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TECHNOLOGY GROUP

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so your equipment works exactly as you specify.

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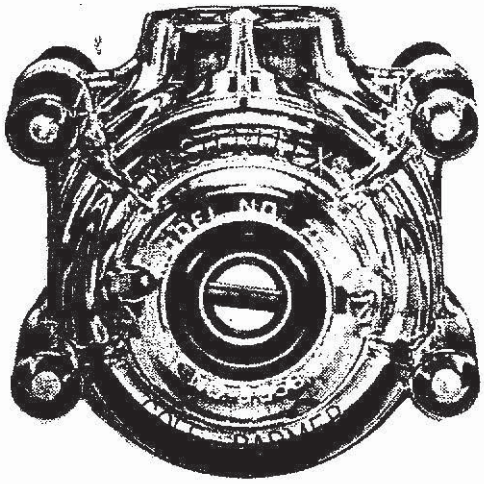
Find the *Cole-Parmer 7024-20* at our website: *Click HERE*

7014-20, -21, -52
7016-" "
7017-
7018-
7015-
7024-"

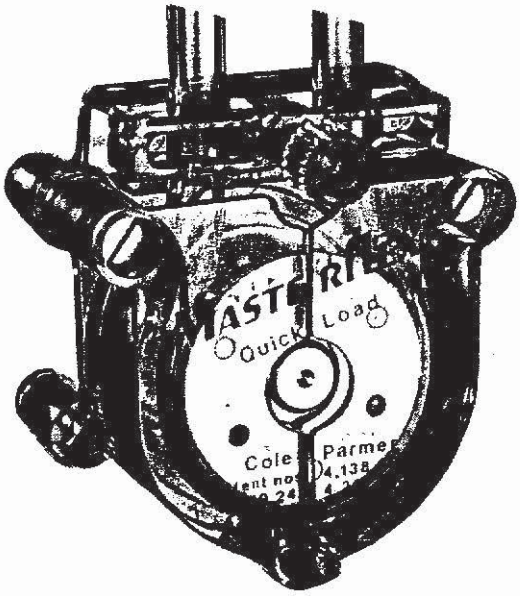
INSTRUCTIONS

LOADING THE TUBING IN THE *MASTERFLEX*® PUMP HEAD AND "MOUNTING THE PUMP HEAD ON THE MOTOR DRIVE

7021-20, -22, -24, -26



STANDARD PUMP HEAD



QUICK LOAD® PUMP HEAD

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MASTERFLEX—Reg TM Cole-Parmer Instrument Company
Quick Load—Reg TM Cole-Parmer Instrument Company

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WARRANTY

The warranty card must be properly filled out and returned. The manufacturer warrants this product to be free from defects in material and workmanship. If repair or adjustment is necessary and has not been the result of abuse or misuse, please return, freight prepaid, and correction of the defect will be made without charge (see note on return of items). Out of warranty items will be repaired for a nominal charge.

RETURN OF ITEMS

Authorization must be obtained from our Customer Service Department before returning items for any reason. When applying for authorization, please include data regarding the reason items are to be returned. A 15% restocking charge will be made on all returns resulting from customer errors in ordering.

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against damage or loss. We will not be responsible for damage resulting from careless or insufficient packing.

Prices and specifications subject to change without notice.

Cole-Parmer

Cole-Parmer Instrument Company

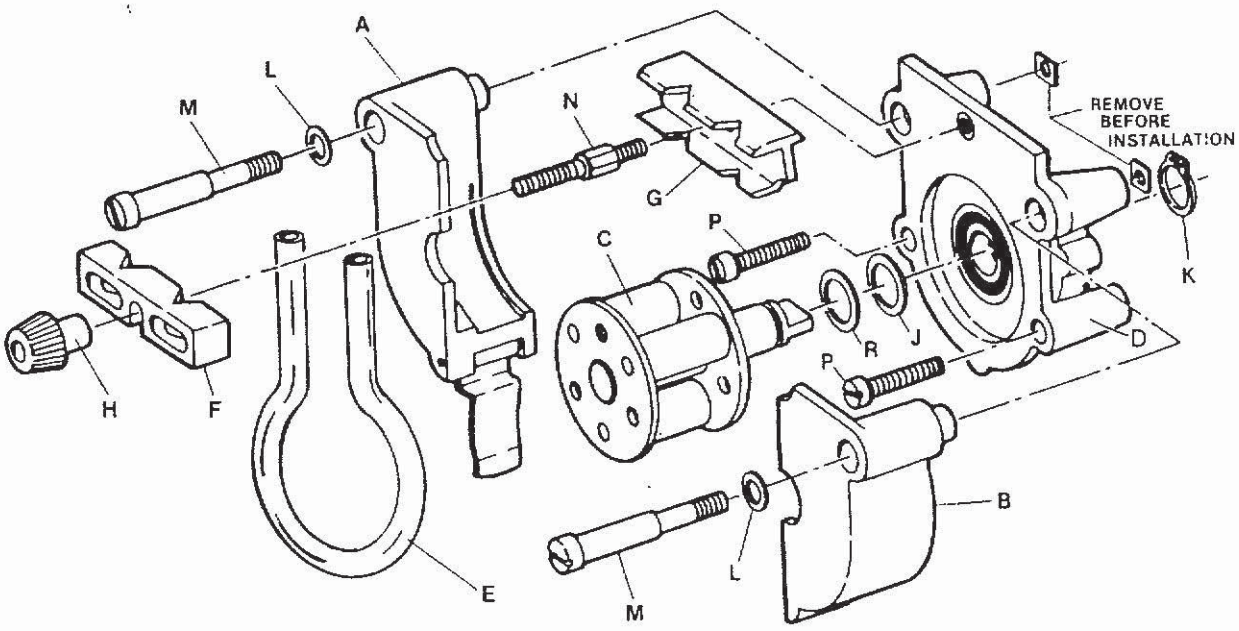
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1-800-323-4340

