



INSTRUCTION MANUAL



BALDWINTM - Series
PERISTALTIC DRAIN PUMPS
GENERAL PURPOSE SERIES
Model 3KBP-00x

Revision A

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A: SPECIFICATIONS

Perma Pure LLC Baldwin-Series sample conditioning systems feature a peristaltic drain pump designed for reliable performance. The motor is protected by a metal enclosure. Special heavy duty Norprene® tubing is used to minimize consumable costs and maintenance hassles.



Single Head Drain Pump
(P/N 3KPB-001)



Dual Head Drain Pump
(P/N 3KPB-003)

Our single head drain pump (P/N 3KPB-001) is used to drain moisture from single heat exchanger Baldwin-Series Thermo-Electric Coolers (Models M115, 115, 215, 4110). Our dual head drain pump (P/N 3KPB-003) is used with dual heat exchanger Baldwin Thermo-Electric Coolers (Models 225, 325, 425, 5210, 8210, M225, M325, M425, e5300, e5400, e5500, e5800). Not shown is our triple head drain pump (P/N 3KPB-005) which is used on coolers with 3 or 4 heat exchangers (Models 545, 10410, 15310, 20410, e5900). Each head is capable of pumping upto 16.8 cc/min. Other tubing materials are available for certain uses, like hydrocarbon applications.



Peristaltic Pump Tubing, Size 17
(P/N 2PBT-002PK)

B: LIMITED WARRANTY

Perma Pure LLC WARRANTY and DISCLAIMERS

Perma Pure (Seller) warrants that product supplied hereunder shall, at the time of delivery to Buyer, conform to the published specifications of Seller and be free from defects in material and workmanship under normal use and service. Seller's sole obligation and liability under this warranty is limited to the repair or replacement at its factory, at Seller's option, of any such product which proves defective within one year after the date of original shipment from seller's factory (or for a normal usable lifetime if the product is a disposable or expendable item) and is found to be defective in material or workmanship by Seller's inspection.

Buyer agrees that (1) any technical advice, information, suggestions, or recommendations given to Buyer by Seller or any representative of Seller with respect to the product or the suitability or desirability of the product for an particular use or application are based solely on the general knowledge of Seller, are intended for information guidance only, and do not constitute any representation or warranty by Seller that the product shall in fact be suitable or desirable for any particular use or application; (2) Buyer takes sole responsibility for the use and applications to which the product is put and Buyer shall conduct all testing and analysis necessary to validate the use and application to which Buyer puts the product for which Buyer may recommend the use or application of the product by others; and (3) the characteristics, specifications, and/or properties of the product may be affected by the processing, treatment, handling, and/or manufacturing of the product by Buyer or others and Seller takes no responsibility for the nature or consequence of such operations or as to the suitability of the product for the purposes intended to be used by Buyer or others after being subjected to such operations.

SELLER MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, OF THE PRODUCT SUPPLIED HEREUNDER, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, AND ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY EXCLUDED. SELLER SHALL HAVE NO LIABILITY FOR LOSS OF PROFITS, OR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES UNDER ANY CIRCUMSTANCES OR LEGAL THEORY, WHETHER BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, TORT, CONTRACT, OR OTHERWISE. SELLER SHALL IN NO EVENT BE LIABLE IN RESPECT OF THIS ORDER AND OR PRODUCT DELIVERED ON ACCOUNT OF THIS ORDER FOR ANY AMOUNT GREATER THAN THAT PAID TO SELLER ON ACCOUNT OF THIS ORDE

C: SPARE PARTS

Model 3KPB

Part No.	Description
3KPB-001	Peristaltic pump, single head, 115 VAC, complete with enclosure
3KPB-002	Peristaltic pump, single head, 230 VAC, complete with enclosure
3KPB-003	Peristaltic pump, dual head, 115 VAC, complete with enclosure
3KPB-004	Peristaltic pump, dual head, 230 VAC, complete with enclosure
3KPB-000-1A	Peristaltic pump motor 115 VAC, complete with enclosure, no heads
3KPB-000-2A	Peristaltic pump motor 230 VAC, complete with enclosure, no heads
2PBM-001	Peristaltic pump, motor only, 115 VAC 60 Hz
2PBM-002	Peristaltic pump, motor only, 230 VAC 50 Hz
2PBM-003	Peristaltic pump, head only, standard
2PBT-02PK	Peristaltic pump, tubing, norprene, size 17 (10 feet)
2PBM-015	Single head hardware kit
2PBM-006	Dual head hardware kit

