressure relief system.*

2. HIGH SYSTEM-generated backpressures.

AN INJECTION CHECK/BACK PRESSURE VALVE should always be installed when pumping into a pressurized reservoir or line. This will prevent siphoning and/or backflow of liquid from a treated line in the event of tubing failure.



WARNING: PRODUCT USE LIMITATION

These products are not designed for, nor intended for use in patient connected applications; including, but not limited to medical and dental use, and, accordingly have not been submitted for FDA approval.

INTRODUCTION

The Model 77390-00 PTFE Tubing Pump, Figure 1, provides quick loading of the special PTFE tubing assemblies. The pump is designed to work with the MASTERFLEX 2mm ID PTFE Tubing Model 77390-50 and 4mm ID Model 77390-60 and provides a wide flow range when used with compatible MASTERFLEX Pump Drives. Appendix A lists most of the MASTERFLEX® L/S® Pump Drives which can be used with this pump.

The step-by-step instructions in this manual are task-oriented for easy reference. The manual provides information for installing, operating and customer maintenance of the Model 77390-00 PTFE Tubing Pump.

CAUTION: *Improper setup or operation may result in damage to the pump system components. Read instructions prior to use.*

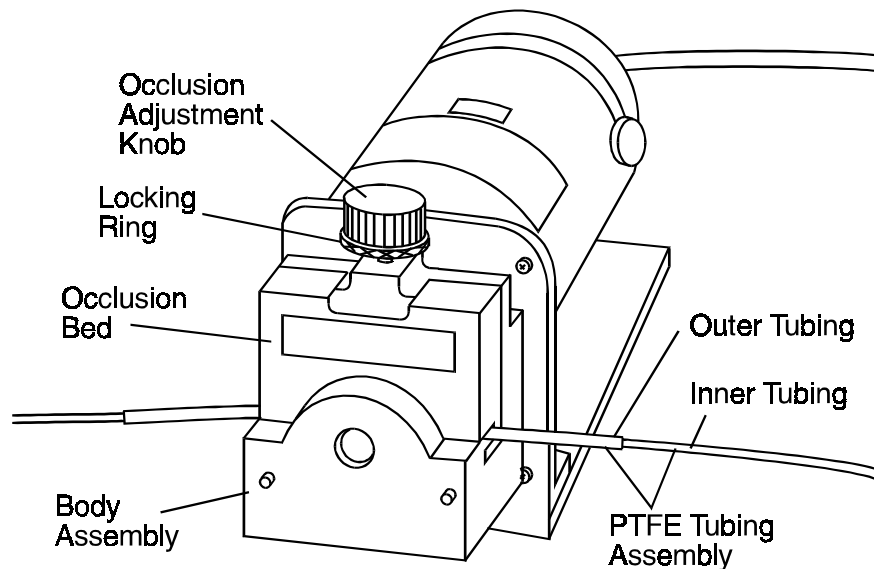


Figure 1. Model 77390-00 PTFE Tubing Pump

APPLICATION DATA

The Model 77390-00 PTFE Tubing Pump is used to pump caustic and/or sterile liquids, particularly those liquids that are not compatible with other existing MASTERFLEX tubing materials. The use of PTFE tubing provides improved liquid compatibility and maintenance of liquid purity. The specially designed tubing assemblies provide for intermittent operation at pressures up to 100 psig. Various compatible accessories are available including PTFE valves, T-connectors, fittings, etc. for connection to remaining user system components. **Make sure that the fittings used are properly sized and are compatible with the pressure rating of the pump.** Contact your dealer.

A typical application is transfer of liquids from storage containers to those used in experiments. Metering of such liquids is another application when the pump is used with an appropriate MASTERFLEX® L/S® Pump Drive. The higher pressure capability allows use in low-volume filtering, chromatography sample injection and other applications.