A-1299-108
Edition 6586

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PARTS DIAGRAM (Quick Load Pump Head)



REPLACEMENT PARTS (Quick Load Pump Head)

All Quick Load Pump Head catalog numbers, except for (C) Rotor Assembly and (E) Tubing, use the same replacement part.

07021-01 Includes A+B

	Replacement Part	Part No.	Cost
A	Reaction Arm L.H.	B-2349-12	~~$12.50~~
B	Reaction Arm R.H.	D-1953-12	~~2.75~~
C	Rotor Assembly	See table	
D	Pump Housing	See table	
E	Tubing	See Guide	
F	Front Tubing Retainer	D-1798	1.15
G	Rear Tubing Retainer	D-1797	1.15
H	Knob	A-2838	1.85
J	Thrust Washer	A-1184	.15
K	Retaining Ring	B-1508-3	.99
L	Wave Washer	A-2480	.35
M	Mounting Screw	A-2386-12*	2.80
N	Retainer Screw	B-2034-12	1.85
P	Screw	B-1079-197*	.20
R	Washer	A-3219	.35

*Parts included in 7020-01 Hardware kit $5.50

A2839

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GENERAL COMMENTS ABOUT *Masterflex*® PUMP SYSTEMS

There are three (3) components to every Masterflex System:

A. Pump Head
B. Motor Drive
C. Tubing

The simplicity of this system makes the pumps easy to use and also easy to order. Familiarity with these components help insure satisfaction with your Masterflex System.

SIMPLE AS A B C

A PUMP HEAD + B MOTOR DRIVE + C TUBING = *Masterflex*® PUMP SYSTEM

A. PUMP HEAD

The patented Masterflex pump head with the three roller rotor, provide the peristaltic action to propel fluids through the tubing.

B. MOTOR DRIVE

The drive (which provides the power to rotate the rollers in the pump head) is available in many different configurations to fit your particular application.

C. TUBING

Make sure the tubing is compatible with the media you are pumping. Refer to the chemical compatibility in the general catalog.

Be certain the temperature and pressure are within the specified range of the pump head.

Masterflex tubing is precision-extruded to insure top performance with Masterflex heads. Other commercial tubing will not meet or perform to our specifications.

The pump heads are available in two materials: Lexan® for general applications, and polyphenylene sulfide (PPS) for more corrosive applications.

Lexan—Reg. General Electric Co.

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07021-26

⚠ 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.

Note: *Use only MASTERFLEX precision tubing with MASTERFLEX pumps to ensure optimum performance. Use of other tubing may void applicable warranties.*

Contents: One MASTERFLEX® I/P® Pump Head, one 20 in (50-cm) length of silicone tubing, one mounting hardware package, manual and tubing loading key.

Flat bladed screwdriver required for mounting.

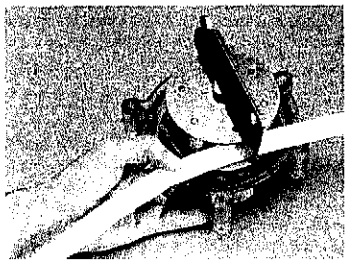
1. Single Pump Head Loading

a) Separate the end bells (the pump head halves). Hold the end bell containing the rotor as shown with the tubing retainer grooves pointing down.
Place tubing in the right groove and against the first two rollers. Hold tubing with thumb. Near groove, insert bottom tab of loading key between the top of the rotor and tubing. Push key in as far as possible, locking into the slot of the rotor.

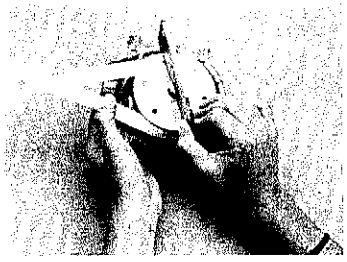
b) Push down and turn key counterclockwise (CCW) completely around the rotor.
The key will push the tubing uniformly into the end bell assembly.
Hold the second end of tubing. Remove the key. Position the other end bell on top and press the end bells together. Be careful not to pinch the tubing. If end bells do not snap tightly together, reload tubing. If necessary, twist key in slot on rotor shaft to adjust tubing.

c) With key in slot on rotor shaft, twist key to align tang on rotor shaft with slot in motor drive shaft. Point tubing retainer grooves up. Shift the pump head slightly until it snaps on the alignment pins (if present). Secure with five screws provided. Tighten with screwdriver.