For further service assistance, contact:

Perma Pure LLC
8 Executive Drive
Toms River, NJ 08755
Tel: 800-337-3762 (toll free U.S.)
Tel: 732-244-0010
Fax: 732-244-8140
Email: info@permapure.com
or your local representative



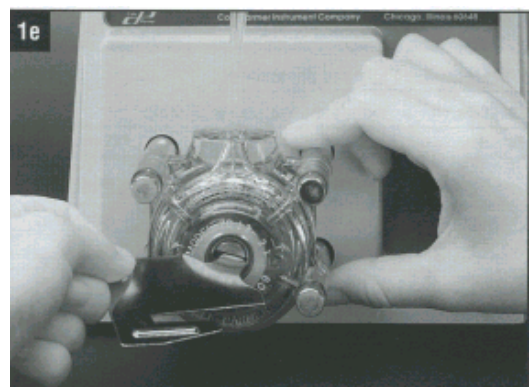
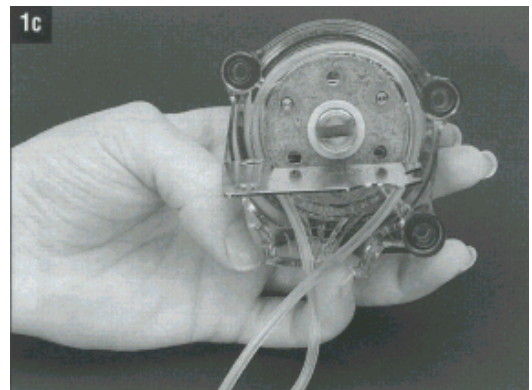
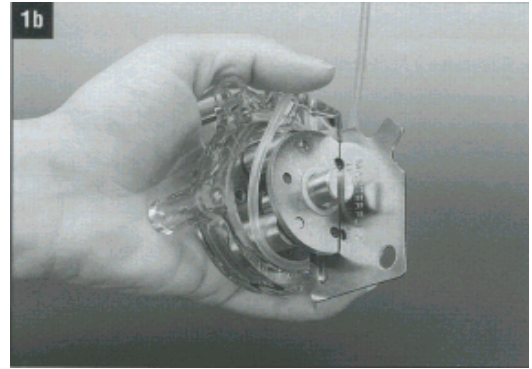
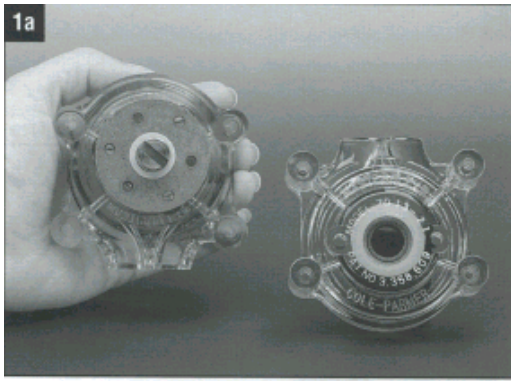
1. Single Pump Head Loading

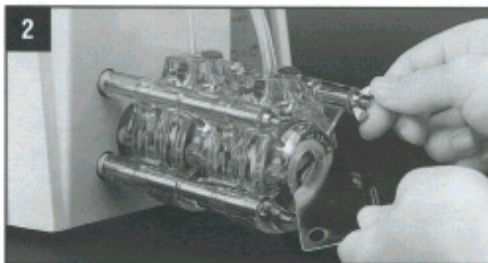
Note: Use only MASTERFLEX Precision Tubing with MASTERFLEX Pumps to insure optimum performance. Use of other tubing may void applicable warranties.

