PENGUIN

Installation & Maintenance

Magnetic Drive Pump

Series M

MODELS		MATERIALS
M-1/14	M-1/8	B - Polypropylene
M-1/4	M-1/3	C - PVDF (Kynar)
M-1/2	M-3/4	S - 316 Stainless Steel
M-2	M-3	
M-10		

INTRODUCTION

Penguin magnetic-driven pumps are designed to handle a large range of chemicals without difficulty. Constructed of polypropylene, kynar or stainless steel, Series M pumps have an upper working temperature of 190/220/250 degrees, respectively, and thus can handle highly corrosive or mild chemicals, acids or solvents. Series M pumps eliminate the conventional shaft seal found in most pumps. This means that there is no rotating seal to wear out and allow the liquid being pumped to leak out. The pumping action may eventually fail, however, the liquid can never leak out. Series M pumps are easy to install and operate, and are virtually maintenance free. All pumps have been tested for proper operation before leaving the factory. To obtain optimum service life, please follow all instructions.

RECOMMENDATIONS

Install the pump as close as possible to the liquid reservoir from which the liquid is being pumped. As more energy is necessary to prime the liquid than to discharge the fluid, make the suction as short as possible.

Always make sure there is enough liquid in the reservoir and the level is high enough considering the capacity of the pump unit. Inadequate liquid will cause vortex in the reservoir. A vortex occurs when air mixes from the surface into the fluid. This can disturb the flow and also prevents the pump from priming. Never run the pump for more than 5-10 minutes against a closed discharge valve. This will cause overheating of the fluid in the pump and will damage the polypropylene parts. Temperature in this case will increase up to 220 degrees. If the pump is being run against a closed discharge valve for a long duration of time, install a small bleed line back into the reservoir before the discharge valve of the pump. If the line is small, there is a minimum pressure loss. This prevents overheating by recirculating the fluid.

ELECTRICAL

Model M-1/14 and M-1/8 pumps are supplied as standard in a single phase, single voltage, 115V, 50/60c motor with 230V as an option. All other models supplied with a single phase are dual voltage, 115/230V motors. The factory wires all dual voltage motors for the lower voltage (115V) unless otherwise requested. When changing from 115V wiring to 230V wiring, follow the motor manufacturer's wiring instructions, which are found in the motor junction box or motor label. Be sure to wire the motor for clockwise rotation as viewed from the suction entrance of the pump. A power cord and plug are supplied for immediate plug-in operation on motors wired for the lower voltage. These motors have already been wired at the factory for proper rotation. A plug is not supplied on motors wired 230V. Motors supplied in three-phase are dual voltage, 230/460V, 50/60c which are not wired at the factory. Since direction of rotation cannot be determined without operating the pump, the motor rotation must be checked before operation. Attach leads to motor and bump start. Since these pumps must not run dry for more than 10 seconds, do not leave motor running. As viewed from the suction entrance of the pump, check for clockwise rotation. If counterclockwise rotation, change any two leads and check rotation again. Many options are available on the M Series motors including explosion-proof and special voltage motors. If any of these options are required, please check the motors carefully or consult factory.

PLUMBING

It is recommended to enlarge the suction line a minimum of one size larger than the suction entrance. Never reduce plumbing on the suction. Avoid 90 degree elbows and never use a 180 degree elbow. Make sure that every suction coupling/connection is airtight. Always use a valve on the discharge of the pump. In case of a flooded suction, in which the liquid level is higher than the center of the suction entrance, provide a T-connection with a small valve after the discharge valve to assist in letting the air out during flooding. In case of a non-flooded suction, in which the liquid level is lower than the center of the suction entrance, provide a foot valve on the end of the submerged suction line.

PRIMING

Under flooding conditions, open all the valves in the suction and discharge lines. If a T-connection with valve is provided, wait until the fluid is escaping with no air bubbles. Close all the valves in the discharge line.
Always leave the suction valves wide open.
A closed suction valve will cause severe damage to the impeller and housing.
Under non-flooded conditions, fill up the pump and suction line very slowly from the discharge in order to let entrapped air out. Then close all valves in the discharge line. Give the pump a couple of seconds to build up pressure, then slowly open discharge valve until the desired flow is achieved. A priming chamber can be included as an option to help facilitate priming the pump, but all non- flooded directions must still be followed.
If a priming chamber is included, the maximum suction length of the inlet pipe combining both vertical and horizontal lengths is as follows:

Pump Model	Maximum Length of Inlet Pipe
M-1/14, M-1/8, M-1/4	10 feet
M-1/3	7 feet
M-1/2	6 feet

When a flapper valve is supplied on the inlet of the priming chamber, a maximum length of inlet pipe is not required. For proper operation, it is important to note that the liquid being pumped lubricates the impeller-magnet assembly bushing which is spinning on the stationary ceramic spindle. If the pump is run dry for longer than 30 seconds, the impeller bushing may “freeze” onto the spindle. Other bushing materials are available for “dry” running and the factory should be contacted.

DISASSEMBLY

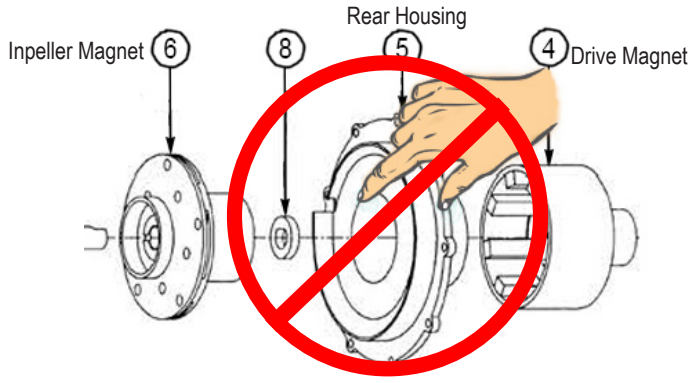
1. Remove the housing screws (item 13). The entire pump head wet end assembly will now slide out from the drive magnet assembly.
2. The impeller magnet assembly will slide off the spindle.
3. The spindle is a light press fit into the pump housing and can be pulled out by hand.
4. Clean all parts as necessary and replace all worn or damaged parts before re-assembling.

