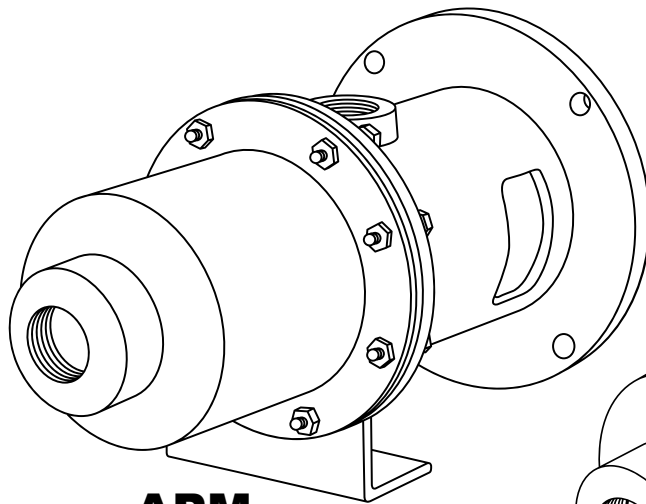


# INSTALLATION, OPERATION & MAINTENANCE MANUAL

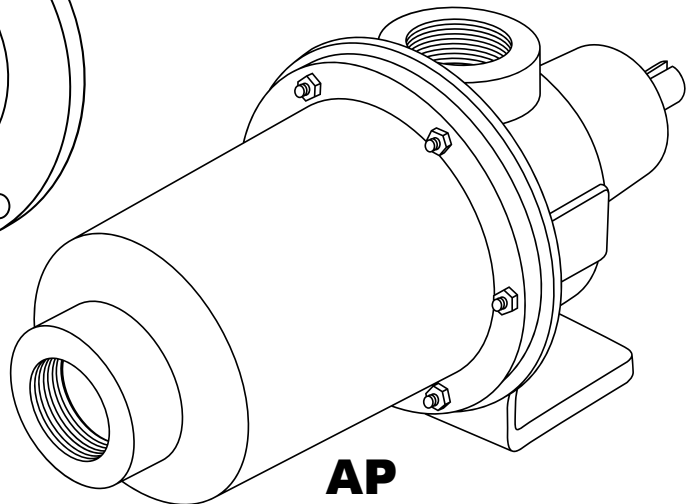


## AMERICAN - SERIES

WOBBLE STATOR PROGRESSIVE CAVITY PUMP



**APM**



**AP**

**! Read and understand this manual prior to installing, operating or maintaining this pump !**

DATE OF PURCHASE: \_\_\_\_\_

SERIAL #: \_\_\_\_\_

CONTACT #: \_\_\_\_\_

P.O. #: \_\_\_\_\_

# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 1.0 GENERAL

### 1.1 SELECTION & OPERATING CONSIDERATION

Speed, Temperature, Viscosity, Suction Lift Discharge Pressure, Abrasive Content & Corrosive Action of the liquid to be handled should be considered in applying these pumps.

### 1.2 START UP PRECAUTIONS

The pumping liquid serves as lubricant. Pump should always be filled with the liquid to be handled before running. The liquid can be easily poured into the pump through the discharge port before final assembly of the piping or hose connections. A filling tee with a plug or valve can be installed above the discharge port for ease in filling.

**WARNING!** Non-observance or proper follow-up of the installation, operation and maintenance instructions may result in either injury to the attending personnel or could cause catastrophic failure of the pump/equipment.