Contents: One pump head, one 15 in (38 cm) length of silicone tubing, one mounting hardware package, manual and tubing loading key.

Supplied tubing loading key required for assembly.

- Separate the end bells (the pump head halves). Hold the end bell containing the rotor as shown with the tubing retainer grooves facing down.
- Place tubing in the right groove and against the first two rollers. Hold tubing with thumb. Near groove, insert smaller prong of loading key between the top of the rotor and tubing. Push key in as far as possible.
- Push down and turn key counterclockwise (ccw) completely around the rotor. The key will push the tubing uniformly into the end bell assembly. Hold the second end of tubing. Remove key.
- Position the other end bell on top and press the end bells together. Be careful not to pinch the tubing. If end bells do not snap tightly together, reload tubing. If necessary, turn key in slot on rotor shaft to adjust tubing (as in Step e).
- With key in slot on rotor shaft, turn key to align tang on rotor shaft with slot in motor drive shaft. Point tubing retainer grooves up. Shift the pump head slightly till it snaps on the alignment pins (if present). Secure with four provided screws. Tighten with fingers only.





2. Multi-Channel Mounting

Flat bladed screwdriver required for mounting.

Tubing loading key required for mounting.

Note: Other special mounting hardware for multi-channel pumping. See “ 3. Replacement Parts and Accessories”.

- Load the pump heads with tubing.
- Install the four correct length-mounting screws in drive.
- Slide the first pump head into the mounting screws.
- Place key in slot on mounting shaft. Twist to align tang on rotor shaft with slot in motor drive shaft. Shift the pump housing around till it drops over the alignment pins (if present).
- Repeat for each additional pump head, aligning pump head tang with slot on previously mounted pump head.
- Slide the four flat washers onto screws and secure with the four wingnuts. Tighten with fingers only.
- A support bracket is supplied with 3 and 4 channel mounting hardware for additional support. Mount over bottom two screws. Inert one of the three different adjustments screws depending upon drive height.

3. Replacement Parts and Accessories

A. End Bells (order two end bells for a complete head assembly).

Pump Head #	PC Order number	Pump Head #	PC Order number
07013-00, -20	MN-07013-81	-	-
07013-10, -21	MN-07013-91	07013-50, -52	MN-07013-92
07014-00, -20	MN-07014-81	-	-
07014-10, -21	MN-07014-91	07014-50, -52	MN-07014-92
07015-00, -20	MN-07015-81	-	-
07015-10, -21	MN-07015-91	07015-50, -52	MN-07015-92
07016-00, -20	MN-07016-81	-	-
07016-10, -21	MN-07016-91	07016-50, -52	MN-07016-92
07017-00, -20	MN-07017-81	-	-
07017-10, -21	MN-07017-91	07017-50, -52	MN-07017-92
07018-00, -20	MN-07018-81	-	-
07018-10, -21	MN-07018-91	07018-50, -52	MN-07018-92
07024-00, -20	MN-07024-81	-	-
07024-10, -21	MN-07024-91	07024-50, -52	MN-07024-92
07035-02, -20	MN-07035-81	-	-
07035-12, -21	MN-07035-91	-	-

B. Rotor assemblies

Pump Head number	Pump Head suffix	Order number
07013, 07014, 07016 07018	-00	MN-07013-75
	-10, -50	MN-07013-76
	-20	MN-07013-80
	-21, -52	MN-07013-95
07015, 07024, 07035	-00, -02	MN-07013-75
	-10, -50, -12	MN-07013-76
	-20	MN-07013-80
	-21, -52	MN-07013-90

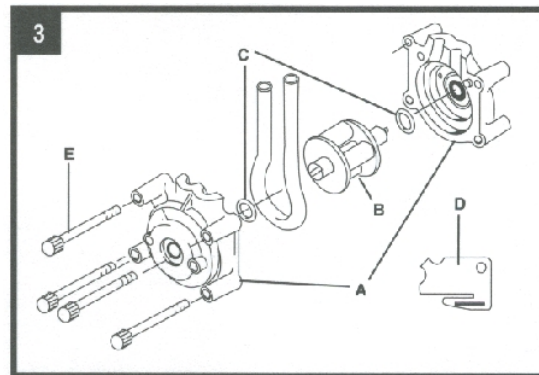
C. MN-07021-04 Thrust washers. Pack of 10.