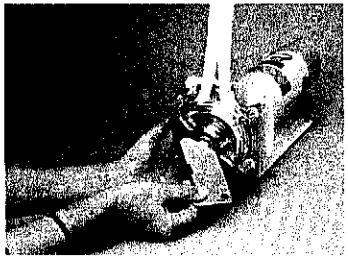
1a.



1b.



1c.



2. Multi-channel Mounting

Tubing loading key required for mounting.

Note: Order special mounting hardware for multi-channel pumping, see "3. Replacement Parts and Accessories".

a) Load the pump heads with tubing.

b) Install the five correct length mounting screws into the drive.

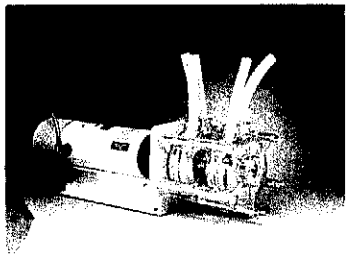
c) Slide the first pump head onto the mounting screws.

d) Place key in slot on rotor shaft. Twist to align tang on rotor shaft with slot in motor drive shaft.

e) Repeat for each additional pump head, aligning pump head tang with slot on previously mounted pump head.

f) Slide the five flat washers onto screws and secure with the five wing nuts. Tighten with fingers only.

2



3. Replacement Parts and Accessories

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

Pump Head number	PC Order number	Pump Head number	PPS Order number
7019-00, -20	MN-07019-78	—	—
7019-01, -21	MN-07019-79	7019-41, -43	MN-07019-73
7019-25, -32	MN-07019-74	—	—
7019-26, -31	MN-07019-75	7019-51, -53	MN-07019-77

B. Rotor assemblies

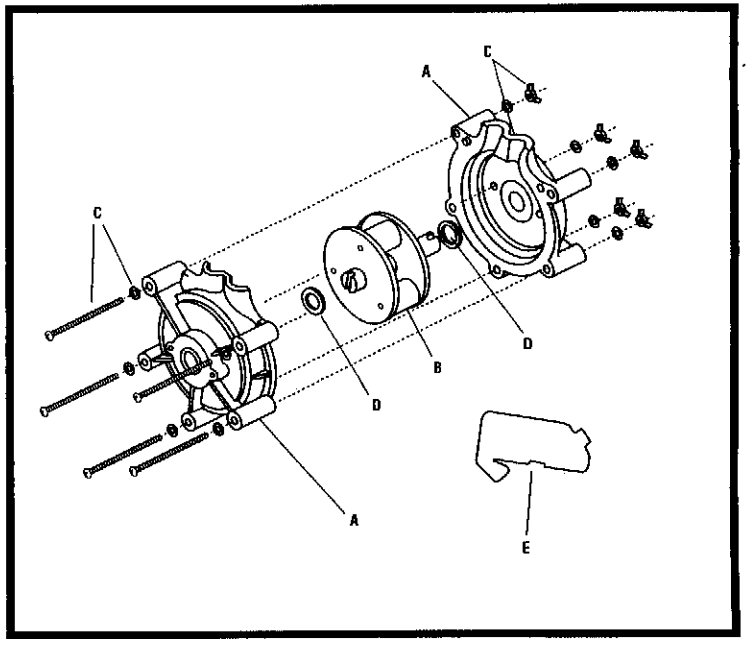
Pump Head number	Long Shaft Order No.	Pump Head number	Short Shaft Order No.
7019-00, -25	MN-07019-80	7019-20, -32	MN-07019-82
7019-01, -41	MN-07019-83	7019-21, -43	MN-07019-85
7019-26, -51	MN-07019-83	7019-31, -53	MN-07019-85

C. Mounting hardware for standard pump heads.
Set contains five #10-24 screws, five washers, and five wing nuts.

Number of heads to be mounted	Stainless steel order number
1	MN-07019-95
2	MN-07019-96

D. MN-07019-92 Thrust washers. Pack of 10

E. MN-07019-90 Tubing loading key.



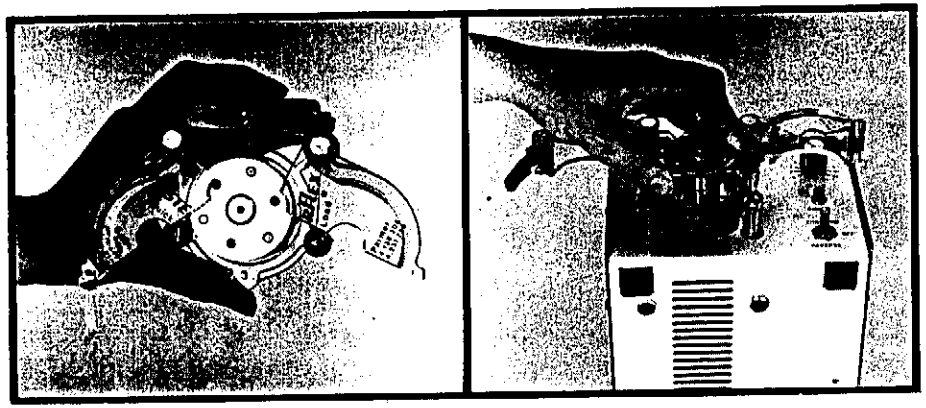
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QUICK LOAD PUMP HEAD