## 2.0 SAFETY OPERATING CONDITIONS

Liquid to be pumped should never exceed 190° F Temperature

Maximum speed that any of these pumps should be run is 2,800 rpm and then only in handling thin, abrasive-free liquid. Preferably the speed should be 1,750 rpm for longest life. When liquid contains abrasive material or is viscous, the speed should be reduced with consultation with Liberty Process Equipment. For various viscosities of abrasive-free liquids, the maximum operating speed of the pump is set forth below:

### **SUGGESTED MAXIMUM OPERATING SPEED OF PUMP**

<b>SPEED (rpm)</b>	<b>2800</b>	<b>1750</b>	<b>1150</b>	<b>870</b>	<b>580</b>	<b>430</b>	<b>180</b>	<b>100</b>
Viscosity in Cent poise	1	1 to 100	100 to 500	500 to 1000	1000 to 3000	3000 to 5000	5000 to 10000	10000 to 20000
Standard Fluids	Water	Canned Milk	Motor Oil	Table Syrup	Honey	Molasses	Paste	Peanut Butter
Abrasive Fluids	None	None	None	Light	Medium	Medium	Heavy	Heavy
	Clear Water Gasoline			Dirty Water	Clay Slurries		Lapping Compounds	

Capacity and life of these pumps will depend upon the liquid being handled. Piping to the pump should be properly selected and should not be smaller in size than the suction & discharge ports of the pump. All pipe and the hose fittings joints should be tight.

Discharge lines should be open or if the pump is operated in an enclosed system, provision should be made for pressure relief when the pump pressure exceeds the limits as set forth for each model pump. Pump bearings do not require lubrication as they are pre-lubricated. We recommend that the pump be flushed after each use.

**PUMP SHOULD NEVER START/RUN DRY.**

# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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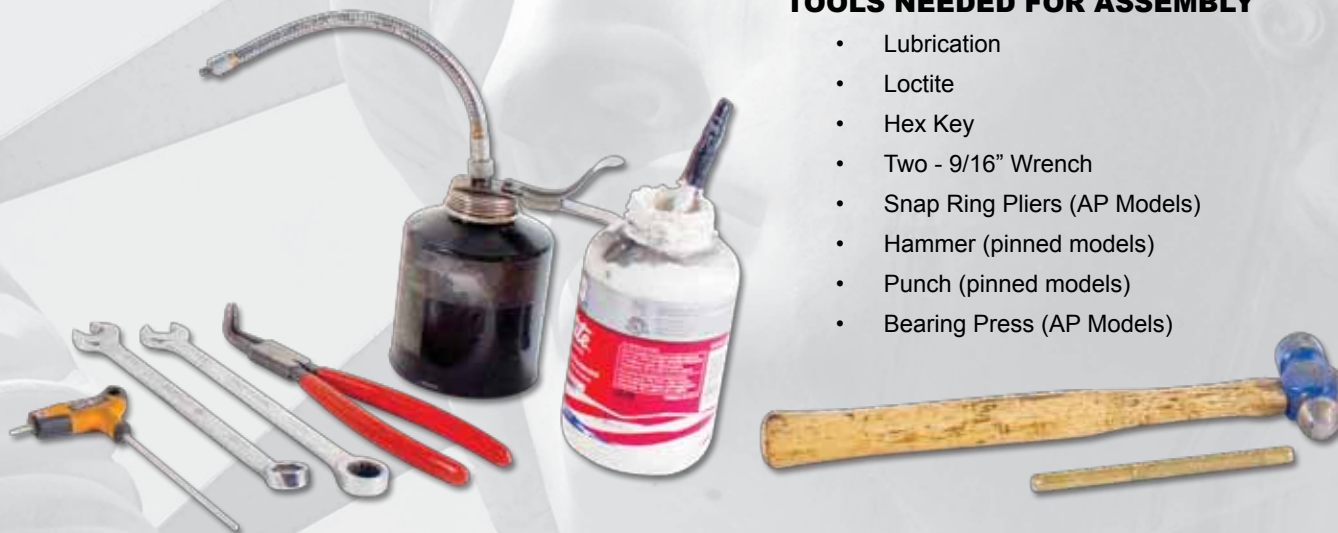
## 3.0 DISMANTLING & ASSEMBLING \*(Please refer to illustrations/pictures of the following pages.)