D. MN-07013-90 Tubing loading key.

E. Mounting hardware for standard pump heads.

Set contains four #8-32 screws, four washers, and four wingnuts.

Number of heads To be mounted	Cold-rolled steel Order number	Stainless steel Order number
1	MN-07013-02	MN-07013-04
2	MN-07013-03	MN-07013-05
3	MN-07013-03	MN-07013-08
4	MN-07013-07	MN-07013-09



4. Specifications

	Thin wall*	Thick wall*
Maximum continuous discharge pressure-psi(bar):	20(1.4)	25(1.7)
Maximum intermittent discharge pressure-psi(bar):	35(2.4)	40(2.7)
Maximum vacuum:	660(510")m Hg	26(20")in Hg
Maximum suction lift:	8.8(6.7")m H2O	29(22")ft H2O
Number of rollers:	3	
Occlusion:	Standard fixed	
Maximum pump speed (rpm):	600	
Nominal torque load:	6.5 kg-cm(90 oz-in)	
Housing materials:	Polycarbonate (PC) all models, or Polyphenylene sulfide (PPS) all models except 07035	
Roller/rotor materials:	Cold rolled Stl (CRS) or Stainless Stl (SS)	
Operating temperature:	0 to 40° (32 to 104°F)	
*Thin wall: tubing 13, 14, 16, 17, 18	Thick wall: tubing 15, 24, 35	
†With tubing 17 & 18		
‡ Use in this temperature range for continuous duty operation with no decrease in performance or product life. Pump heads will work outside this range with some possible reductions in performance or product life.		

5. Warranty and Return Items

Warranty

Use only MASTERFLEX Precision Tubing with MASTERFLEX Pumps to insure optimum performance. Use of other tubing may void applicable warranties.

The manufacturer warrants this product to be free from any 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 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.

Technical Assistance

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

Masterflex® Pump Heads

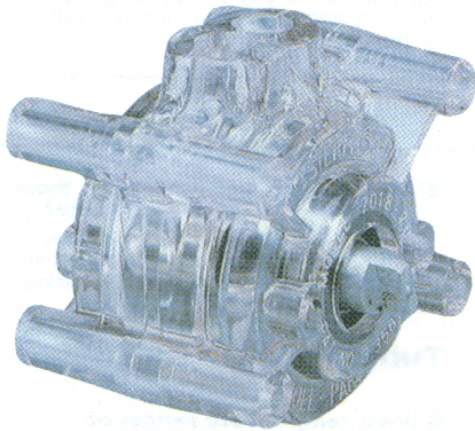
A Masterflex® Pump Head has only two components: rotor assembly and housing. This unique, but simple device, is operating around the world, in hundreds of diverse applications. It offers thousands of end users and original equipment manufacturers a high degree of flexibility not offered in competitive designs. That flexibility is achieved through a modular concept which permits complete interchangeability between seven basic sizes of pump heads, materials of construction, and numerous types of drives. Standard Pump Heads are precision injection molded of high visibility, water-clear polycarbonate (Lexan®) or are also

available with Polyphenylene Sulfide (PPS) housing. All Quick Load® Pump Heads have housings of Lexan®.

Masterflex® Pump Heads attach directly to Masterflex® drives. The Standard Pump Head can be stacked for multi-channel operation. While our Quick Load® Pump Head cannot be stacked, it is easier to load and accepts multiple tubing sizes. For multi-channel use, the pump head may be mounted last on a stack of Standard Pump Heads.

A Masterflex® Pump Head delivers outstanding accuracy, versatility and is the most cost-effective pump head on the market today.

Masterflex® Standard Pump Heads



Standard Pump Heads, with Polyphenylene Sulfide (PPS) housing, offer a rotor assembly of either 1) plated cold-rolled steel or 2) stainless steel.

