

# Pumps by Hayward

## "T" SERIES IMMERSIBLE PUMP OWNER'S MANUAL

INSTALLATION, OPERATION, MAINTENANCE, PARTS

Models

T2 T4 T5 T6 T7 T8



**PLEASE READ THE FOLLOWING INFORMATION PRIOR TO INSTALLING AND USING HAYWARD T-SERIES PUMPS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY, OR EVEN DEATH.**

1. Hayward Flow Control (Hayward), a division of Hayward Industries, guarantees its products against defective material and workmanship only. Hayward assumes no responsibility for property damage or personal injury resulting from improper installation, misapplication, or abuse of any product.
2. Hayward assumes no responsibility for property damage or personal injury resulting from chemical incompatibility between its products and the process fluids to which they are exposed. Determining whether a particular PVC or CPVC product is suitable for an application is the responsibility of the user. Chemical compatibility charts provided in Hayward literature are based on ambient temperatures of 70°F and are for reference only.
3. Hayward products are designed for use with non-compressible liquids.

**WARNING**

**Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.**

4. The maximum recommended fluid velocity through any Hayward product is eight feet per second (8 ft/s). Higher fluid velocity can result in damage due to the water hammer effect.
5. Piping systems must be designed and supported to prevent excess mechanical loading on Hayward products due to system misalignment, weight, shock, vibration, and the effects of thermal expansion and contraction.
6. The effect of temperature on plastic piping systems must be considered when the systems are initially designed. The pressure rating of plastic systems must be reduced with increasing temperature. Maximum operating pressure is dependent upon material selection as well as operating temperature. Before installing any Hayward product, consult Hayward product literature for pressure vs. temperature curves to determine any operating pressure or temperature limitations.
7. PVC and CPVC plastic products become brittle below 40°F. Use caution in their installation and operation below this temperature.

**WARNING**

**Hayward PVC and CPVC products should not be used in services with operating temperature below 34°F.**

8. Due to differential thermal expansion rates between metal and plastic, transmittal of pipe vibration and pipe loading forces, **DIRECT INSTALLATION OF PLASTIC PRODUCTS INTO METAL PIPING SYSTEMS IS NOT RECOMMENDED.** Wherever installation of plastic products into metal piping systems is necessary, it is recommended that at least 10 pipe diameters in length of plastic pipe be installed upstream and downstream of the plastic product to compensate for the factors mentioned above.
9. Published operating specifications are based on testing of new products using clean water at 70°F. Pump performance is affected by many factors including fluid chemistry, viscosity, specific gravity, and temperature. These should be considered when sizing pumps.
10. Fluid handling systems should always be depressurized and drained prior to installing or maintaining any Hayward product. Electrical systems should be shut off and disconnected prior to installing or maintaining any Hayward product.

## READ AND FOLLOW SAFETY INSTRUCTIONS!



This is the safety-alert symbol. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury:



**DANGER** warns about hazards that will cause serious personal injury, death or major property damage if ignored.



**WARNING** warns about hazards that can cause serious personal injury, death or major property damage if ignored.



**CAUTION** warns about hazards that will or can cause minor personal injury or property damage if ignored.

**NOTICE** indicates special instructions which are important but not related to hazards.

**Carefully read and follow all safety instructions in this manual and on pump.**

Keep safety labels in good condition. Replace missing or damaged safety labels.

# T2 T4 T5 T6 T7 T8 SERIES IMMERSIBLE PUMPS

To avoid performance issues, prevent possible injuries, and extend the life of your pump, **READ THIS MANUAL CAREFULLY!!**

**Hayward T-Series Immersible Pump Features:**

- Easy to install and operate.
- No bearings or shaft seals immersed in the fluid being pumped.
- Can handle moderately abrasive liquids.
- Designed to run dry without damage.
- Virtually maintenance free.