- 3.1. Disconnect pipe or hose at suction & discharge port.
- 3.2. Remove bolts which connect Suction Housing to Discharge Housing.
- 3.3. Disconnect pipe or hose at suction & discharge port.
- 3.4. Rotor (22) can be removed by turning it in opposite direction (ccw looking from shaft end). Grip Rotor with wrench, whose teeth have been protected, and externally – hold motor Shaft (26) with screw driver on APM Models.
- 3.5. To replace the rotary seal (24), unscrew Flexible joint (25) with 3/16" hexagonal wrench. Rotary Seals can be easily removed from Shaft. If any parts of the rotary seal are worn or broken, replace complete rotary seal. The part of each rotary seal is precision matched and is not interchangeable.
- 3.6. To replace bearing remove retaining ring and then tap shaft at threaded end. Protect threaded end with wood or rubber block.

**Precaution!** Please check the fasteners on the pump and motor/motor-base plate assemblies since fasteners may loosen during transportation. This is particularly important for the couplings and coupling guards since the security of these fasteners can have a significant effect on the safety of the pump – motor unit.

## TOOLS NEEDED FOR ASSEMBLY

- Lubrication
- Loctite
- Hex Key
- Two - 9/16" Wrench
- Snap Ring Pliers (AP Models)
- Hammer (pinned models)
- Punch (pinned models)
- Bearing Press (AP Models)



NOTES:

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# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 4.0 APM SERIES - ASSEMBLY INSTRUCTIONS - Threaded Assembly

**ALL PARTS REQUIRED ARE SHOWN BELOW**

See parts list for description and part numbers



### 4.1 INSTALL STUB SHAFT ONTO MOTOR SHAFT.

- 1.) Be sure the Stub Shaft (26) is on all the way (fig. 1)
- 2.) Be sure to tighten the Set Screw (A) (fig. 2)



(fig. 1)



(fig. 2)

### 4.2 INSTALL STATIONARY FACE OF MECHANICAL SEAL

- 1.) Lubricate the outer diameter of Seal(24). (fig. 3)
- 2.) Push the Mechanical Seal(24) gently into Bearing Housing(5) until seated. (fig. 4)

(Silicone Carbide faces are available and in difficult applications will extend the Mechanical Seal life.)



(fig. 3)



(fig. 4)

# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 4.3.1 INSTALL DISCHARGE CASING ONTO THE MOTOR

- 1.) Be sure the Bearing Housing(5) is seated onto the motor (fig. 5) and fasten into place. (fig. 6)

(fig. 5)



(fig. 6)



## 4.3.2 INSTALL MECHANICAL SEAL ONTO STUB SHAFT

- 2.) Lubricate the stationary face of the Mechanical Seal (24) and the rotary parts. (fig. 7)
- 3.) Install rotating face (fig. 8) and spring (fig. 9) onto the Stub Shaft(26).

(fig. 7)



(fig. 8)



(fig. 9)



## 4.4 FLEX JOINT & SHAFT ASSEMBLY

- 1.) Thread the Flex Joint(25) into the Rotor(22). (fig. 10)  
(The Flex Joint and Stub Shaft can be pinned together. Shown in Example 5.4 of the AP Series Assembly.)
- 2.) Thread the Flex Joint(25) and Rotor (22) into the Stub Shaft(26). (fig. 11)



(fig. 10)

(fig. 11)





# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 4.5 STATOR ASSEMBLY

1.) Lubricate the Rotor(22) (fig. 12) and Lubricate the inside of the Stator(21) (fig. 13).

3.) Slide the Stator(21) onto the Rotor(22) until Stator (21) seats into the groove. (fig. 14).

- The O.D. of the Stator(21) will seat into the Suction Casing(2) and act as a seal.