Polyphenylene Sulfide (PPS) Pump Heads provide the best protection against chemical attack and corrosion, and should be used if you are pumping corrosives or anticipate contact with corrosive vapors.

Choose a rotor assembly best for your application

When pumping corrosive fluids at high temperatures (above 175°F) we recommend stainless steel.

Plated cold-rolled steel rotor assembly features ball bearing construction in each roller. Designed for general applications, suitable for use from -148°F to +230°F when used with appropriate tubing and are rated for continuous duty at any speed up to 600 RPM. Refer to pages 11 and 12 for chemical compatibility in case of spills or corrosive atmosphere.

Stainless steel rotor assembly features all 300 series stainless steel construction. This stainless steel construction is combined with special permanently lubricated, sealed ball bearings to provide high corrosion resistance and protection in the event of tubing failure. Life expectancy of stainless steel construction is considerably greater than that of other rotor construction.

Plated solid steel roller/rotor assembly offers substantial cost savings for low to moderate flow rate applications. Primarily designed for OEM users whose pumping speeds are up to 150 RPM. The pump head features solid-plated steel roller/rotor assembly. These solid rollers replace the normally used ball bearing type, yet they provide identical pumping characteristics and life at speeds up to 150 RPM. Pump heads can operate at higher speeds but at a very limited duty cycle. The rollers are chrome plated and rotate in oil-impregnated bronze bushings. Pump head halves are polycarbonate with sealed ball bearings.

Choose housing in either of two formulations

Standard Pump Heads with Lexan® housing, offer a rotor assembly of your choice of 1) plated cold-rolled steel, 2) stainless steel, or 3) a plated solid steel roller/rotor assembly.

Lexan® Pump Heads are recommended for general purpose use.

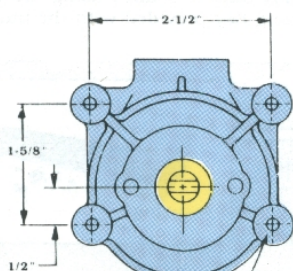
Pump head package includes one Masterflex® Standard Pump Head, 15' of silicone tubing, one package of mounting hardware, one tubing key, and instruction manual.

Tubing Size	Flow Rates		Maximum Head Pressure (psi)		Pump Head Catalog Number				
					Lexan® Pump Heads			Polyphenylene Sulfide Pump Heads	
	ml/rev	ml/min at 600 RPM	Continuous	Intermittent	Cold-rolled Steel Rotor	Stainless Steel Rotor	Solid Steel Rotor*	Cold-rolled Steel Rotor	Stainless Steel Rotor
13	0.06	36			7013-20	7013-21	7013-72	7013-42	7013-52
14	0.21	126	20	35	7014-20	7014-21	7014-72	7014-42	7014-52
16	0.80	480			7016-20	7016-21	7016-72	7016-42	7016-52
15	1.67	1000	25	40	7015-20	7015-21	7015-72	7015-42	7015-52
17	2.80	1680	20	35	7017-20	7017-21	7017-72	7017-42	7017-52
18	3.80	2280	20	35	7018-20	7018-21	7018-72	7018-42	7018-52
24	2.80	1680	25	40	7024-20	7024-21	7024-72	7024-42	7024-52

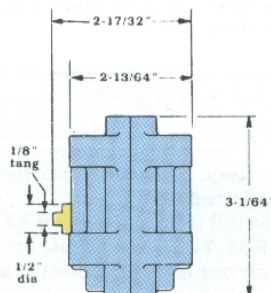
All pump heads will pull a 24" Hg vacuum, except the 7018 series which pull a 12" Hg vacuum.

Data is approximate. Test conditions were as follows: 0 PSIG at inlet, 0.5 PSIG at outlet, 22°C water circulant with four feet of tubing. Flow at maximum continuous outlet pressure is about 90% of flow at 0 PSIG outlet pressure.

*Recommended for speeds up to 150 RPM. See pages 10 and 11 for additional information on tubing.