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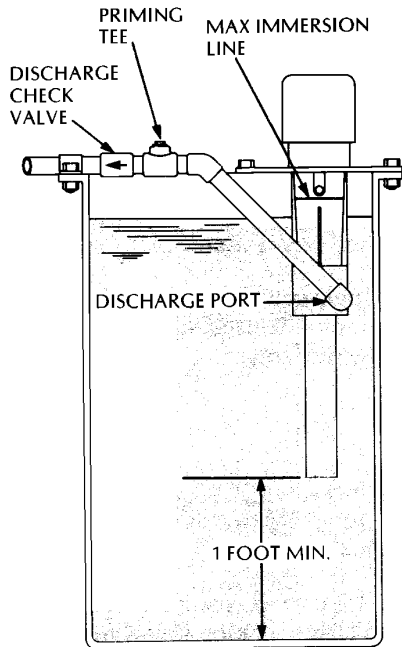


Fig. 1

## INSTALLATION

- Install pump inside tank (See Figure 1).
- Mount pump vertically with motor above highest liquid level in the tank. Be sure that highest liquid level in tank is below 'Maximum Immersion' line (molded into body) located below weep hole on pump body column (See Figure 1).
- Pump inlet opening must always be at least one foot above tank bottom.
- Inlet pipe (if used) must be at least as large as the pump inlet port.

**CAUTION**

- **CAUTION:** Thermoplastic pumps will not tolerate piping stress. To prevent damage or deformation of pump body and damage to pump, be sure any piping attached to pump is properly aligned and supported.
- Mount pump in tank so that pump inlet opening is at least one foot above tank bottom. Be sure that any foot valve or other hardware on inlet pipe will not stick closed or partially closed. Restricting flow can starve inlet, causing cavitation, which can damage pump.
- To be sure of priming on restart, install an inlet foot valve and discharge check valve, or
- Be sure that fluid level covers discharge port after shutoff (see Fig. 1).
- When a foot valve is installed, manually prime pump for initial start-up.
- With both foot valve and discharge check installed, pump should not need priming for restart even if liquid level in tank falls below discharge port.

**CAUTION**

- **CAUTION:** To prevent liquid rising up into the upper chamber of the pump body and contacting the base of the motor on shutoff, discharge check valve must be installed between 1 to 3 feet of the pump discharge port.

## ELECTRICAL

**▲ WARNING**

Ground motor before connecting to electrical power supply! Failure to ground motor can cause severe or fatal electrical shock hazard!

**▲ WARNING**

Do not ground to a gas supply line!

**▲ WARNING**

To avoid dangerous or fatal electrical shock, turn OFF power to motor before working on electrical connections.

**▲ CAUTION**

Motor wiring and supply voltage must match exactly to prevent poor performance and motor damage. Running the motor at the wrong voltage will void the warranty.

## MOTOR FUSE AND WIRING DATA

See Table 1 for motor fuse and wiring data

**TABLE 1 - MOTOR FUSE AND WIRING DATA**

PUMP MODEL	MOTOR		BRANCH FUSE RATING (Amps)	MAX LOAD (Amps)	VOLTAGE/ HZ/PHASE	WIRE SIZE (AWG)		
	NO.	H.P.				DIST. IN FEET (SERVICE TO MOTOR)		
						0-100'	101-200'	201-300'
T2		1/3	15	4.6/2.3	115/230/60/50/1	14	14	14
		1/3	15	1.2/0.6	208-230/460/60/50/3	14	14	14
T4		1/2	15	6.0/3.0	115/230/60/50/1	14	14	14
		1/2	15		208-230/460/60/50/3	14	14	14
T5		3/4	20	8.6/4.3	115/230/60/50/1	14	12	12
		3/4	15	2.4/1.2	208-230/460/60/50/3	14	14	12
T6		1	20	10.8/5.4	115/230/60/50/1	12	10	8
		1	15	3.5/1.6	208-230/460/60/50/3	14	14	14
T7		1	20	10.8/5.4	115/230/60/50/1	12	10	8
		1	15	3.5/1.6	208-230/460/60/50/3	14	14	14
T8		1-1/2	30	14.8/7.4	115/230/60/50/1	10	10	8
		1-1/2	15	4.4/2.2	208-230/460/60/50/3	14	14	14

## ROTATION

- Motor shaft rotation is counterclockwise (CCW) viewed from suction end of pump. Running pump backwards may loosen impeller and will reduce performance.
- Single Phase Motors: Pre-wired for correct rotation and highest nameplate voltage. For lower voltage operation, follow motor manufacturer's instructions inside wiring access cover or on motor.
- Three Phase Motors: Follow directions on motor nameplate to connect for desired voltage and rotation