Contents of Quick Load Pump Head Package

- Quick Load Pump Head. 1
- 2 Sections Silicone Tubing (except 7020-60 and -80) . . . . . 15"
- Mounting Hardware Package 1
- Instruction Booklet. 1

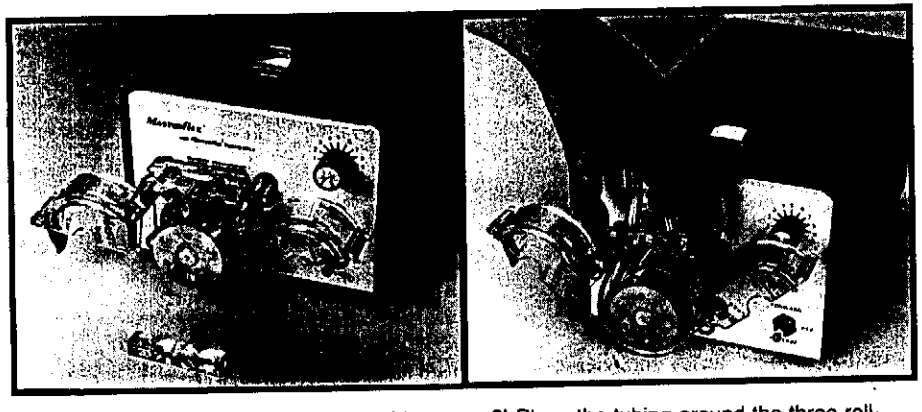
MOUNTING THE PUMP HEAD TO THE MOTOR DRIVE



1) The Quick-Load pump head is shipped completely assembled with four mounting screws held in place with fiber washers. **Remove these washers before attempting to mount to the drive.**

2) To mount the pump head onto the drive, swing open the reaction arm halves, then slowly turn the rotor assembly by hand until the rotor shaft mates with the drive output shaft. With the shafts mated, shift the pump housing around until it drops over the alignment pins in the gearcase cover. Hold pump in position and fasten with the four mounting screws.

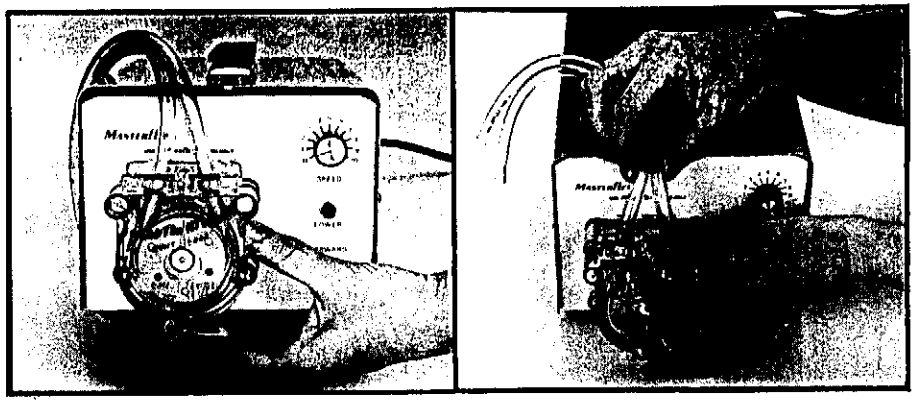
LOADING THE TUBING



1) After the pump has been mounted to the drive, unscrew the knob that holds the tubing retainer together and remove front half.

2) Place the tubing around the three rollers, making sure it comes up between the two "V" grooves in the tubing retainer. Replace the front half of the tubing retainer and screw the knob until retainer is secure enough to hold tubing in place.

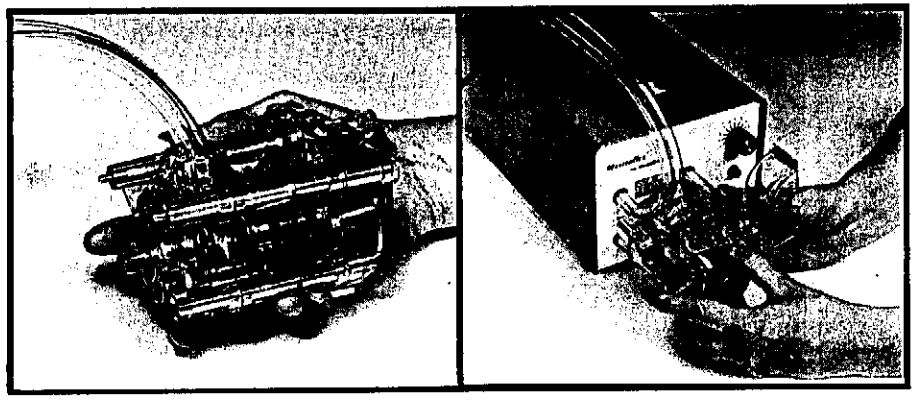
LOADING THE TUBING, continued



3) Secure metal latch on bottom of left reaction arm to close pump head. Slightly loosen tubing retainer knob.