CAUTION & SAFETY APPLICABLE TO MODELS M-1/2 THRU M-10

This pump utilizes very strong rare earth cobalt or neodymium magnets. Any individuals with ***pacemakers, implanted defibrillators, electric medical devices, metallic heart valves or sicke cell anemia*** should consult a health care professional before working with this pump.
Magnets, specifically on these models, M-2, M-3, & M-10, may be strong enough to pull the impeller magnet from your grasp suddenly and quickly during assembly or disassembly, into the rear housing/drive magnet on the motor end.
The magnetic attraction of the rear housing/drive magnet for the impeller magnet is tremendously strong enough to slam these two parts together and break or crush any fingers or hand that are loged between these two magnets.

CAUTION: DO NOT put fingers or hands between these two magnetic mating surfaces during assembly or disassembly.

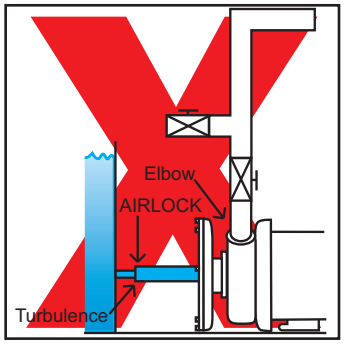
The placement of a 1” or 2” thick block of wood between these two magnets during assembly or disassembly is stroongly recommended as a precaution to avoid serious injury to fingers or hand. The axial pull will diminish as these two magnets become alighned and fully engaged. The magnetic pull is greatest betweem 1/3 to 2/3 engagement. If you allow the impeller magnet to snap into the rear housing/drive magnet you may damage the impeller bushing, the rear thrust washer or the rear housing.
It should be noted that rear housing/drive magnet is in reference to the rear housing which sits inside the drive magnet with the impeller magnet sitting inside the rear housing after assembly is completed.

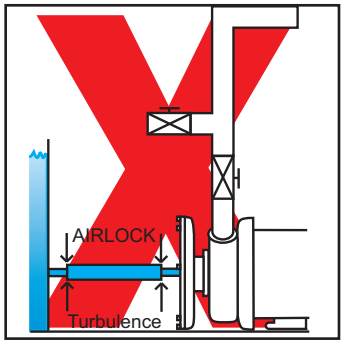


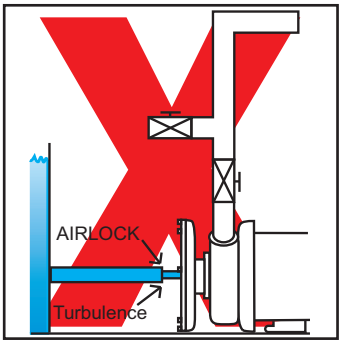
CAUTION: DO NOT put fingers or hands between these two magnetic mating surfaces during assembly or disassembly.