(fig. 12)



(fig. 13)



(fig. 14)



## 4.6 INSTALLING THE SUCTION CASING & FOOT

1.) Install the Suction Casing(2) onto the pump assembly and align the holes in both casings. (fig. 15)

2.) Add Pump Foot(3) to pump assembly and insert bolts(19) through lined up holes then thread on each nut. (fig. 16)

3.) Bolt down the casing until seated. (fig. 17)

(fig. 15)



(fig. 16)



(fig. 17)

**The pump is now ready to use and should be leak tested by filling with water to check the seal.**

# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 5.0 AP SERIES - ASSEMBLY INSTRUCTIONS - Pinned Assembly

**ALL PARTS REQUIRED ARE SHOWN BELOW**

See parts list for description and part numbers



### 5.1 INSTALL DRIVE SHAFT INTO BEARING HOUSING

1.) Press Bearing(29) onto each side of Drive Shaft(26). (fig. 1)

2.) Align Bearings(29 & 30) on Drive Shaft(26) with the Bearing Housing(5) and press into place. (fig. 2) *(Notch on end of Drive Shaft should be visible on the outside of Bearing Housing when in proper position.)*

(fig.1)



(fig.1)



(fig.2)



### 5.2 INSTALL RETAINING RING INTO BEARING HOUSING

1.) Compress Retaining Ring(62) with a set of snap ring pliers and position into the retaining ring groove in the Bearing Housing(5) and decompress Retaining Ring(62). (fig. 3)



(fig.1)



# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 5.1 INSTALL STATIONARY FACE ON DRIVE SHAFT.

- 1.) Lubricate the Stationary Face of the Mechanical Seal(24). (fig. 4)
- 2.) Slide the Stationary Face down the Drive Shaft(26) until it seats into place in the Bearing Housing(5). (fig. 5)



(fig.4)



(fig.5)

## 5.2 INSTALL ROTARY FACE OF MECHANICAL SEAL

- 1.) Lubricate the outer diameter of Rotary. (fig. 6)
  - 2.) Push Rotary gently onto Drive Shaft(26) until seated against Stationary Face of Seal(24). (fig. 7)
- (Silicone Carbide faces are available, and in difficult applications will extend the Mechanical Seal life.)



(fig.6)



(fig.7)

## 5.3 INSTALL SPRING OF MECHANICAL SEAL

- 1.) Spring will fit over the remaining end of the Drive Shaft(26) inside the Bearing Housing(5). (fig. 8)



(fig.8)



# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 5.4 FLEX JOINT & ROTOR ASSEMBLY

- 1.) Slide the Flex Joint(25) into the receiving end of the Rotor(22) and align the Pin holes. (fig. 9)
- 2.) Insert the Rotor Pin(17) in the hole and tap flush into place. (fig. 10)

- The Rotor may need to be clamped in a vice to prevent them from moving while inserting the pin.



(fig.9)



(fig.10)

## 5.5 INSTALL ROTOR ASSEMBLY ONTO DRIVE SHAFT

- 1.) Slide the Rotor(22)/Flex Joint(25) onto the Drive Shaft(26). (fig. 11)
- 2.) Looking through the Inlet Port align the pin holes and insert the Shaft Pin(18) same as the opposite side. (fig. 12)
- 3.) Tap Pin flush into place. (fig. 13)

(fig. 11)



(fig. 12)



(fig. 13)

## 5.6 INSTALL STATOR ONTO ROTOR

- 1.) Lubricate the Rotor(22) (fig. 14) & Stator(21) (fig. 15)
  - 2.) Slide Stator(21) on to Rotor(22) until Stator(21) seats in to the groove in the Bearing Housing(5). (fig. 16)
- The O.D. of the Stator(21) will seat into the Suction Casing and act as seal.