4) Gently pull on both ends of the tubing until the slack is removed in the pump head, then adjust knob to securely grip the tubing. **Do not overtighten, as a decrease in flow will result.**

MULTI-CHANNEL PUMPING (Quick Load Pump Head)



1) Remove the fiber washers and mounting screws from the Quick Load Pump and insert the multi-head hardware. Load the standard pump head(s) (see page 4) and slide the Quick Load and standard pump heads together, snap open the Quick Load pump head and turn the rotor to engage the shafts. Connect additional standard pump heads, if any, following the same procedure. (Different hardware is necessary; see below.)

2) Connect the pumps to the drive system by turning the Quick Load rotor to align the shafts.

Tighten the four mounting screws with a flat-blade screwdriver. Load the tubing in the Quick Load pump head as described on the preceding page.

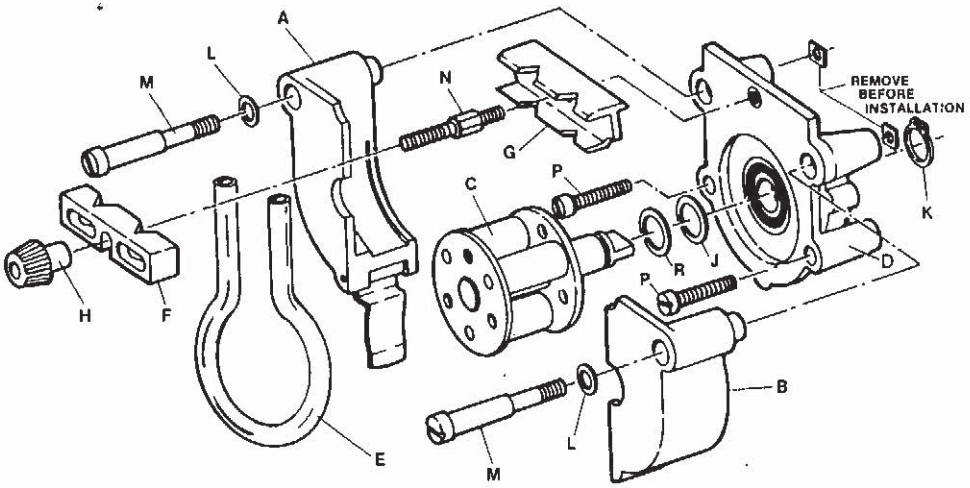
NOTE: Only one Quick Load pump head can be mounted to standard Masterflex pump heads. Two or more Quick Load pump heads cannot be mounted together.

The following hardware is needed for multi-channel pumping:

Number of Heads	Cat. No. Plated Steel	Price
2	7020-02	$21.00
3	7020-03	$21.00
4	7020-04	$21.00

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PARTS DIAGRAM (Quick Load Pump Head)



REPLACEMENT PARTS (Quick Load Pump Head)

All Quick Load Pump Head catalog numbers, except for (C) Rotor Assembly and (E) Tubing, use the same replacement part.

	Replacement Part	Part No.	Cost
A	Reaction Arm L.H.	B-2349-12	$12.50
B	Reaction Arm R.H.	D-1953-12	2.75
C	Rotor Assembly	See table	
D	Pump Housing	See table	
E	Tubing	See Guide	
F	Front Tubing Retainer	D-1798	1.15
G	Rear Tubing Retainer	D-1797	1.15
H	Knob	A-2838	1.35
J	Thrust Washer	A-1184	.19
K	Retaining Ring	B-1508-3	.99
L	Wave Washer	A-2480	.35
M	Mounting Screw	A-2386-12*	2.80
N	Retainer Screw	B-2034-12	1.85
P	Screw	B-1079-197*	.20
R	Washer	A-3219	.35

*Parts included in 7020-01 Hardware kit $5.50

REPLACEMENT PARTS (Quick Load)