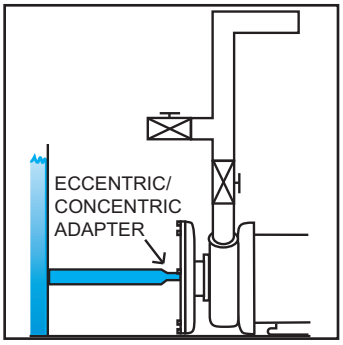
Recommended Installation

Suction Plumbing



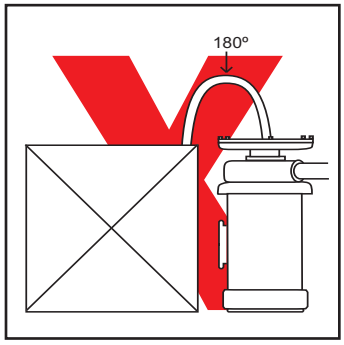


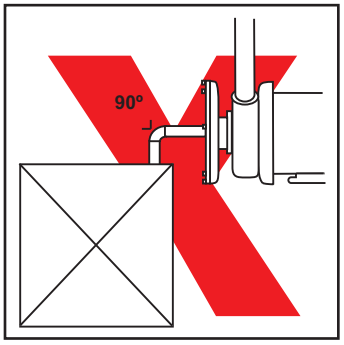


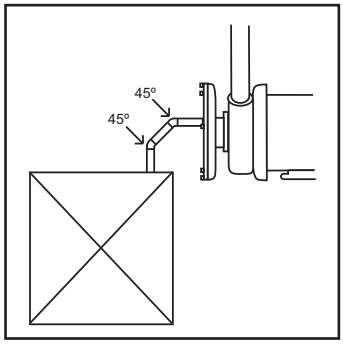


Recommended

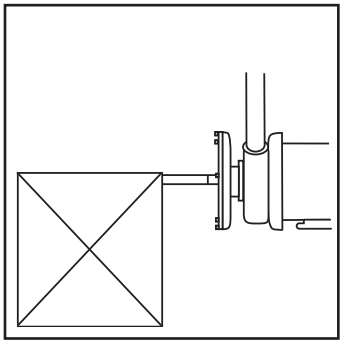
Suction Top View





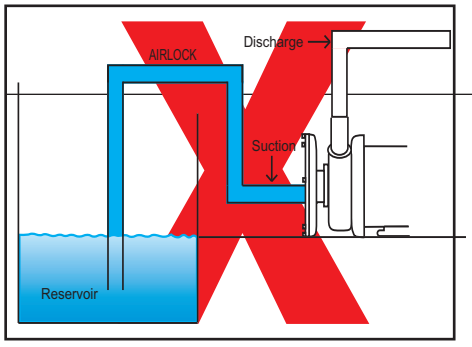


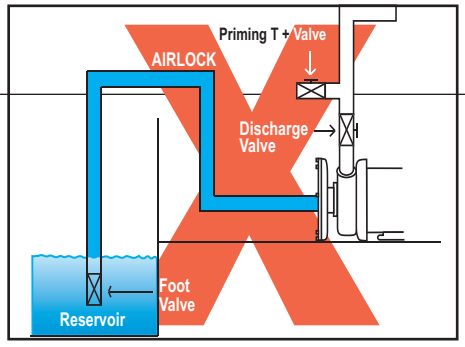
Recommended

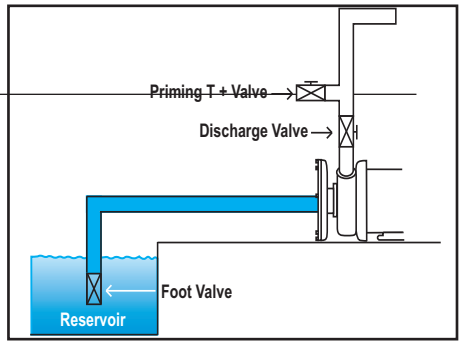


Recommended

Suction Lift

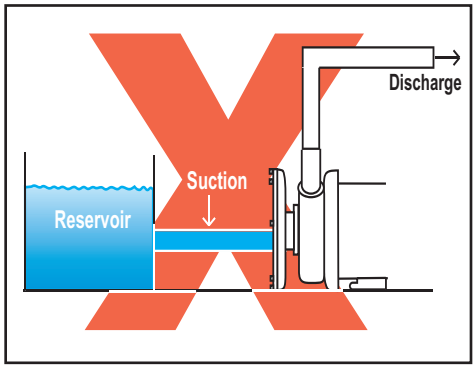


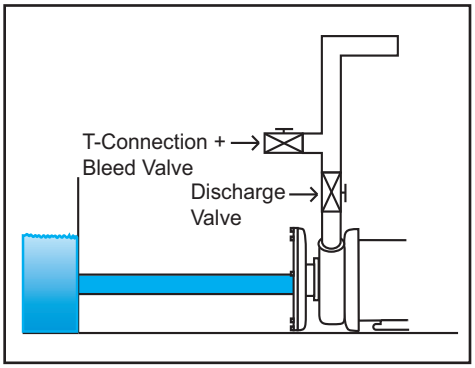




Recommended

Suction Head





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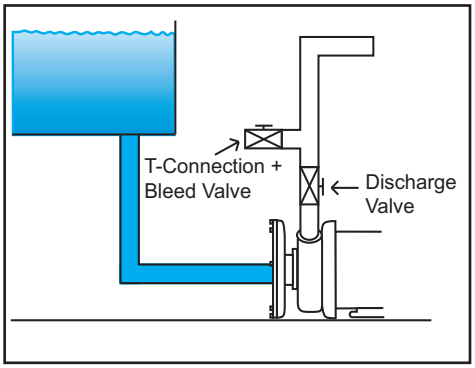
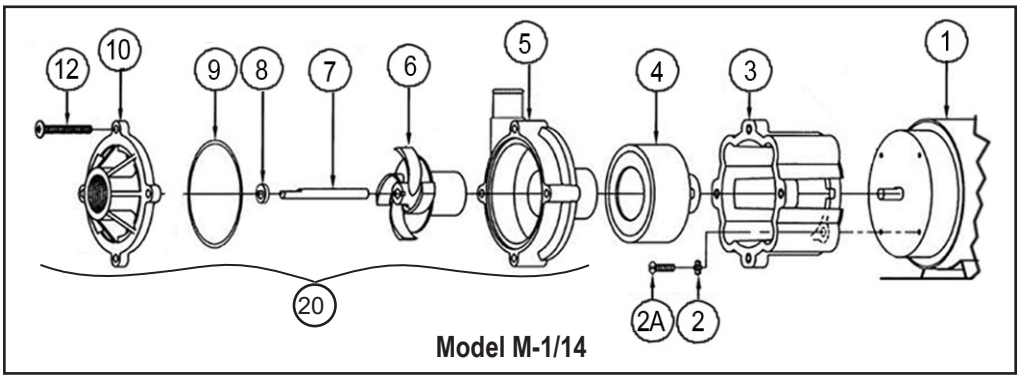
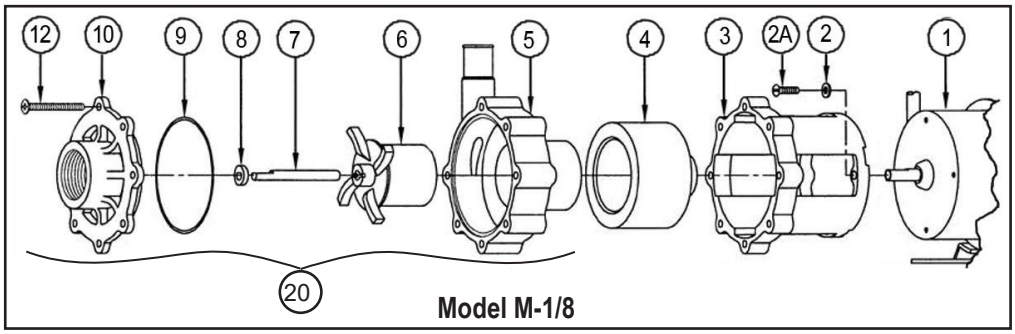