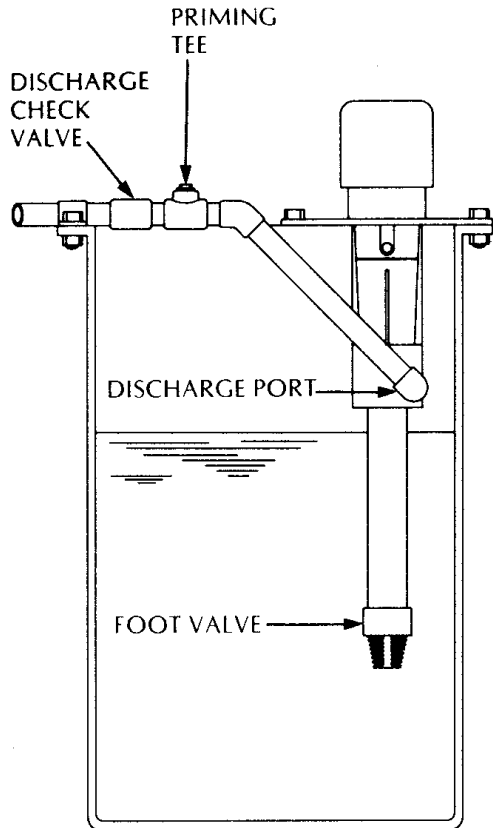


Fig. 2

## OPERATION

- Hayward pumps will handle temperatures from  $-20^{\circ}\text{F}$  to  $+260^{\circ}\text{F}$  and a wide range of chemicals (depending on pump materials of construction; see product catalog, or reference Hayward website for data).

### **CAUTION**

- **CAUTION:** Liquid within impeller will cause heavy side loading and may cause motor bearing failure and pump damage. To prevent liquid from rising high enough to fill impeller:
  1. Use a liquid level control on sump installations.
  2. Set liquid level control to start pump when sump liquid level is between discharge port centerline and 'Maximum Immersion' line on pump flange.
  3. Pump should shut off before liquid level has reached bottom of pump inlet.

### **CAUTION**

- **CAUTION:** Hayward pumps are designed to allow dry running. However, do not run pump **partially** dry; that is,
  1. Do not operate pump with impeller only partially submerged and
  2. Do not operate pump with impeller alternately submerged and dry. **Operating under these conditions will put shock loads on the pump which can cause early motor bearing or pump failure.**

### **WARNING**

- **WARNING:** If pump runs dry, **NEVER** allow pumping chamber to refill while pump is running! To avoid shock loading of impeller, **stop pump** while liquid level rises into pumping chamber.

## START-UP

1. Manually prime pump before starting for the first time.
2. Close pump discharge.
3. Start pump.
4. Open discharge to desired flow rate.
5. With both foot valve and discharge check installed and operating correctly, pump will not need priming for restart even if liquid level in tank drops below discharge port. (Figure 2)

## MAINTENANCE:

### Series T2

#### **⚠ WARNING**

**To avoid danger of injury from electrical shock or from motor unexpectedly starting, disconnect power to motor before working on pump.**

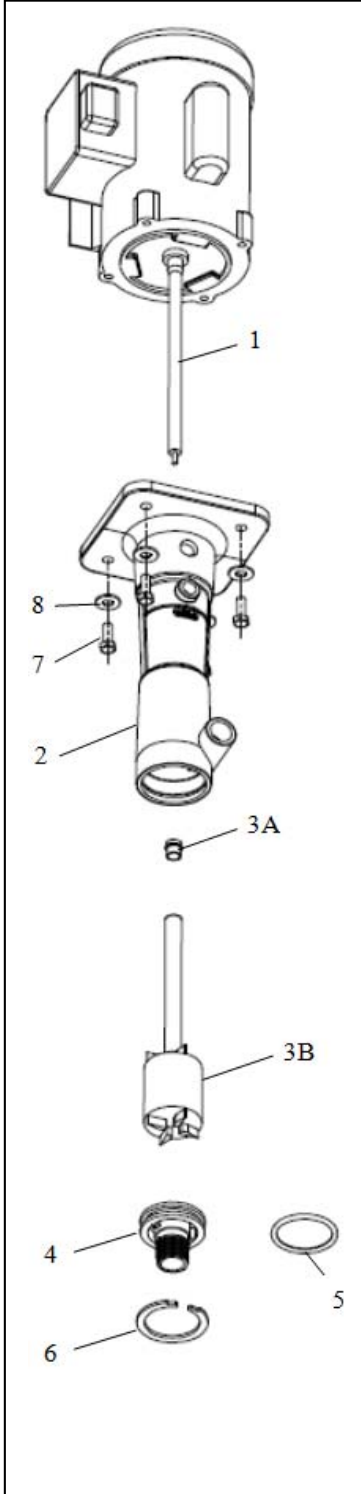
#### Disassembly:

1. Use a screwdriver to pry retainer ring (6) toward suction port and out of its groove.
2. Pull end cover (4) out of pump body (2). Move end cover from side to side while pulling to loosen it. Do not remove end cover o-ring (5) unless you are replacing it.
3. Remove impeller by holding motor shaft via the motor fan blades and unscrewing the impeller (3B) counterclockwise until it fully disengages from shaft threads and lift out of pump body.
4. Check impeller shaft seal (3A) for damage and replace as necessary. (Note: Impeller shaft seal may stay assembled in end of impeller sleeve upon impeller removal.)
5. Remove four main pump body bolts (7) and washers (8). Lift body (2) off of motor (1).
6. For pump motor maintenance, consult factory.

**NOTICE: Disassembly of motor will void motor manufacturer's warranty.**

#### Assembly:

1. Orient discharge port as desired and place flange of body (2) against face of motor (1) with bolt holes of body flange aligned with tapped holes in motor face.
2. Install four main pump body bolts (7) and washers (8). Tighten bolts in an alternating crossing pattern to ensure that body flange is tightened evenly to motor face.
3. Check impeller shaft seal (3A) for damage and replace as necessary. Insert shaft seal (3A) into top of sleeve of impeller (3B) and push seal into counterbore in top of impeller sleeve.
4. Position impeller (3B) over shaft of motor (1) and holding motor shaft in place by engaging motor fan blades thread impeller (3B) onto threaded end of the motor shaft (1). Note that as the impeller (3B) is threaded onto the motor shaft (1), the shaft seal (3A) will be compressed and will form a seal between the impeller and a shoulder on the motor shaft. **Notice: Do not over-tighten impeller.**
5. Make sure impeller (3B) spins freely and that there is no interference between the impeller (3B) and the inside surfaces of body (2).
6. Push end cover (4) into bore in end of pump body (2) until end cover o-ring (5) and bottom face of end cover clear the groove in the end of the pump body.
7. Install the retainer ring (6) into the groove in the end of the pump body. Make sure that retainer ring fully snaps into the groove.