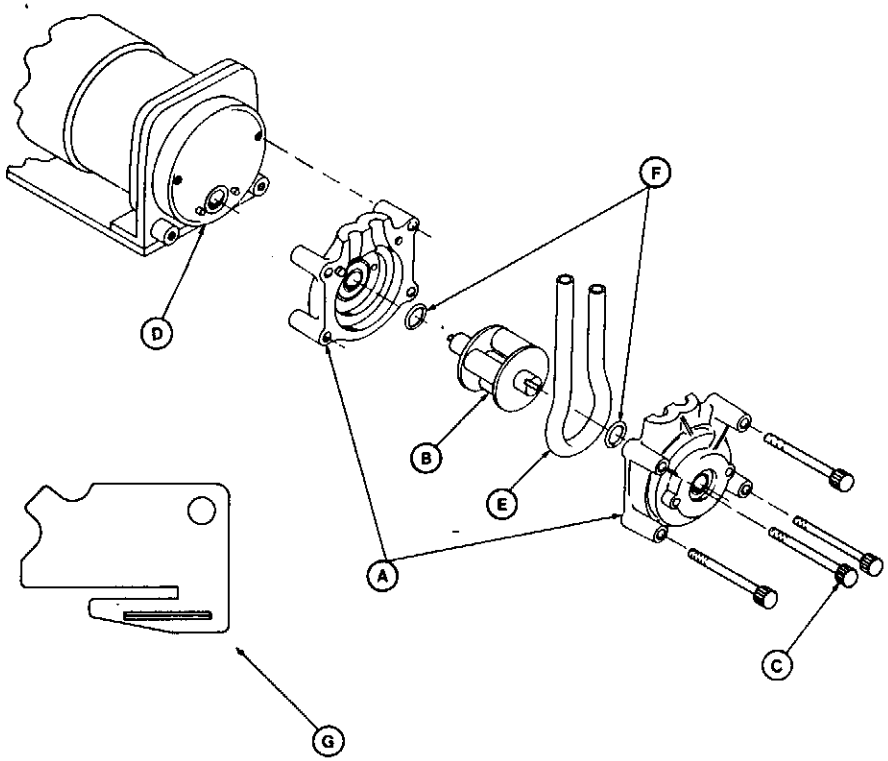
PUMP HEAD				ROTOR ASS'Y		HOUSING ASS'Y	
Cat. No.	Tubing Type	Shaft Type	Rotor Type	Rotor	Price	Housing	Price
7021-20	Thin Wall	Short	Steel	B-2335-2	$58.15	D-1958	$17.50
7021-22	Thick Wall	Short	Steel	B-2335-1	58.15	D-1958	17.50
7021-24	Thin Wall	Short	S.S.	B-2337-2	85.50	D-1959	25.75
7021-26	Thick Wall	Short	S.S.	B-2337-1	85.50	D-1959	25.75
7021-28	Thin Wall	Short	Solid	B-2345-2	35.30	D-1958	17.50
7021-30	Thick Wall	Short	Solid	B-2345-1	35.30	D-1958	17.50
7021-32	Thin Wall	Long	Steel	B-2339-2	58.15	D-1958	17.50
7021-34	Thick Wall	Long	Steel	B-2339-1	58.15	D-1958	17.50
7021-36	Thin Wall	Long	S.S.	B-2340-2	85.50	D-1959	25.75
7021-38	Thick Wall	Long	S.S.	B-2340-1	85.50	D-1959	25.75
7021-40	Thin Wall	Long	Solid	B-2347-2	35.30	D-1958	17.50
7021-42	Thick Wall	Long	Solid	B-2347-1	35.30	D-1958	17.50

Thin Wall: Pump will accept 13, 14, 16, 17, 18, tubing
Thick Wall: Pump will accept 15, 24, tubing
Short: Short output shaft (Standard)
Long: Long output shaft
Steel: Rollers are plated steel w/ball bearings
S.S.: Rollers are stainless steel w/ball bearings
Solid: Rollers are plated steel w/sleeve bearings

Reaction Arm kit
A+B+

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PARTS DIAGRAM (Standard Pump Head)



Legend:

- A Pump Head Half with Bearing (End Bell)
- B Rotor with Rollers and Shaft
- C Pump Head Mounting Hardware
- D Drive
- E Tubing
- F Thrust Washer A-1184
- G Tubing Key Cat. No.7013-90

"F" Thrust Washer (A-1184) is common to all standard Masterflex Pump Heads. Price..... $0.19

"C" Mounting Hardware:

Cat. No. 7013-02, Plated Steel	$3.50
Cat. No. 7013-04, Stainless Steel	$4.50

All other parts, see page 11.

REPLACEMENT PARTS (Standard Pump Head)