Recommended

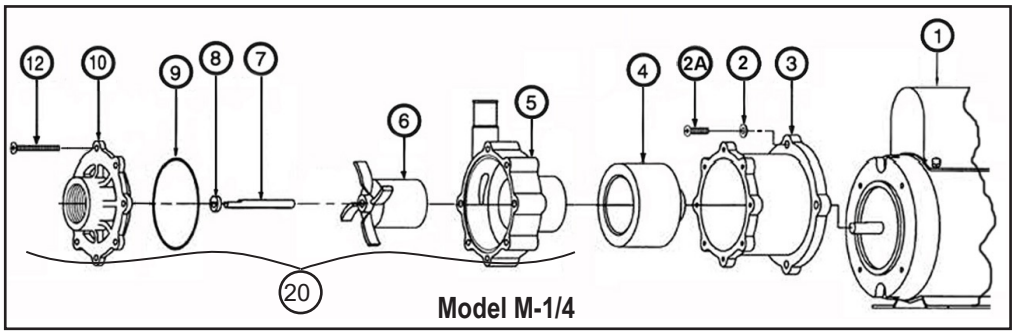
M Spare Parts Drawings



Model M-1/14



Model M-1/8

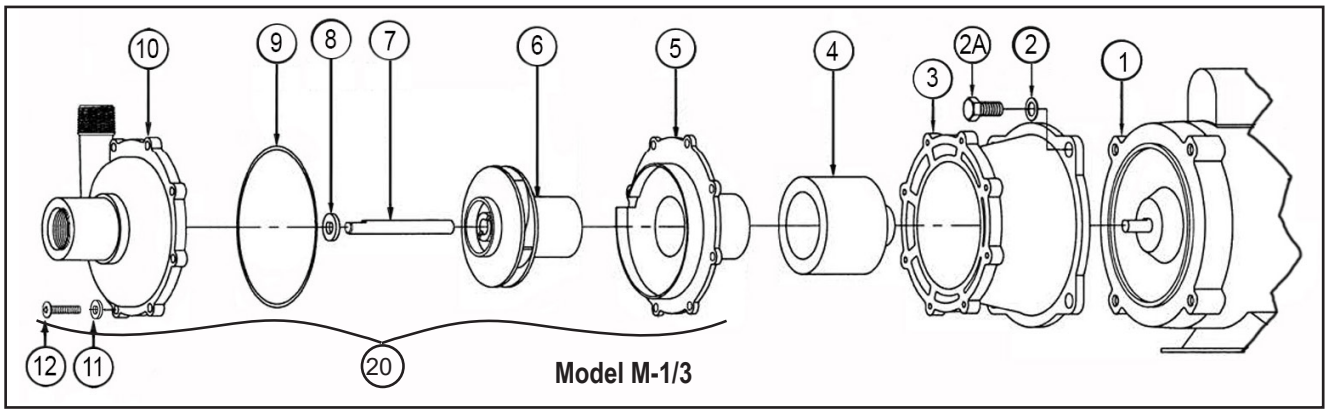


Model M-1/4

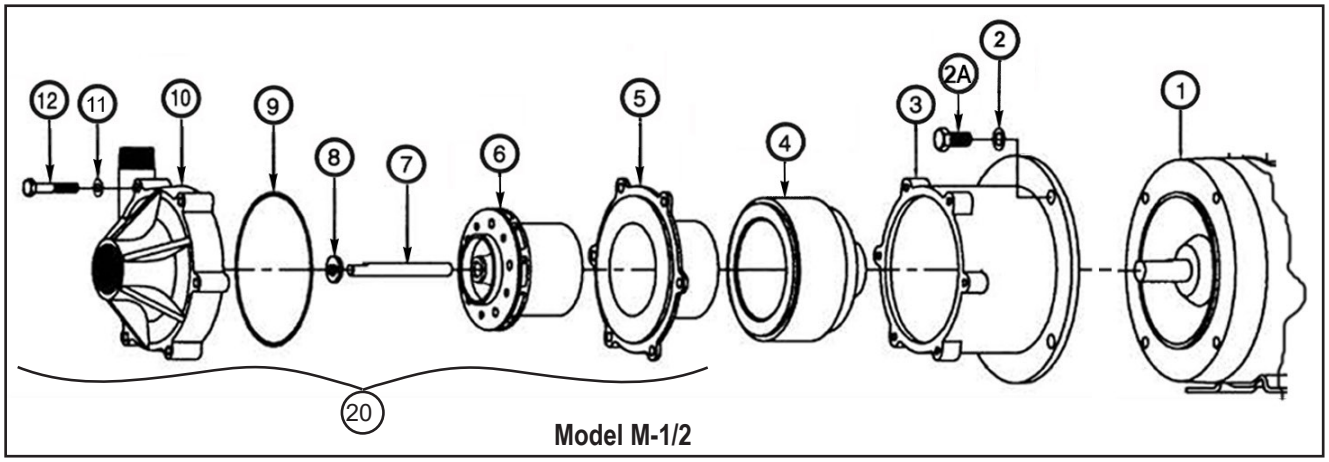
Item	Description	M-1/14B, C	M-1/8B, C	M-1/4B, C, S
1	Motor (TEFC)			
	115V 1-Ph 50/60hz	M-130-140-10	M-145-035-10	NA
	230V 1-Ph 50/60hz	M-130-049-12	M-145-036-10	NA
	115/230V 1-Ph 50/60hz	NA	NA	M-150-213-10
	Motor Bracket Hardware			
2	Washer	M-140-014-10(4)	M-858-004-10(4)	M-150-051-10(4)
2A	Screw	M-618-027-10(4)	M-618-027-10(4)	M-150-050-10(4)
3	Pump Motor Bracket	M-130-066-01	M-145-010-10	M-150-070-01
4	Drive Magnet	M-130-043-02	M-145-027-01	M-150-176-03
5	Rear Housing			
	Polypropylene	M-130-018-10	M-150-031-01	M-150-031-01
	Kynar	M-130-110-10	M-150-123-01	M-150-123-01
	316SS	NA	NA	M-150-110-00
6	Impeller Magnet			
	Polypro w/Molded Bushing	M-130-069-02	M-145-033-02	M-150-098-02
	Polypro w/Carbon Bushing	NA	M-145-033-03	M-150-098-03
	Polypro w/Mica-Teflon Bushing	NA	NA	M-150-098-05
	Kynar w/Molded Bushing	M-130-112-02	M-145-039-02	M-150-125-02
	Kynar w/Carbon Bushing	NA	NA	M-150-125-03
	Kynar w/Mica-Teflon Bushing	NA	NA	M-150-125-05
	316SS w/carbon bushing	NA	NA	M-150-114-04
	316SS w/mica-Teflon bushing	NA	NA	M-150-114-06