Four #8 mounting screws



Multiple Pump Head Mounting Hardware		
Hardware allows you to mount up to four Standard Pump Heads to your drive.		
Number of Heads on Drive	Plated Steel	Stainless Steel
	Cat. No.	Cat. No.
2	7013-03	7013-05
3	7013-06	7013-08
4	7013-07	7013-09

Lexan®, registered TM General Electric Co.

Specifications for L/S Standard Pump Heads

CATALOG NUMBER	070XX-20 SERIES	070XX-21 SERIES	070XX-52 SERIES
----------------	-----------------	-----------------	-----------------

Performance Specifications

Flow capacity	0.06 to 2500 mL/min (0.1 to 36 GPH)*		
Max. rpm	600		
Number of rollers	3		

Torque Specifications** (@ 0 psi)

PLARNED™ NORPRENE®	Starting torque	6.9 kg-cm (96 oz-in)
	Running torque	5.8 kg-cm (80 oz-in)
TYGON®, VITON®	Starting torque	6.6 kg-cm (92 oz-in)
	Running torque	4.6 kg-cm (64 oz-in)
C-FLEX®, Silicone	Starting torque	4.1 kg-cm (56 oz-in)
	Running torque	1.7 kg-cm (24 oz-in)

Physical Specifications

Operating temperature	-100 to 110°C (-148 to 231°F)		
Housing material	Clear polycarbonate		Polysphenylene sulfide
Rotor material	Cold-rolled steel	Stainless steel	
Shipping weight:	0.54 to 1.18 lb		

*Depending on pump head selected. ** Actual torque depends on tubing size/formulation. For complete torque data, please see pages 154-155.

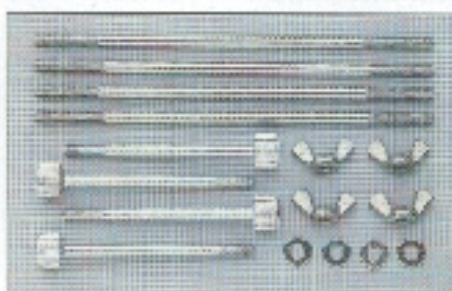
Multichannel Capabilities

Mount up to four pump heads depending on the drive. Order hardware based on the number of pump heads to be mounted.



Mounting Hardware

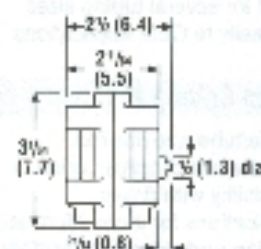
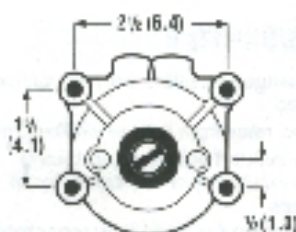
No. of heads to be mounted	Catalog number/set
	Stainless steel
One	LC-07013-04
Two	LC-07013-05
Three	LC-07013-08
Four	LC-07013-09



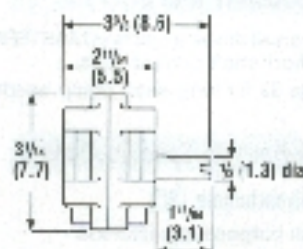
Mounting hardware
07013-04 (one) and 07013-05 (two channel)

Dimensional Drawings cm (in)

L/S Standard Pump Head



Short-shaft



Long-shaft

See page 142 for long-shaft pump heads.

The design of the standard pump head enables the most precise dispensing accuracy of any MASTERFLEX pump head.



1 Disassemble pump head. Load tubing.



2 Use the loading key (included) to ensure proper tubing alignment and tension.



3 Reassemble two halves and mount on drive.

C-FLEX—Reg TM Consolidated Polymer Technologies, Inc.

MASTERFLEX, L/S—Reg TM Cole-Parmer Instrument Company

NORPRENE, PHARMED, TYGON—Reg TM Norton Co.

VITON—Reg TM DuPont Dow Elastomers L.L.C.