Pump Head Cat. No.		Standard Head Replacement Parts Nos.					
		ROTOR "B"		END BELL "A"			
Lexan®	PPS		Price	Lexan®	Price	PPS	Price
7013-00	-40	B-1061-1	$27.25	A-1106-2	$15.50	A-2292-2	$20.90
7013-10	-50	B-1290-1	57.25	A-1400-1	22.85	A-2639-1	28.35
7013-20	-42	B-1289-1	27.25	A-1106-2	15.50	A-2292-2	20.90
7013-21	-52	B-1291-1	57.25	A-1400-1	22.85	A-2639-1	28.35
7013-70		B-1016	21.00	A-1106-2	15.50		
7013-72		B-1017	21.00	A-1106-2	15.50		
7014-00	-40	B-1061-1	27.25	A-1106-3	15.50	A-2292-3	20.90
7014-10	-50	B-1290-1	57.25	A-1400-2	22.85	A-2639-2	28.35
7014-20	-42	B-1289-1	27.25	A-1106-3	15.50	A-2292-3	20.90
7014-21	-52	B-1291-1	57.25	A-1400-2	22.85	A-2639-2	28.35
7014-70		B-1016	21.00	A-1106-3	15.50		
7014-72		B-1017	21.00	A-1106-3	15.50		
7015-00	-40	B-1061	27.25	A-1106-1	15.50	A-2292-1	20.90
7015-10	-50	B-1290-2	57.25	A-1400-3	22.85	A-2639-3	28.35
7015-20	-42	B-1289-2	27.25	A-1106-1	15.50	A-2292-1	20.90
7015-21	-52	B-1291-2	57.25	A-1400-3	22.85	A-2639-3	28.35
7015-70		B-1016-1	21.00	A-1106-1	15.50		
7015-72		B-1017-1	21.00	A-1106-1	15.50		
7016-00	-40	B-1061-1	27.25	A-1106-5	15.50	A-2292-5	20.90
7016-10	-50	B-1290-1	57.25	A-1400-5	22.85	A-2639-5	28.35
7016-20	-42	B-1289-1	27.25	A-1106-5	15.50	A-2292-5	20.90
7016-21	-52	B-1291-1	57.25	A-1400-5	22.85	A-2639-5	28.35
7016-70		B-1016	21.00	A-1106-5	15.50		
7016-72		B-1017	21.00	A-1106-5	15.50		
7017-00	-40	B-1061-1	27.25	A-1106-4	15.50	A-2292-4	20.90
7017-10	-50	B-1290-1	57.25	A-1400-4	22.85	A-2639-4	28.35
7017-20	-42	B-1289-1	27.25	A-1106-4	15.50	A-2292-4	20.90
7017-21	-52	B-1291-1	57.25	A-1400-4	22.85	A-2639-4	28.35
7017-70		B-1016	21.00	A-1106-4	15.50		
7017-72		B-1017	21.00	A-1106-4	15.50		
7018-00	-40	B-1061-1	27.25	A-1106-6	15.50	A-2292-6	20.90
7018-10	-50	B-1290-1	57.25	A-1400-6	22.85	A-2639-6	28.35
7018-20	-42	B-1289-1	27.25	A-1106-6	15.50	A-2292-6	20.90
7018-21	-52	B-1291-1	57.25	A-1400-6	22.85	A-2639-6	28.35
7018-70		B-1016	21.00	A-1106-6	15.50		
7018-72		B-1017	21.00	A-1106-6	15.50		
7024-00	-40	B-1061	27.25	A-1106-7	15.50	A-2292-7	20.90
7024-10	-50	B-1290-2	57.25	A-1400-7	22.85	A-2639-7	28.35
7024-20	-42	B-1289-2	27.25	A-1106-7	15.50	A-2292-7	20.90
7024-21	-52	B-1291-2	57.25	A-1400-7	22.85	A-2639-7	28.35
7024-70		B-1016-1	21.00	A-1106-7	15.50		
7024-72		B-1017-1	21.00	A-1106-7	15.50		

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MASTERFLEX® TUBING FORMULATIONS

Use Masterflex® tubing only. Masterflex® tubing is precision-extruded and optically inspected to ensure top performance with all Masterflex® pump heads. Other commercial tubing will not meet or perform to our specifications.

Tubing for the Masterflex® system is manufactured in six formulations to meet most pumping requirements. All Masterflex® tubing is precision-extruded to stringent specifications.

Choose from the following formulations:

TYGON® (R-3603) — a low-cost, non-corrosive tubing for general applications in the laboratory. Excellent for vacuum pumping.

TYGON® SPECIAL (F-4040-A) — formulated to transport hydrocarbons. It's best suited for gasoline, fuels, oils, and lubricants.

TYGON® FOOD (B-44-4X) — designed specifically for use in pumping food products. Meets USDA and FDA standards.

VITON® — for exceptional chemical resistance against corrosives and solvents. This fluorelastomer has the shortest tubing life.

SILICONE — meets USDA and FDA standards. Silicone has the widest temperature range and the longest life. It can withstand pump head squeezing action at 200 rpm for up to 450 hours before losing its elastic memory.

C-FLEX™ THERMOPLASTIC-ELASTOMER — a new high-performance Masterflex® tubing with exceptional chemical resistance. C-Flex is a cost-efficient, long-life tubing.

NORPRENE® — a new long-life Masterflex® tubing that is resistant to heat and ozone with excellent vacuum characteristics.

NORPRENE® FOOD — FDA approved for use with food products.

Silicone, C-Flex, Norprene and Viton tubing can be AUTOCLAVED by standard procedures:

1. High speed instruments (flash) autoclave — place on muslin cloth or sterilizing paper in clean, open tray. Sterilize 10 minutes at 270° F (30 psi), (132° C) (2 kg/cm²).
2. Standard gravity autoclave — wrap in muslin cloth or sterilizing paper and place in a clean, open tray. Sterilize 30 minutes at 250° F (15 psi), (121° C) (1 kg/cm²).
3. Prevacuum high temperature autoclave — wrap in muslin cloth or sterilizing paper and place in a clean, open tray. Sterilize at normal cycle (30-55 minutes) at 250° F (121° C).

Tygon can be sterilized by two methods:

1. Using one of a number of germicides or gases, based on ethylene oxide in a gas sterilizer.
2. Steaming to a maximum of 250° F at 15 psi for 30 minutes and then cooling at 150° F in a dry heat for 2½ hours maximum.

Tygon, Norprene — Reg TM Norton Company
Viton — Reg TM E. I. DuPont Nemours & Company
C-Flex — TM Concept Inc.