7	Spindle (shaft) M-1/14B, C	M-1/14B, C	M-1/8B, C	M-1/4B, C, S
	Ceramic (plastic pumps)	M-130-024-10	M-130-024-10	M-130-024-10
8	Front Thrust Washer			
	Ceramic	M-130-028-10	M-130-028-10	M-130-028-10
9	Housing Cover O-ring			
	Viton/Teflon	M-130-121-10	M-150-212-10	M-150-212-10
	Viton	M-130-033-10	M-750-986-10	M-750-986-10
10	Pump Housing Cover			
	Polypropylene	M-130-021-10	M-150-032-10	M-150-032-10
	Kynar	M-130-111-10	M-150-124-10	M-150-124-10
	316SS	NA	M-150-111-00	M-150-111-00
11	Pump Housing Cover Washer	M-150-051-10(4)	NA	NA
12	Pump Housing Cover Screw	M-823-008-10(4)	M-150-021-10(7)	M-150-021-10(7)
13	Impeller Bushing (replacement)			
	Carbon	NA	M-150-063-10	NA
	Mica Teflon	NA	M-150-138-10	NA
20	Wet End Assy, Includes Items (5), (6), (7),(8), (9), (10), (13), (14)			
	Polypropylene	M-130-114-01	M-145-046-02	M-150-148-02
	Kynar	NA	NA	M-150-149-02

M Spare Parts Drawings



Model M-1/3

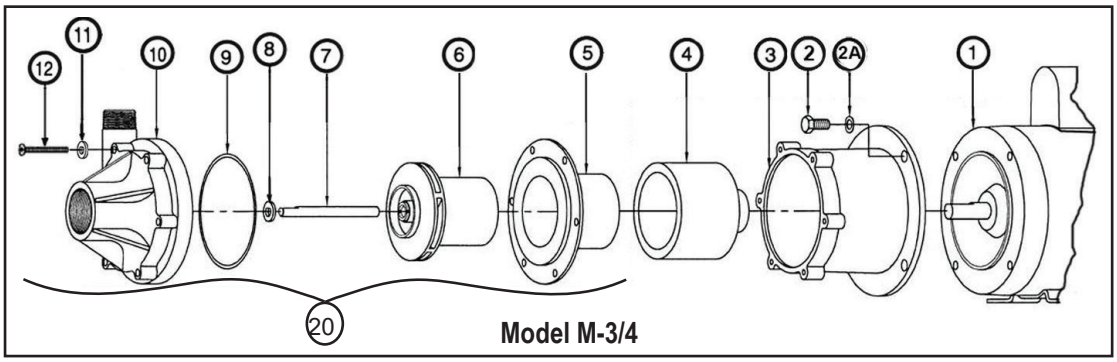


Model M-1/2

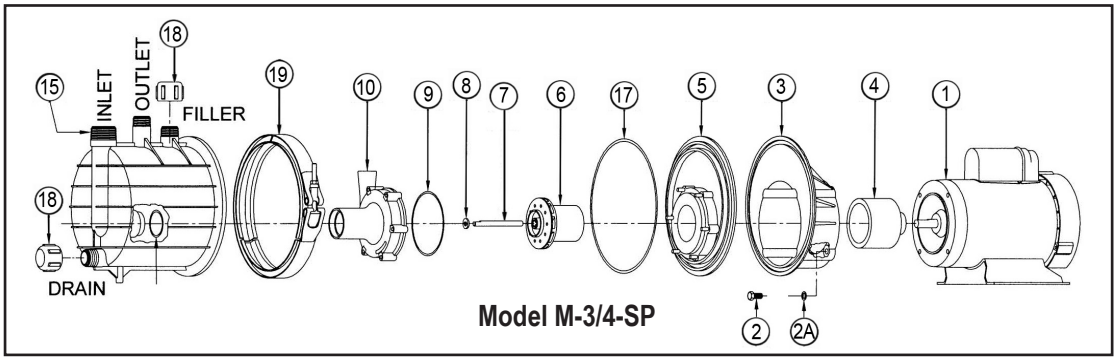
Item	Description	M-1/3B, C, S	M-1/2B, C
1	Motor (TEFC)		
	115/230V 1-Ph 50/60hz	M-151-015-10	M-153-019-10
	230/460V 3-Ph 50/60hz	M-151-039-10	M-153-020-10
	Motor Bracket Hardware		
2	Washer	M-155-019-10(4)	M-155-019-10(4)
2A	Screw	M-155-017-10(4)	M-155-017-10(4)
3	Pump Motor Bracket	M-151-090-01	M-153-001-01
4	Drive Magnet	M-151-061-02	M-153-035-01
5	Rear Housing		
	Polypropylene	M-151-028-01	M-153-052-10
	Kynar	M-151-045-01	M-153-041-01
	Ryton	NA	M-153-005-01
	316SS	M-151-003-00	NA
6	Impeller Magnet		
	Polypro w/Molded Bushing	M-151-029-05	NA
	Polypro w/Ryton Bushing	NA	M-153-003-04
	Polypro w/Carbon Bushing	M-151-029-08	M-153-003-05
	Polypro w/Mica-Teflon Bushing	M-151-029-13	M-153-003-09
	Kynar w/Molded Bushing	M-151-046-03	NA
	Kynar w/Carbon Bushing	M-151-046-05	M-153-043-05
	Kynar w/Mica-Teflon Bushing	M-151-046-11	M-153-043-09
	316SS w/ryton bushing	M-151-001-06	NA
	316SS w/carbon bushing	M-151-001-04	NA
	316SS w/mica-Teflon bushing	M-151-001-08	NA
7	Spindle (shaft)		
	Ceramic (plastic pumps)	M-153-007-10	M-153-007-10
	Ceramic w/3-flats (plastic pumps)	M-153-073-10	M-153-073-10
	316SS (metal/plastic pumps)	M-153-046-10	M-153-046-10
	Hast C for plastic/metal pumps	M-153-040-10	M-153-040-10