GENERAL DESCRIPTION

The PTFE Tubing Pump (see Figure 1) is composed of a Body Assembly and an adjustable Occlusion Bed. The Body Assembly is used to attach the pump to a drive and to support the six-roller ball bearing Rotor Assembly and the Occlusion Bed. The Occlusion Bed holds the tubing and mounts to the Body Assembly. It is held in place by increasing the occlusion to an appropriate level. Occlusion is controlled by adjustment of the Occlusion Adjustment Knob. A Locking Ring maintains the occlusion setting. The six-roller configuration provides low pulsation and prevents back-flow when the pump is stopped.

Tubing is held in place without the use of special retainers. The curvature of the groove along the lower surface of the Occlusion Bed matches the curve of the tubing assembly and holds the tubing in place during pumping.

Two different diameter specially fabricated PTFE tubing assemblies are available. The tubing is semi-flexible and chemically inert.

INSTALLATION

Mounting the Pump Head to a MASTERFLEX® L/S® Pump Drive

The Pump Head is attached to the drive unit with four supplied screws as shown in Figure 2.

NOTE: Two Tang Boots are provided. The Pump Head is shipped with the closed end Tang Boot (A-3480) installed which matches most MASTERFLEX® L/S® Drives. Replace with open end Tang Boot (A-3514) when necessary.

1. Rotate the Occlusion Adjustment Knob fully counterclockwise to lift the Occlusion Bed as shown in Figure 3.
2. Remove the Occlusion Bed by sliding out the front of the Body Assembly.
3. Align the Tang on the Pump Head (including installed boot) with the slot in the motor drive shaft.
4. Align the lower mounting holes on the Pump Head with the mounting holes on the drive and fasten with the two thumbscrews.
5. Insert the two Phillips screws through the mounting holes in the upper part of the Body Assembly. The upper two screw holes are accessible by removing the Occlusion Bed.

This completes the mounting of the Pump Head. Proceed with the Setup Procedure.