MASTERFLEX® TUBING APPLICATIONS SUITABILITY

Suitability Table:
Data given below are general and based on average applications. We recommend you subject a sample of the tubing to an immersion test in the fluid to be pumped, particularly if you are working with hazardous materials. We assume no responsibility for tubing failure in specific applications.

Series Number	Type	Service Life[1]		Temperature Range	Oxygen Permeability[2]
		100 rpm	550 rpm		
6411- 6412- 6409-	Silicone Viton Tygon (R-3603)	825 hrs 165 hrs 275 hrs	150 hrs[3] 30 hrs 50 hrs	-80° to +500° F (-62° to +260° C) -10° to +400° F (-23° to +205° C) -50° to +165° F (-29° to + 74° C)	315,000 374 120
6401- 6419- 6424-	Tygon Special Tygon Food C-Flex	275 hrs 220 hrs 825 hrs	50 hrs 40 hrs 150 hrs[3]	+10° to +180° F (-12° to + 83° C) 0° to +180° F (-18° to + 83° C) -60° to +275° F (-50° to +135° C)	120 120 2450
6404- 6402-	Norprene Norprene Food	5000+ 5000+	1000+ 1000+	-60° to +275° F (-50° to +135° C) -60° to +275° F (-50° to +135° C)	90 90

[1]Approximate life in pump head subjected to stress of peristaltic action.
Tubing life is inversely proportional to pump speed; halving the speed should double the life.
[2]cc-mil/100 inches², day, atmosphere. Figures are approximate.
[3]Except for size 18 tubing which has a 70 hour life at 550 rpm.

Suitability Guidelines:

1. Silicone — exceptionally biocompatible, because it contains no toxic leachable plasticizers. Meets USDA, FDA and USP Class VI standards. Silicone tubing remains flexible through the widest temperature of any Masterflex® tubing, -80° to +500° F (-62° to +260° C). Excellent elastic memory allows the longest tubing life, 825 hours at 100 rpm, 150 hours at 550 rpm, except for size 18 which has a 70 hour life at 550 rpm. Autoclavable. Translucent white.

2. Viton fluoroelastomer — exceptional resistance to corrosives, solvents, and oils at elevated temperatures. Temperature range from -10° to +400° F (-23° to +204° C). Has the shortest life of any Masterflex® tubing, 165 hours at 100 rpm, 30 hours at 500 rpm. Autoclavable. Opaque black.

3. Tygon (R-3603) — soft, clear, low-cost tubing for general laboratory applications. Non-toxic, non-aging, and non-oxidizing. Excellent for vacuum pumping. Temperature range from -50° to +165° F (-45° to +74° C). Service life: 275 hours at 100 rpm, 50 hours at 550 rpm. Autoclavable at 250° F (121° C), 15 psi for 30 minutes. Dry heat at no more than 150° F (66° C) for 2 to 2½ hours. Transparent.

4. Tygon special (F-4040-A) — specially formulated to transport hydrocarbons. Suitable for gasoline, kerosene, heating oils, cutting compounds, and glycol-based coolants. Minimum extractability; will not adulterate pumped fluid. Should not be used with high concentrations of strong acids or alkalies. Temperature range from +10° to +180° F (-12° to +83° C). Service life: 275 hours at 100 rpm, 50 hours at 550 rpm. Autoclave at 250° F (121° C), 15 psi for 30 minutes. Dry heat at no more than 150° F (66° C) for 2 to 2½ hours. Translucent yellow.

5. Tygon food (B-44-4X) — designed specially for pumping food products. Non-toxic. Meets USDA and FDA standards. NSF listed. Will not affect taste or odor of products conveyed through it. Bore is extremely smooth (smoother than stainless steel) so it won't trap particles which might harbor bacteria. Excellent wetting properties permit flush-cleaning and complete drainage. Unaffected by all commercially available sanitizers. Temperature range from 0 to 180° F (-18° to +83° C). Service life: 220 hours at 100 rpm, 40 hours at 550 rpm. Autoclave at 250° F (121° C), 15 psi for 30 minutes. Dry heat at no more than 150° F (66° C) for 2 to 2½ hours. Transparent.

6. C-Flex™ thermoplastic elastomer — low-cost tubing with elastic characteristics and chemical compatibility similar to silicone. Excellent biocompatibility, contains no toxic materials. Meets FDA standards, surpasses USP Class VI requirements. Temperature range from -60° to +230° F (-50° to +110° C). Long service life; 825 hours at 100 rpm, 150 hours at 550 rpm except for size 18 which has a 70 hour life at 550 rpm. Sterilizable by ethylene oxide, gamma radiation, or autoclave. Opaque white.

7. Norprene™ — superior life, shows no sign of weakening or cracking after years of use. Substantial cost savings. Resistant to heat and ozone. Excellent vacuum characteristics. Remarkable consistency of flows over life of tubing.

8. Norprene™ Food Grade — FDA approved. Superior life. Substantial cost savings. Resistant to heat and ozone. Excellent vacuum characteristics. Remarkable consistency of flows over life of tubing.

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