8	Front Thrust Washer	M-1/3B, C, S	M-1/2B, C
	Ceramic	M-155-009-10	M-155-009-10
	Hast C	M-155-084-10	NA
	Silicon Carbide	M-155-149-10	NA
9	Housing Cover O-ring		
	EPR	M-153-025-10	M-153-025-10
	Viton/Teflon	M-153-024-10	NA
	Viton	M-153-015-10	NA
10	Pump Housing Cover		
	Polypropylene	M-151-027-10	M-153-052-10
	Kynar	M-151-044-10	M-153-042-10
	Ryton	M-153-002-10	NA
	316SS	NA	M-155-036-00
11	Pump Housing Cover Washer	M-151-016-10(8)	M-155-021-10(6)
12	Pump Housing Cover Screw	M-135-180-10(8)	M-153--011-10(6)
13	Impeller Bushing (replacement)		
	Ryton	M-151-011-10	M-153-016-10
	Carbon	M-151-009-10	M-153-006-10
	Mica Teflon	M-151-064-10	M-153-053-10
20	Wet End Assy, Includes Items (5), (6), (7),(8), (9), (10), (13), (14)		
	Polypropylene	M-151-069-01	M-153-056-01
	Kynar	M-151-070-01	M-153-057-01

M Spare Parts Drawings



Model M-3/4

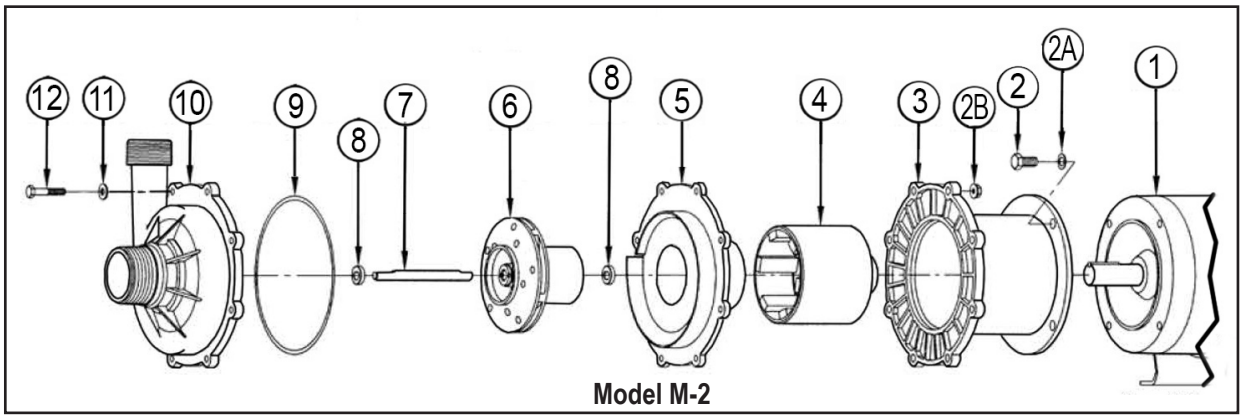


Model M-3/4-SP

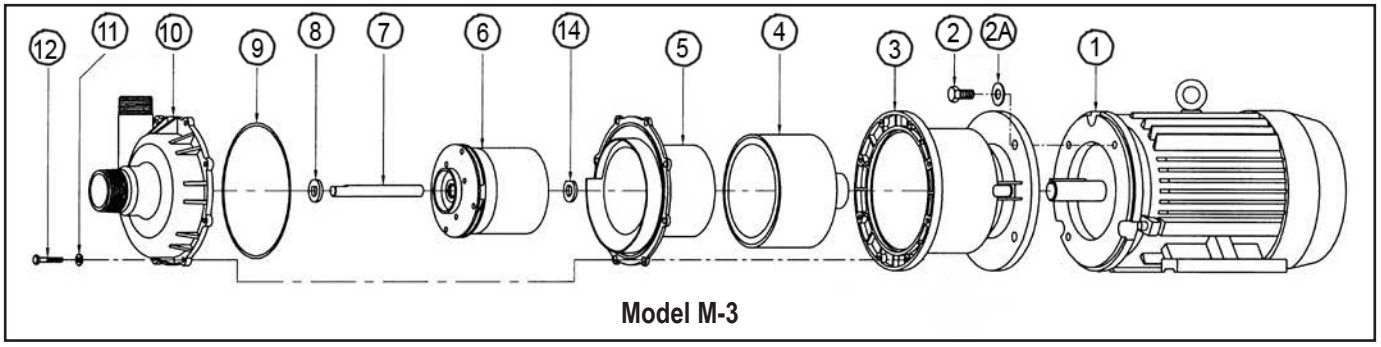
Item	Description	M-3/4B, C	M-3/4S	M-3/4-SP
1	Motor (TEFC)			
	115/230V 1-Ph 50/60hz	M-155-016-10	M-155-173-10	M-155-185-10
	230/460V 3-Ph 50/60hz	M-155-022-10	M-155-174-10	M-155-186-10
	Motor Bracket Hardware			
2	Nut	NA	NA	NA
2A	Washer	M-155-019-10(4)	M-155-019-10(4)	M-155-019-10(4)
	Screw	M-155-017-10(4)	M-155-017-10(4)	M-155-017-10(4)
3	Pump Motor Bracket	M-155-092-01	M-155-092-01	M-155-178-10
4	Drive Magnet	M-155-130-02	M-155-130-02	M-155-130-02
5	Rear Housing			
	Polypropylene	M-155-091-01	NA	M-155-176-01
	Kynar	M-155-124-01	NA	M-155-194-01
	Ryton	M-155-067-01	NA	NA
	316SS	NA	M-155-035-00	NA
6	Impeller Magnet			
	Polypro w/Ryton Bushing	M-155-159-05	NA	NA
	Polypro w/Carbon Bushing	M-155-159-02	NA	M-155-159-02
	Polypro w/Mica-Teflon Bushing	M-155-159-04	NA	M-155-159-04
	Kynar w/Molded Bushing	NA	NA	NA
	Kynar w/Ryton Bushing	NA	NA	NA
	Kynar w/Carbon Bushing	M-155-160-02	NA	M-155-160-02
	Kynar w/Mica-Teflon Bushing	M-155-160-04	NA	M-155-160-04
	316SS w/ryton bushing	NA	M-155-112-03	NA
	316SS w/carbon bushing	NA	M-155-112-04	NA
	316SS w/mica-Teflon bushing	NA	M-155-112-08	NA
7	Spindle (shaft)			
	Ceramic (plastic pumps)	M-155-039-10	NA	M-155-039-10
	Ceramic (metal pumps)	NA	M-155-117-10	NA
	Ceramic w/3-flats (plastic pumps)	M-155-145-10	NA	NA
	Hast C (metal pumps)	NA	M-155-082-10	NA
	316SS for metal pumps	NA	M-155-081-10	NA
	316SS (metal/plastic pumps)	NA	NA	NA
	316SS (plastic pumps)	M-155-146-10	NA	NA
8	Front Thrust Washer	**M-3/4B, C**	**M-3/4S**	**M-3/4-SP**
	Ceramic	M-155-009-10	M-155-009-10	M-155-009-10
	Silicon Carbide	NA	M-155-149-10	NA