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Laboratory Standard

Standard Pump Heads

L/S PUMP HEADS

Tubing selection guide

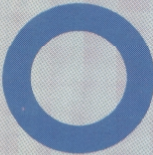

Tubing ordering information for Masterflex® Standard and Quick Load® Pump Heads

Standard/Long-shaft Pump Heads	Series No.	7013-	7014-	7016-	7015-	7017-	7018-	7024-
Quick Load®/Long-shaft Quick Load® Pump Heads	Catalog Numbers	7021-20, -24, -28 -32, -36 -40	7021-20, -24, -28 -32, -36 -40	7021-20, -24, -28 -32, -36 -40	7021-22, -26, -30 -34, -38 -42	7021-20, -24, -28 -32, -36 -40	7021-20, -24, -28 -32, -36 -40	7021-22, -26, -30 -34, -38 -42
Actual Size of Tubing								
Tubing Size No.		13	14	16	15	17	18	24
Inside Diameter (Inches)		0.030	0.064	0.123	0.190	0.253	0.313	0.248
Hose Barb Size		1/16"	1/16"	1/8"	3/16"	1/4"	3/8"	1/4"

Materials	Std. Pkg.	Tubing Catalog Numbers							
Silicone	25'	6411-13	6411-14	6411-16	6411-15	6411-17	6411-18	6411-24	
Tygon® (R3603)	50'	6409-13	6409-14	6409-16	6409-15	6409-17	6409-18	6409-24	
Tygon® Special	50'	6401-13	6401-14	6401-16	6401-15	6401-17	6401-18	6401-24	
Tygon® Food (B-44-4X)	50'	6419-13	6419-14	6419-16	6419-15	6419-17	6419-18	6419-24	
Viton®	25'	6412-13	6412-14	6412-16	6412-15	6412-17	6412-18	6412-24	
C-Flex®	25'	6424-13	6424-14	6424-16	6424-15	6424-17	6424-18	6424-24	
Norprene®	50'	6404-13	6404-14	6404-16	6404-15	6404-17	6404-18	6404-24	
Norprene® Food Grade	50'	6402-13	6402-14	6402-16	6402-15	6402-17	6402-18	6402-24	

Tubing ordering information for Masterflex® High-Capacity Pump Heads

Tubing shown in actual size, with nominal dimensions

6424-82; 6402-82;
6411-81: 0.502" ID;
1/2" hose barb

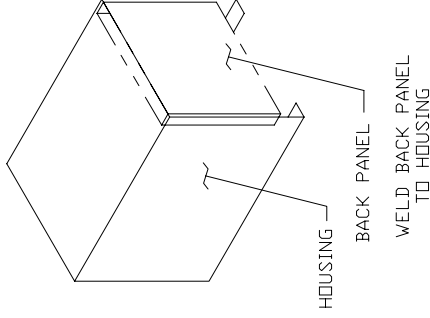
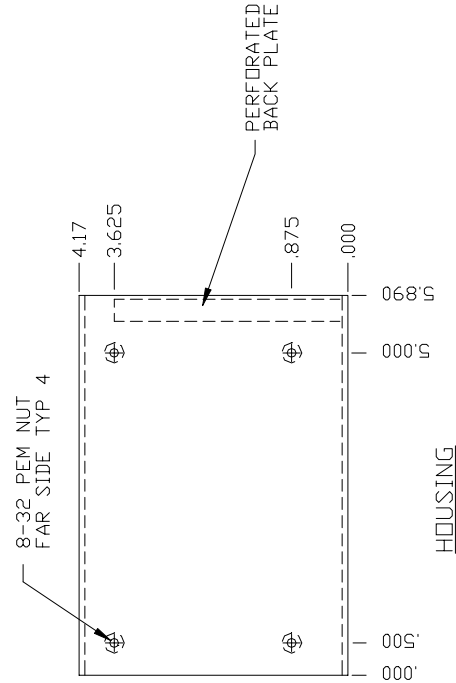
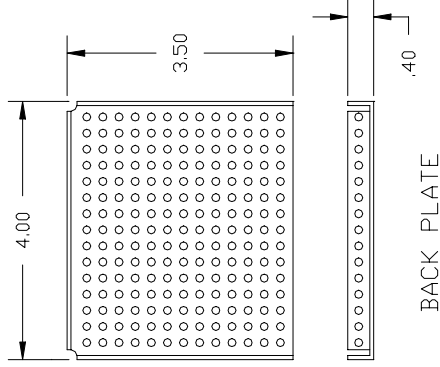
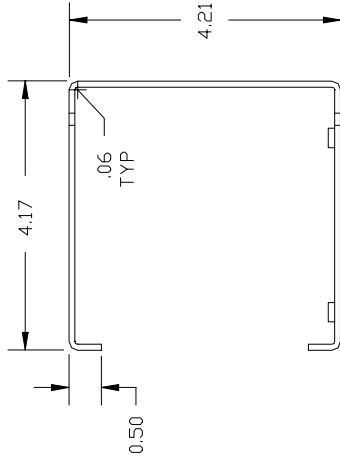
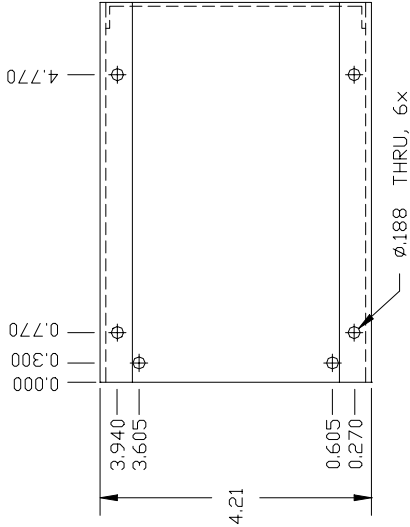
All others: 0.374" ID;
3/8" hose barb