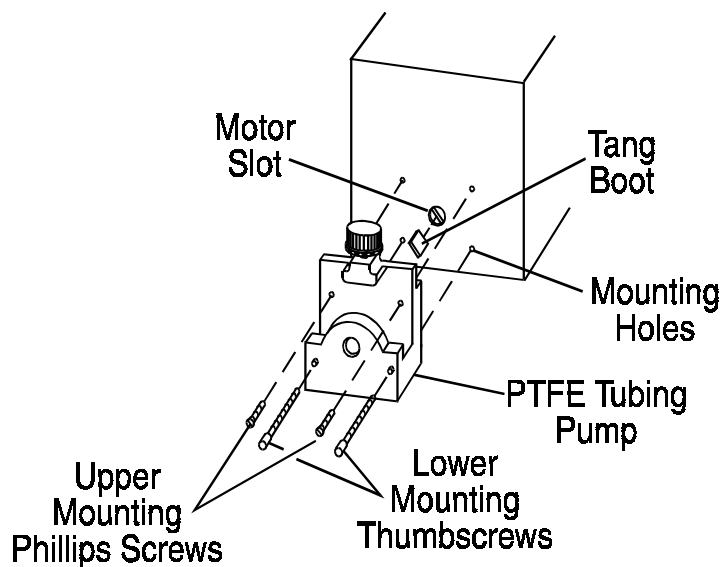


Figure 2. Attaching Pump to Drive

SETUP AND OPERATION

Selecting Tubing Size

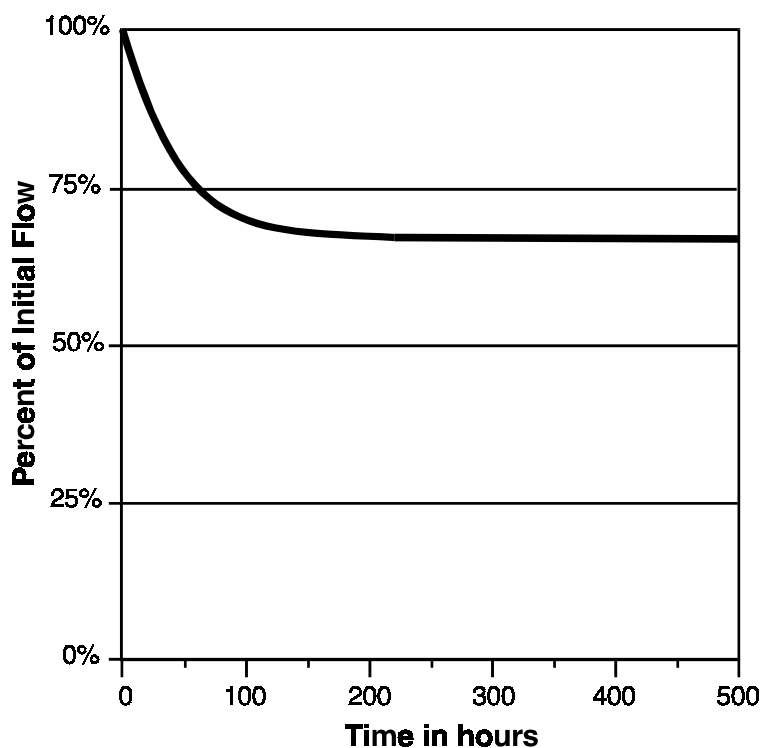
The following chart provides approximate flow rates for the different tubing sizes when used at various speeds. Liquid medium is distilled water at 72°F (22.2°C) and zero psig backpressure.

Drive Speed r/min	Tubing Catalog No.	
	77390-50	77390-60
	Initial Flow Rate mL/min	
1	0.09	0.35
75	7	26
100	9	35
150	13	53
300	26	105

Drive speeds greater than 300 r/min are not recommended.

Initial Flow Rate vs. Drive Speed

The following curve provides approximate percent age of decay of initial flow vs. time at 300 r/min. Decay will be faster or slower at different speeds.



Decay of initial Flow vs. time at 300 r/min

Loading Tubing

WARNING: *Turn drive off before removing or installing tubing. Fingers or loose clothing could be caught in the rollers.*



1. Rotate Locking Ring fully counterclockwise to unlock Occlusion Adjustment Knob.
2. Rotate the Occlusion Adjustment Knob completely counterclockwise.

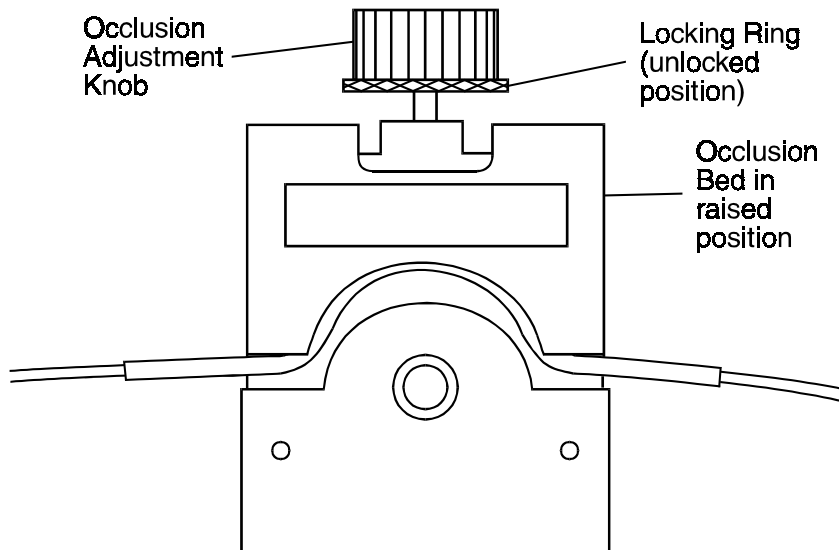


Figure 3. Occlusion Assembly in Raised Position

3. Lift the Occlusion Bed as shown in Figure 3, then remove the Occlusion Bed by sliding out the front of the Body Assembly.