Item	Description	M-3/4B, C	M-3/4S	M-3/4-SP
9	Housing Cover O-ring			
	EPR	M-155-105-10	M-155-105-10	NA
	Viton/Teflon	M-155-071-10	NA	M-155-215-10
	BunaN	NA	NA	NA
	Viton	M-155-010-10	NA	M-155-180-10
10	Pump Housing Cover			
	Polypropylene	M-155-011-10	NA	M-155-175-10
	Kynar	M-155-125-10	NA	M-155-195-10
	316SS	NA	M-155-036-00	NA
12	Pump Housing Cover Screw	M-155-014-10(6)	NA	NA
13	Impeller Bushing (replacement)			
	Ryton	M-155-093-10	NA	NA
	Carbon	M-155-013-10	NA	NA
	Mica Teflon	M-155-147-10	NA	NA
14	Rear Thrust Washer			
	Ceramic	M-155-064-10	NA	NA
15	Housing Container			
	Polypropylene	NA	NA	M-155-177-10
	Kynar	NA	NA	M-155-196-10
16	Housing Container Internal O-ring			
	Viton	NA	NA	M-155-179-10
	Viton/Teflon	NA	NA	M-155-214-10
17	Rear Housing O-ring			
	Viton	NA	NA	M-155-181-10
	Viton/Teflon	NA	NA	M-155-216-10
18	Drain & Filler Cap			
	Polypropylene	NA	NA	M-155-182-10(2)
	Kynar	NA	NA	M-155-197-10(2)
19	V-Retainer Clamp, Stainless Steel	NA	NA	M-155-183-10
20	Wet End Assy, Includes Items (5), (6), (7),(8), (9), (10), (13), (14)			
	Polypropylene	M-155-165-01	NA	NA
	Kynar	M-155-166-01	NA	NA
21	Pump Head Assy Complete Less Motor, Includes Items (2), (3), (4),(5), (6), (7), (8), (9), (10), (11), (12), (13), (14)			