(fig. 14)



(fig. 15)



(fig. 16)



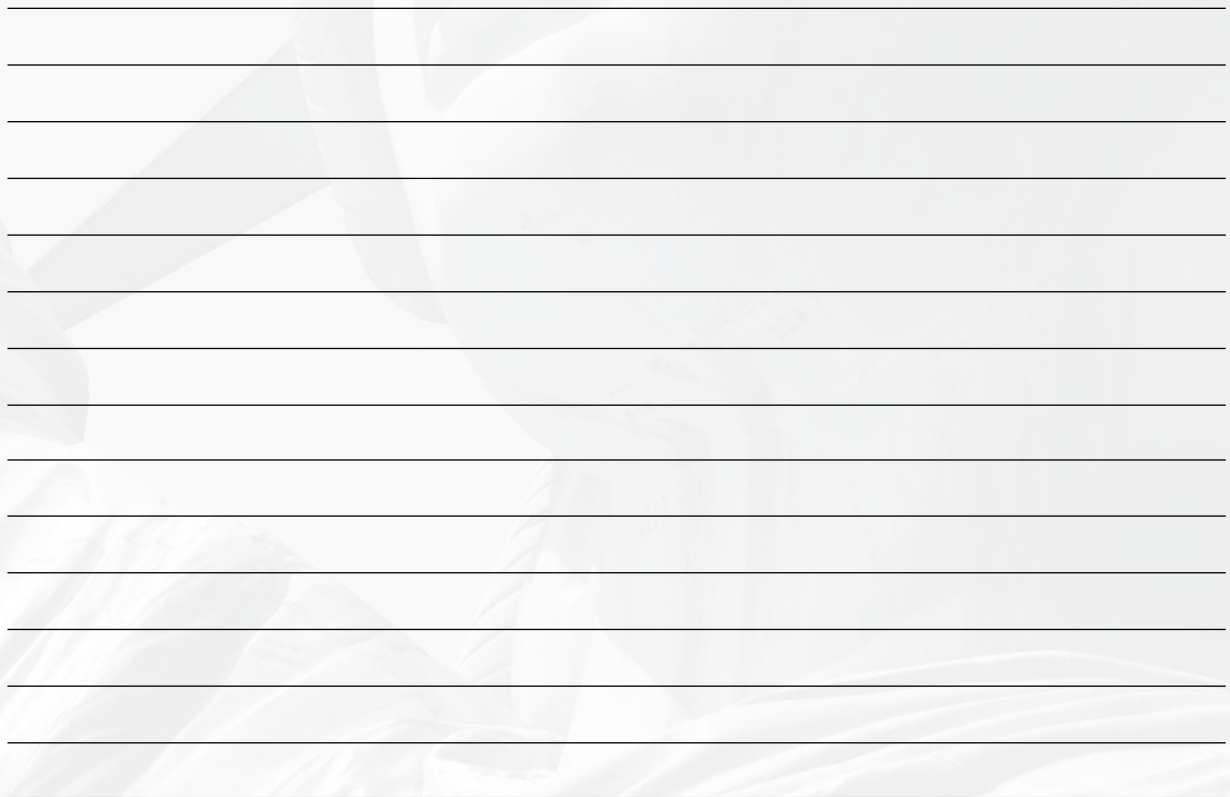
Pump Model: AMERICAN AP & APM - SERIES



- 1.) Install the Suction Casing(2) onto the pump assembly and align the holes in both casings. (fig. 17)
- 2.) Insert bolts through lined up holes then thread on each nut. (fig. 18)
- 3.) Bolt down the casing until seated. (fig. 19)