Hayward Flow Control  
One Hayward Industrial Drive  
Clemmons, NC 27012-5100

## MAINTENANCE: Series T4 through T8

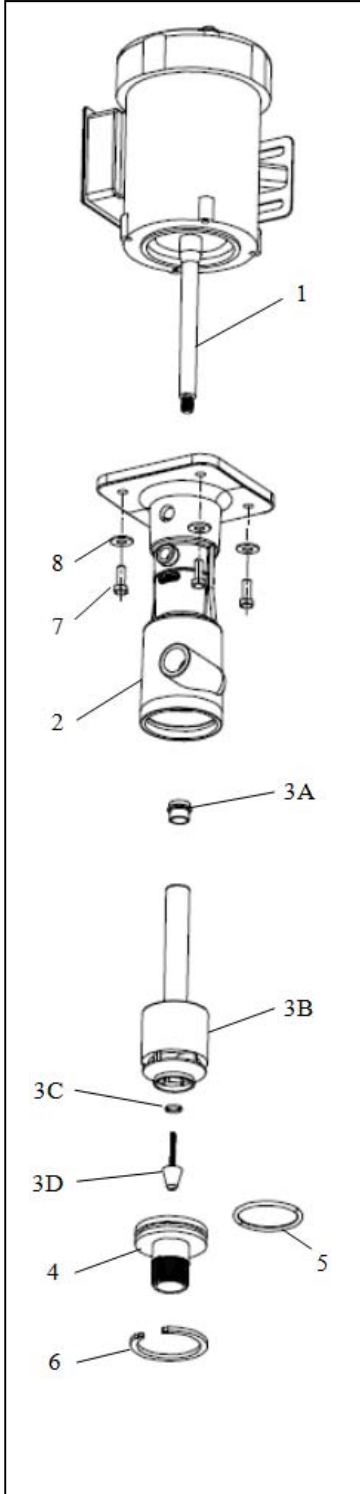
**▲ WARNING**

To avoid danger of injury from electrical shock or from motor unexpectedly starting, disconnect power to motor before working on pump.

### Disassembly:

1. Use a screwdriver to pry retainer ring (6) toward suction port and out of its groove.
2. Pull end cover (4) out of pump body (2). Move end cover from side to side while pulling to loosen it. Do not remove end cover o-ring (5) unless you are replacing it.
3. Remove nosepiece (3D) by holding motor shaft via the motor fan and unscrewing nosepiece counterclockwise.
4. While continuing to hold motor shaft in place by engaging motor fan blades, unscrew impeller (3B) counterclockwise until it fully disengages from shaft threads and lift out of pump body.
5. Check impeller shaft seal (3A) for damage and replace as necessary. (Note: Impeller shaft seal may stay assembled in end of impeller sleeve upon impeller removal.)
6. Remove four main pump body bolts (7) and washers (8). Lift body (2) off of motor (1).
7. For pump motor maintenance, consult factory.

**NOTICE: Disassembly of motor will void motor manufacturer's warranty.**



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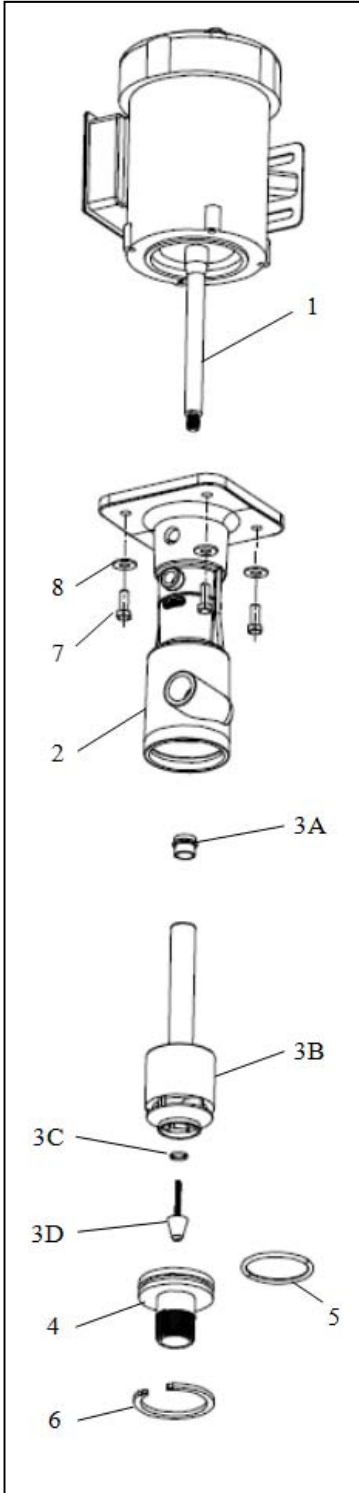
## MAINTENANCE: Series T4 through T8

### **WARNING**

To avoid danger of injury from electrical shock or from motor unexpectedly starting, disconnect power to motor before working on pump.