M Spare Parts Drawings



Model M-2



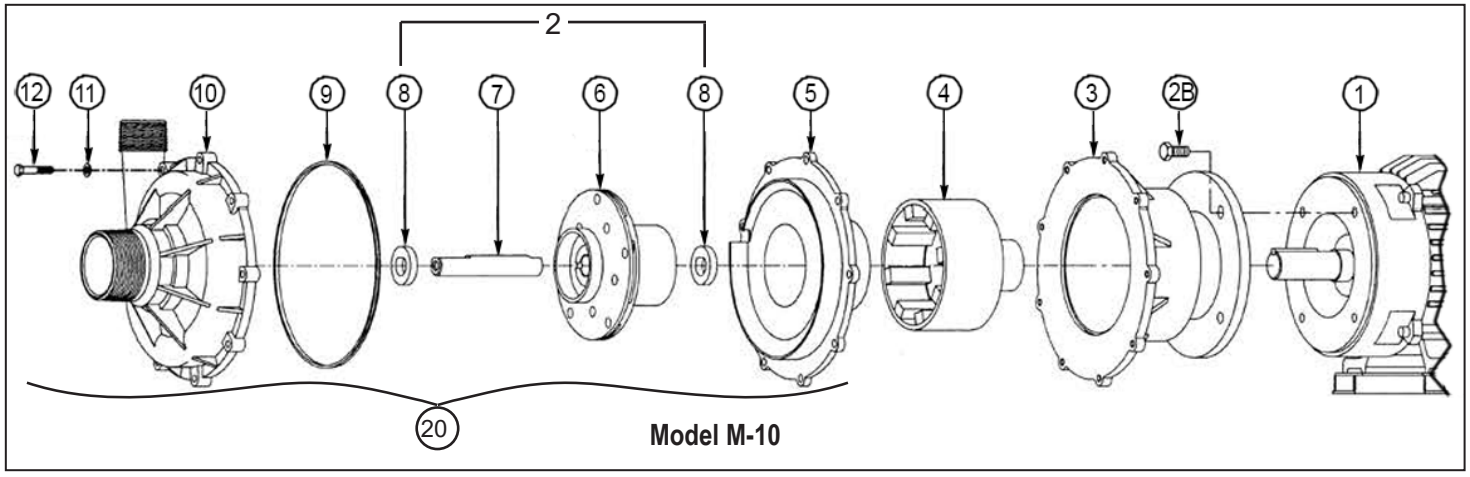
Model M-3

Item	Description	M-2B, C	M-3B, C	M-3S
	Motor (TEFC)			
1	230/460V 3-Ph 50/60hz	M-156-008-10	M-157-012-10	M-157-065-10
	Motor Bracket Hardware			
2	Nut	M-156-053-10	NA	NA
2A	Washer	M-155-019-10(4)	M-160-032-10(4)	M-160-032-10(4)
2B	Screw	M-155-017-10(4)	M-160-031-10(4)	M-160-031-10(4)
3	Pump Motor Bracket	M-156-041-10	M-157-100-10	M-157-100-10
4	Drive Magnet	M-156-009-01	M-157-005-01	M-157-005-01
5	Rear Housing			
	Polypropylene	M-156-061-10	M-157-006-10	NA
	Kynar	M-156-002-10	M-157-053-10	NA
	Ryton	NA	M-157-038-00	NA
	316SS	NA	NA	M-157-028-00
6	Impeller Magnet			
	Polypro w/Ryton Bushing	NA	M-157-004-02	NA
	Polypro w/Carbon Bushing	M-156-064-02	M-157-004-05	NA
	Polypro w/Mica-Teflon Bushing	NA	M-157-004-07	NA
	Kynar w/Ryton Bushing	NA	M-157-050-02	NA
	Kynar w/Carbon Bushing	M-156-004-02	M-157-050-05	NA
	Kynar w/Mica-Teflon Bushing	M-156-004-03	M-157-050-07	NA
	316SS w/ryton bushing	NA	NA	M-157-029-02
	316SS w/carbon bushing	NA	NA	M-157-029-05
	316SS w/mica-Teflon bushing	NA	NA	M-157-029-07
7	Spindle (shaft)			
	Ceramic (plastic pumps)	M-156-007-10	M-157-002-10	NA
	Hast C (metal pumps)	NA	NA	M-157-045-10
	Hast C for plastic/metal pumps	NA	M-157-045-10	M-157-045-10
8	Front Thrust Washer			
	Ceramic	M-156-016-10	M-157-001-10	M-157-001-10
	Hast C	NA	NA	M-157-043-10
9	Housing Cover O-ring			
	Teflon	M-156-023-10	NA	NA
	EPR	M-156-034-10	NA	NA
	Viton/Teflon	M-156-023-10	M-157-032-10	NA
	Viton	M-156-010-10	M-157-011-10	NA

Item	Description	M-2B, C	M-3B, C	M-3S
10	Pump Housing Cover			
	Polypropylene	M-156-006-10	M-157-007-10	NA
	Kynar	M-156-001-10	M-157-052-10	NA
11	Pump Housing Cover Washer	M-157-023-10(8)	M-157-023-10(8)	M-157-037-10(8)
12	Pump Housing Cover Screw	M-153-011-10(8)	NA	NA
13	Impeller Bushing (replacement)			
	Ryton	NA	M-157-010-10	NA
	Carbon	M-156-025-10(2)	M-157-033-10	NA
	Mica Teflon	M-156-026-10(2)	M-157-057-10	NA
14	Rear Thrust Washer			
	Ceramic	M-156-016-10	M-157-057-10	NA
	Hast C	NA	NA	M-157-047-10
20	Wet End Assy, Includes Items (5), (6), (7),(8), (9), (10), (13), (14)			
	Polypropylene	M-156-066-01	M-157-085-01	NA
	Kynar	M-156-031-01	M-157-086-01	NA

M Spare Parts Drawings

Item	Description	M-10C	M-10B
1	Motor (TEFC)		
	230/460V 3-Ph 50/60hz	M-161-012-10	M-161-012-10
Motor Bracket Hardware			
2	Nut	NA	NA
2A	Washer	NA	NA
2B	Screw	M-160-031-10(4)	M-160-031-10(4)
3	Pump Motor Bracket	M-161-007-00	M-161-007-00
4	Drive Magnet	M-161-031-01	M-161-031-01
5	Rear Housing		
	Kynar	M-161-009-10	M-161-052-10
6	Impeller Magnet		
	Kynar w/Carbon Bushing	M-161-005-04	M-161-053-03
	Kynar w/Mica-Teflon Bushing	M-161-005-06	M-161-053-04
7	Spindle (shaft)		
	Ceramic	M-161-002-10	M-161-002-10
	Ceramic w/3-flats	M-161-039-10	M-161-039-10
8	Front Thrust Washer		
	Ceramic	M-161-001-10	M-161-001-10
9	Housing Cover O-ring		
	Viton	M-161-043-10	M-161-043-10
10	Pump Housing Cover		
	Kynar	M-161-008-10	M-161-056-10
11	Pump Housing Cover Washer	M-160-030-10(9)	M-160-030-10(9)
12	Pump Housing Cover Screw	M-160-029-10(9)	M-160-029-10(9)
13	Impeller Bushing (replacement)		
	Carbon	M-161-011-10(2)	M-161-011-10(2)
	Mica Teflon	M-161-032-10(2)	M-161-032-10(2)
14	Rear Thrust Washer		
	Ceramic	M-161-001-10	M-161-001-10
20	Wet End Assy, Includes Items(5), (6), (7),(8), (9), (10), (11), (12)		
	Kynar	M-161-035-01	M-161-060-01



Model M-10

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