Tubing Cat. No.	Materials	Pump Head No.
6401-73 6402-73 6404-73 6408-73 6411-73 6412-73 6419-73 6424-73	Tygon® Special Norprene® Food Norprene® Tygon® Silicone Viton® Tygon® Food C-Flex®	7019, -00, -01, -20, -21, -40, -41, -42, -43, -70, -72
6411-81 6424-82 6402-82	Silicone C-Flex® Norprene® Food	7019-25, -26, -35, -51

Tubing selection guide

Material	Pressure	Vacuum	Chemical Compatible	Typical Life Hours	Tubing Temperature Range - °F	Oxygen Perm.*	Comment/Applications
Silicone (6411-)	fair	good	fair	See chart on page 12	- 80 to + 500	31500	Excellent for food, bio/pharm. easy to load in pumps
C-Flex® (6424-)	fair	good	fair		- 60 to + 230	2450	Same as above
Tygon® (6409-)	best	best	good		- 50 to + 165	120	General, economical
Norprene® (6404-)	best	good	good		- 60 to + 275	90	General, excellent life
Viton® (6412-)	good	good	best		- 10 to + 400	374	Corrosives, solvents
Tygon® Food (6419-)	best	best	fair		0 to + 180	120	Food products
Norprene® Food (6402-)	best	good	good		- 60 to + 275	90	Food products
Tygon® Special (6401-)	best	best	good		+ 10 to + 180	120	Hydrocarbons

*cc-mil/100 in day atmosphere —approximate data



ASSEMBLY DRAWING

REV	DATE	NEW PART #	DESCRIPTION	MGH	DWN	APVD
B	07/07/95					
REVISIONS						
AS NOTED						
MATERIAL/DESCRIPTION						
PART NO.						
BARNANT PUMP SHROUD						
PREVIOUS PART NO. 7NIP-0040B						
FDR						
BALDWIN ENVIRONMENTAL						
DRAWN BY MGH						
APVD BY						
DATE 04/21/93						
SCALE 1/2						
SIZE B						
SHEET 1 OF 1						

TOLERANCES		DRAWING NUMBER	
DECIMAL		2PBM-007	
.0	\pm .015"		
.00	\pm .010"		
.000	\pm .005"		
FRACTIONAL			
ALL	\pm .015"		
UNLESS OTHERWISE SPECIFIED			

MATERIAL:
HOUSING, 11GA (.090) 5052 AL
BACK PANEL, 16 GA (.0059)- .125" PERFORATED AL