### Assembly:

1. Orient discharge port as desired and place flange of body (2) against face of motor (1) with bolt holes of body flange aligned with tapped holes in motor face.
2. Install four main pump body bolts (7) and washers (8). Tighten bolts in an alternating crossing pattern to ensure that body flange is tightened evenly to motor face.
3. Check impeller shaft seal (3A) for damage and replace as necessary. Insert shaft seal (3A) into top of sleeve of impeller (3B) and push seal into counterbore in top of impeller sleeve.
4. Position impeller (3B) over shaft of motor (1) and holding motor shaft in place by engaging motor fan blades thread impeller (3B) onto threaded end of the motor shaft (1). Note that as the impeller (3B) is threaded onto the motor shaft (1), the shaft seal (3A) will be compressed and will form a seal between the impeller and a shoulder on the motor shaft. **Notice: Do not over-tighten impeller.**
5. Make sure impeller (3B) spins freely and that there is no interference between the impeller (3B) and the inside surfaces of body (2).
6. Insert nosepiece o-ring (3C) over threaded end of nosepiece (3D) and thread nosepiece into end of motor shaft (1).
7. Using a wide flat screwdriver, tighten nosepiece (3D).
8. Push end cover (4) into bore in end of pump body (2). Push end cover until end cover o-ring (5) and bottom face of end cover clear the groove in the end of the pump body.
9. Install the retainer ring (6) into the groove in the end of the pump body. Make sure that retainer ring fully snaps into the groove.



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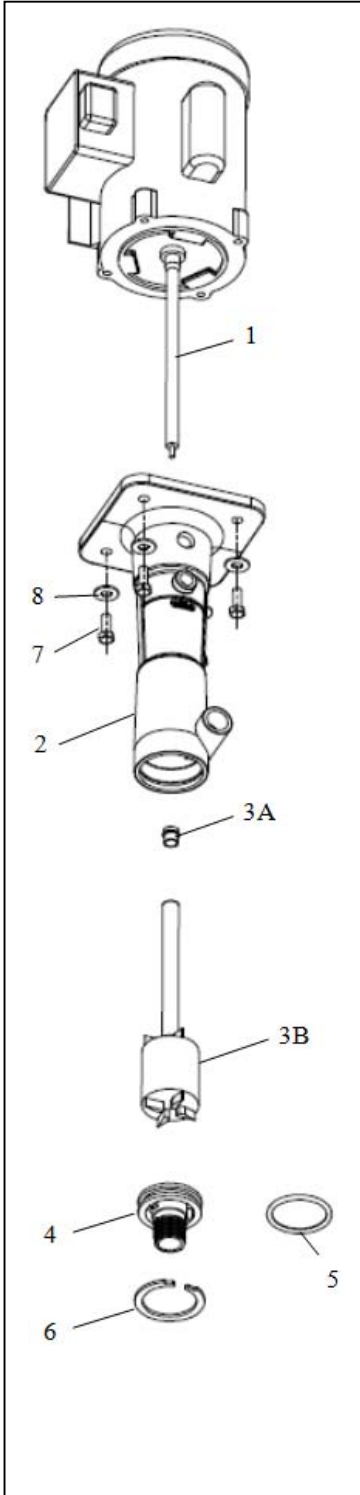
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## Hayward Seal-less Immersible Pump T2 SERIES – Parts List



		T2
		<b>1T2GX0002</b> <b>1T2GX0003</b> <b>1T2GX0008</b> <b>1/3 HP 1ph</b>
		<b>1T2HX0002</b> <b>1T2HX0003</b> <b>1T2HX0008</b> <b>1/3 HP 3ph</b>
Key No.	Part Description	
1	Motor 115/230V/60/50Hz/1 Ph	16FA15-T2-110ST
1	Motor 208-230/460V/60/50Hz/3Ph	16FA15-T2-208ST
2	Body Assembly	1T2BODY
•	Impeller Kit (Includes 3A, 3B)	1T2IMPKIT
3A	Shaft Seal (PTFE) **	1T2SEAL
3B	Impeller **	1T2IMPASSY
4	End Cover	16FA04615
5	O-ring (End Cover)	16FV6-330
6	Retainer Ring	16FA04613
7	Cap Screw, Hex Hd. (4 Req.)	U30-74SS
8	Washer (4 Req.)	U43-62SS
•	Pump Head Assembly***	1T2PHKIT

- Not illustrated.

\*\* Not available separately. Order Impeller Kit.

\*\*\* Entire liquid end; includes all parts except Motor (1).