CAUTION: *Use only pre-formed MASTERFLEX® L/S® PTFE tubing. Use of other tubing may result in premature or unknown failure modes.*



4. Install the pre-formed PTFE tubing assembly in the groove of the Occlusion Bed as shown in Figure 4.

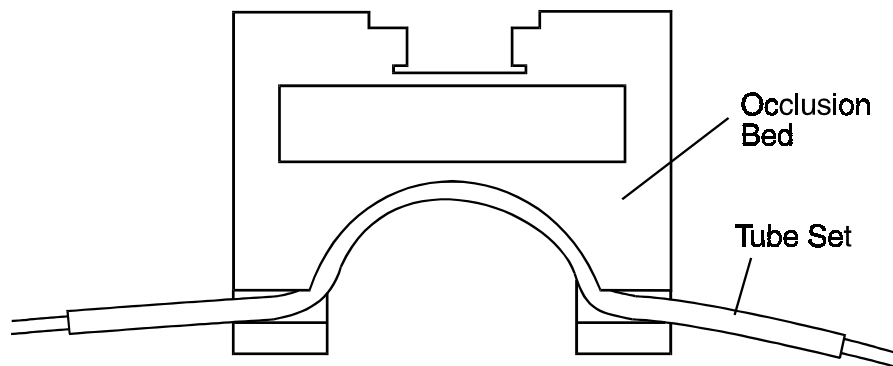


Figure 4. Positioning Tubing Assembly in Occlusion Bed

5. Slide the occlusion assembly into the front of the body assembly.

WARNING: *Use recommended fittings only. Use of improper fittings and/or improper connection to fittings may result in leakage at the fittings.*



6. Attach connecting fitting to the inner PTFE tubing in the Pump Head. Never attach connecting fitting over the larger of the two concentric PTFE tubing sections.

WARNINGS: *Do not operate the pump without the following precautions:*



Either of the following two conditions can result in sudden and/or extensive tubing failure. Tubing failure may result in liquid leaking from pump. In the event of tubing failure, operating pump at elevated speeds and pressures will result in accelerated liquid leakage. Use appropriate measures to protect operator and equipment from caustic liquids.

1. HIGH PUMP-generated pressures.

A PRESSURE RELIEF/BYPASS VALVE must always be installed in a potentially high pressure system to prevent the pump from exceeding the maximum rated pressure (100 psig; 6.8 bar).

- a. where the possibility of a blocked outlet occurs.
- b. where occlusion setting is greater than recommended.

c. where higher pressure filters are used that do not have a built-in pressure relief system.

2. HIGH SYSTEM-generated back pressures.

AN INJECTION CHECK/BACK PRESSURE VALVE should always be installed when pumping into a pressurized reservoir or line. This will prevent siphoning and/or backflow of liquid from a treated line in the event of tubing failure.

NOTE: The following leakage modes are considered evidence of tubing failures:

1. Drip from exit of the outer tube of the concentric tubing assembly.
2. Liquid between inner and outer tubes of the tubing assembly.
3. After pump reaches full prime, a continuous and regular stream of bubbles exiting the tubing assembly.

User must replace tubing at first sign of such leakage.

Recommended Occlusion Setting

CAUTION: *Do not run the pump dry for an extended period of time. Pumping dry or over-occluding can cause overheating and pump damage.*



Proceed as follows:

1. Dip entry and exit connecting tubing approximately one inch into the fluid to be pumped.
2. Be sure Pump Drive is turned on and set to desired operating speed.
3. Rotate Locking Ring fully counterclockwise. Ring should be against lower side of Occlusion Adjustment Knob.
4. Slowly rotate Occlusion Adjustment Knob clockwise just until bubbles first appear at output of the exit connecting tube. *Roughly*, this will occur when 1) the top of the Occlusion Bed becomes even with the top of the Body Assembly, and 2) the pump noise level decreases.
5. Rotate Occlusion Adjustment Knob an additional one-fourth turn clockwise.
6. Rotate Locking Ring fully clockwise until it is tight against the top of the Body Assembly, thus locking the Occlusion Adjustment Knob in place.

Optimized Occlusion Settings

Occlusion is reduced by rotating the Adjustment Knob counterclockwise. Some applications require adjustment of the occlusion setting to maximize tube life while others require adjustment to maintain flow rate when substantial system pressure exists. However, the recommended setting will meet the requirements of most applications, giving both good tube life and some pressure capabilities.