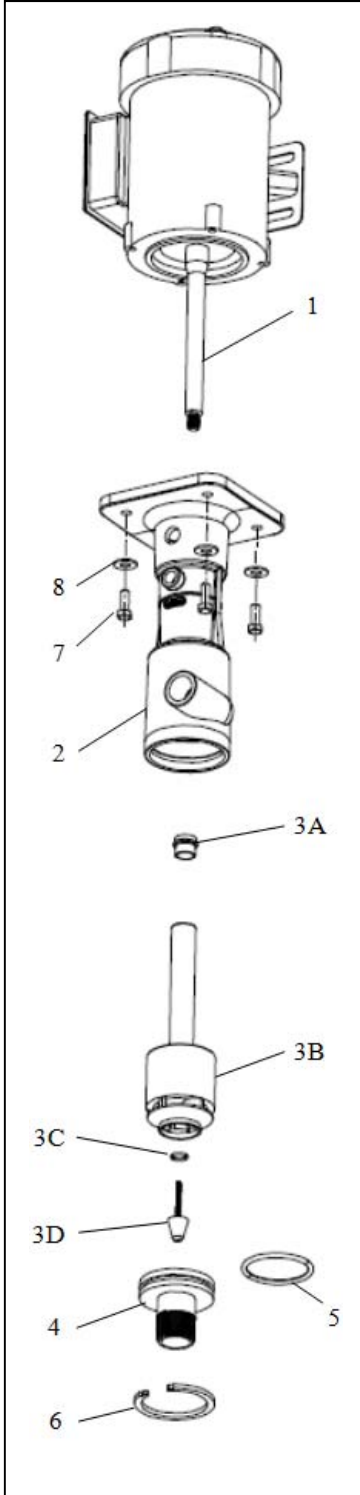
**NOTE ON PART NUMBERS:**

For CPVC parts: use listed part number, no suffix added.

For PVDF parts: use listed part number plus -2 suffix; for example 4654-2

For Polypropylene parts: use listed part number plus -3 suffix; for example 4654-3.

## Hayward Seal-less Immersible Pump T4, T5 SERIES – Parts List



Key No.	Part Description	T4	T5
		1T4GX0002 1T4GX0003 1T4GX0008 1/2 HP 1ph	1T5GX0002 1T5GX0003 1T5GX0008 3/4 HP 1ph
	1T4HX0002 1T4HX0003 1T4HX0008 1/2 HP 3ph	1T5HX0002 1T5HX0003 1T5HX0008 3/4 HP 3ph	
1	Motor 115/230V/60/50Hz/1 Ph	16FA15-T4-110ST	16FA15-T5-110ST
1	Motor 208-230/460V/60/50Hz/3Ph	16FA15-T4-208ST	16FA15-T5-208ST
2	Body Assembly	1T5BODY	1T5BODY
•	Impeller Kit (Includes 3A, 3B, 3C, 3D)	1T4IMPKIT	1T5IMPKIT
3A	Shaft Seal (PTFE) **	1T45SEAL	1T45SEAL
3B	Impeller **	1T4IMPASSY	1T5IMPASSY
3C	Nosepiece O-ring **	16FV6-113	16FV6-113
3D	Nosepiece **	16FA02539	16FA02539
4	End Cover	16FA04645	16FA04645
5	O-ring (End Cover)	16FV6-335	16FV6-335
6	Retainer Ring	16FA04643	16FA04643
7	Cap Screw, Hex Hd. (4 Req.)	U30-74SS	U30-74SS
8	Washer (4 Req.)	U43-62SS	U43-62SS
•	Pump Head Assembly***	1T4PHKIT	1T5PHKIT

• Not illustrated.

\*\* Not available separately. Order Impeller Kit.

\*\*\* Entire liquid end; includes all parts except Motor (1).

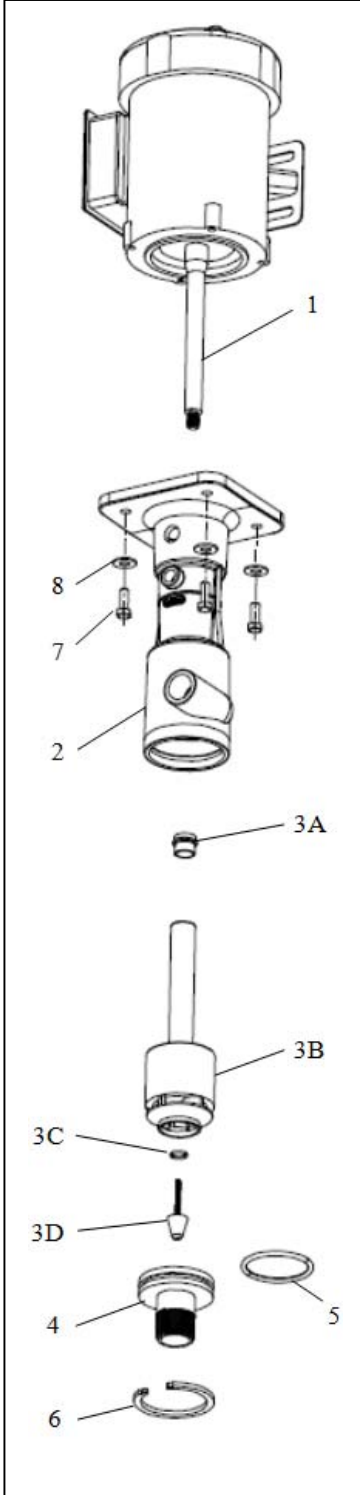
### NOTE ON PART NUMBERS:

For CPVC parts: use listed part number, no suffix added.

For PVDF parts: use listed part number plus -2 suffix; for example 4654-2

For Polypropylene parts: use listed part number plus -3 suffix; for example 4654-3.

## Hayward Seal-less Immersible Pump T6, T7, T8 SERIES – Parts List



		T6	T7	T8
		<b>1T6GX0002</b>	<b>1T7GX0002</b>	<b>1T8GX0002</b>
		<b>1T6GX0003</b>	<b>1T7GX0003</b>	<b>1T8GX0003</b>
		<b>1T6GX0008</b>	<b>1T7GX0008</b>	<b>1T8GX0008</b>
		<b>1 HP 1 PH</b>	<b>1 HP 1PH</b>	<b>1 1/2 1PH</b>
		<b>1T6HX0002</b>	<b>1T7HX0002</b>	<b>1T8HX0002</b>
		<b>1T6HX0003</b>	<b>1T7HX0003</b>	<b>1T8HX0003</b>
		<b>1T6HX0008</b>	<b>1T7HX0008</b>	<b>1T8HX0008</b>
		<b>1 HP 3 PH</b>	<b>1 HP 3 PH</b>	<b>1 1/2 3 PH</b>
Key No.	Part Description			
1	Motor 115/230V/60/50Hz/1 Ph	16FA15-T7-110ST	16FA15-T7-110ST	16FA15-T8-110ST
1	Motor 208/230/460V/60/50Hz/3Ph	16FA15-T7-208ST	16FA15-T7-208ST	16FA15-T8-208ST
2	Body Assembly	1T8BODY	1T8BODY	1T8BODY
•	Impeller Kit (Includes 3A, 3B, 3C, 3D)	1T6IMPKIT	1T7IMPKIT	1T8IMPKIT
3A	Shaft Seal (PTFE)**	1T45SEAL	1T45SEAL	1T45SEAL
3B	Impeller **	1T6IMPASSY	1T7IMPASSY	1T8IMPASSY
3C	Impeller Nosepiece O-Ring**	16FV6-113	16FV6-113	16FV6-113
3D	Nosepiece**	16FA02546	16FA02546	16FA02546
4	End Cover	16FA04625	16FA04625	16FA04625
5	O - ring (End Cover)	16FV6-341	16FV6-341	16FV6-341
6	Retainer Ring	16FA04623	16FA04623	16FA04623
7	Cap Screw, Hex Hd. (4 Req.)	U30-74SS	U30-74SS	U30-74SS
8	Spacer Washer (4 Req.)	U43-62SS	U43-62SS	U43-62SS
•	Pump Head Assembly***	1T6PHKIT	1T7PHKIT	1T8PHKIT

• Not illustrated.

\*\* Not available separately. Order Impeller Kit.

\*\*\* Entire liquid end; includes all parts except Motor (1).

NOTE ON PART NUMBERS:

For CPVC parts: use listed part number, no suffix added.

For PVDF parts: use listed part number plus -2 suffix; for example 4664-2

For Polypropylene parts: use listed part number plus -3 suffix; for example 4664-3.