To Maximize Tubing Life

Occlude according to recommended setting described above and allow pump to prime with the fluid to be transferred. Then, while the pump is running, simply reduce the adjusted occlusion setting by slowly turning the Occlusion Adjustment Knob until the flow drop-off becomes unacceptable. Then turn the knob slightly clockwise and lock in position with Locking Ring.

To Maintain Flow Rate at Higher Pressures

Turn Occlusion Adjustment Knob clockwise just until flow rate returns to the desired level. Lock in position with Locking Ring.

MAINTENANCE

Service Parts:

Item	Part Number
Occlusion Bed	D-2692
Thumb Screw (1)	B-3304-0012
Phillips Head Screw (1)	B-1079-0076
Tang Boot (Closed End)	A-3480
Tang Boot (Open End)	A-3514

Occlusion Bed

Procedures for removal and installation of the Occlusion Bed are covered in the Installation Section.

SPECIFICATIONS

PUMP

Maximum Torque load:	150 in-oz (12 kg-cm)
Operating Speed:	300 r/min maximum
Operating Temperature:	32°F to 104°F (0°C to 40°C)
Storage Temperature:	–50°F to 150°F (–45°C to 65°C)
Humidity (Non-cond):	10% to 90% RH
Dimensions (L x W x H):	2-11/16 in x 3-5/16 in x 5-1/2 in (6.83 cm x 8.4 cm x 14.0 cm)
Weight:	2 lb. (0.91 kg)
Color:	Black
Material:	
Pump Head:	Anodized aluminum, acetal, and stainless steel
Knob:	Plastic

TUBING

Material:	PTFE
Tubing Length:	15 inches ±1 inch (38 cm ±2.54 cm)
Tubing Diameter:	77390-50 2mm ID, 4mm OD 77390-60 4mm ID, 6mm OD
Maximum Pressure at rated flow:	100 psig*
Operating Temperature (Continuous):	32°F to 104°F (0°C to 40°C)
Operating Temperature (Intermittent):	32°F to 212°F (0°C to 100°C)
Storage Temperature:	–50°F to 150°F (–45°C to 65°C)
Humidity (Non-cond):	10% to 90% RH

* Tubing life is significantly reduced at elevated pressure.

WARRANTY

Use only pre-formed MASTERFLEX® L/S® PTFE tubing. Use of other tubing may result in premature or unknown failure modes.

The Manufacturer warrants this product to be free from significant deviations from published specifications. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part as determined by the Manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

The warranty period for this product is noted on the Warranty Card.

PRODUCT RETURN

To limit charges and delays, contact the seller or Manufacturer for authorization and shipping instructions before returning the product, either within or outside of the warranty period. When returning the product, please state the reason for the return. For your protection, pack the product carefully and insure it against possible damage or loss. Any damages resulting from improper packaging are your responsibility.

NOTE: ***Items returned must be free of hazardous or toxic materials.***

TECHNICAL ASSISTANCE

If you have any questions about the use of this product, contact the Manufacturer or authorized seller.

NOTES



Cole-Parmer Instrument Co.

625 East Bunker Court
Vernon Hills, Illinois U.S.A. 60061-1844
1-800-MASTERFLEX (627-8373) (U.S. and Canada only)
11 (847) 549-7600 (outside U.S.)
(847) 549-7600 (Local)
FAX (847) 247-2929 (U.S. and Canada only)
11 (847) 549-1700 (Fax outside U.S.)
www.masterflex.com
e-mail: techinfo@coleparmer.com



Barnant Company

28W092 Commercial Ave.
Barrington, Illinois U.S.A. 60010-2392
1-800-637-3739 (U.S. and Canada only)
11 (847) 381-7050 (outside U.S.)
(847) 381-7050 (Local)
11 (847) 381-7053 (Fax outside U.S.)
(847) 381-7053 (Local Fax)
www.barnant.com
e-mail: barnant@barnant.com