**The pump is now ready to use and should be leak tested by filling with water to check the seal.**



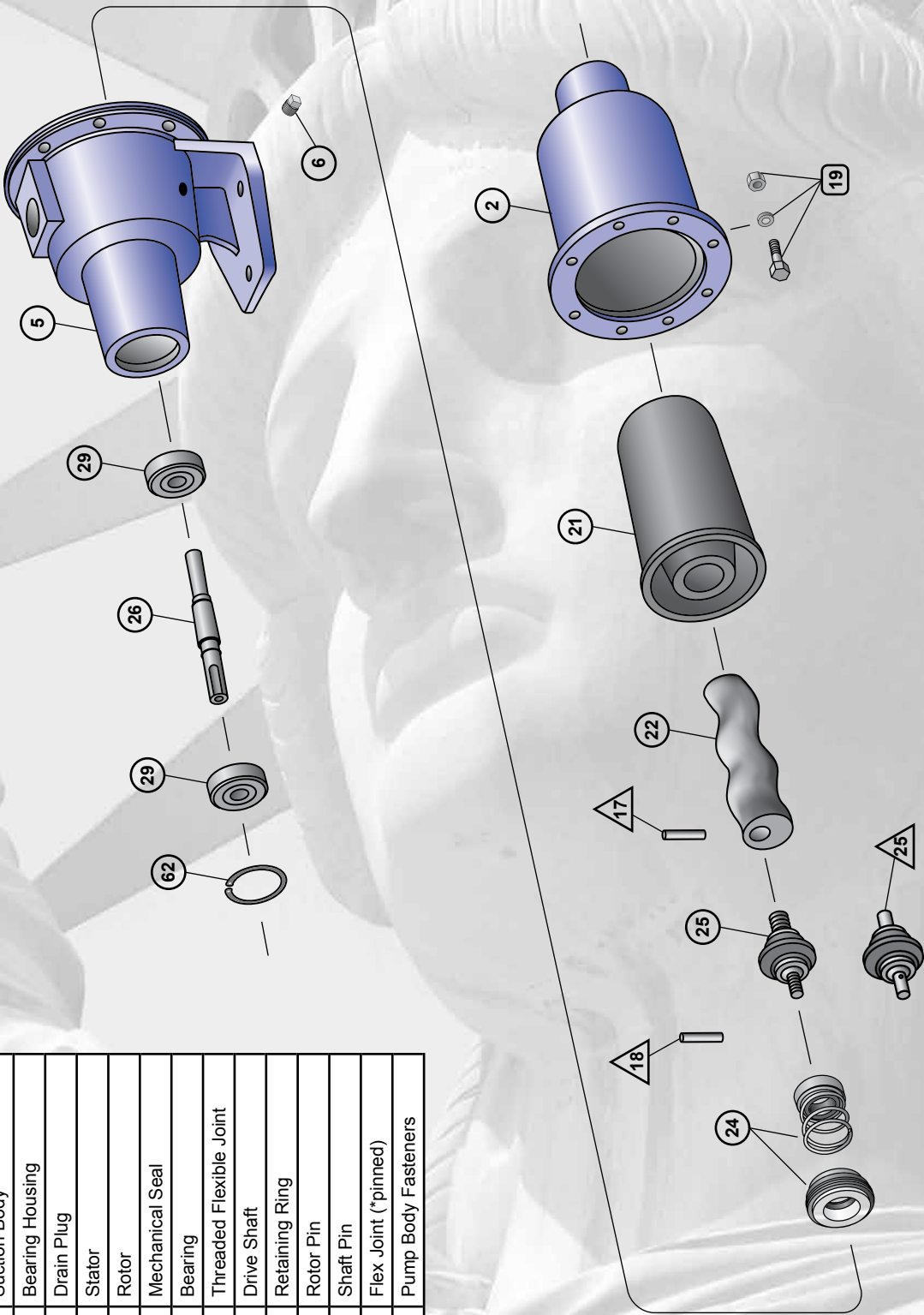
**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**

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**6.0 AP SERIES - PARTS LIST**

AP Series Parts	
Part No.	Part Name
2	Suction Body
5	Bearing Housing
6	Drain Plug
21	Stator
22	Rotor
24	Mechanical Seal
29	Bearing
25	Threaded Flexible Joint
26	Drive Shaft
62	Retaining Ring
17	Rotor Pin
18	Shaft Pin
25	Flex Joint (*pinned)
19	Pump Body Fasteners



△ \*Optional for Pinned Pump Components



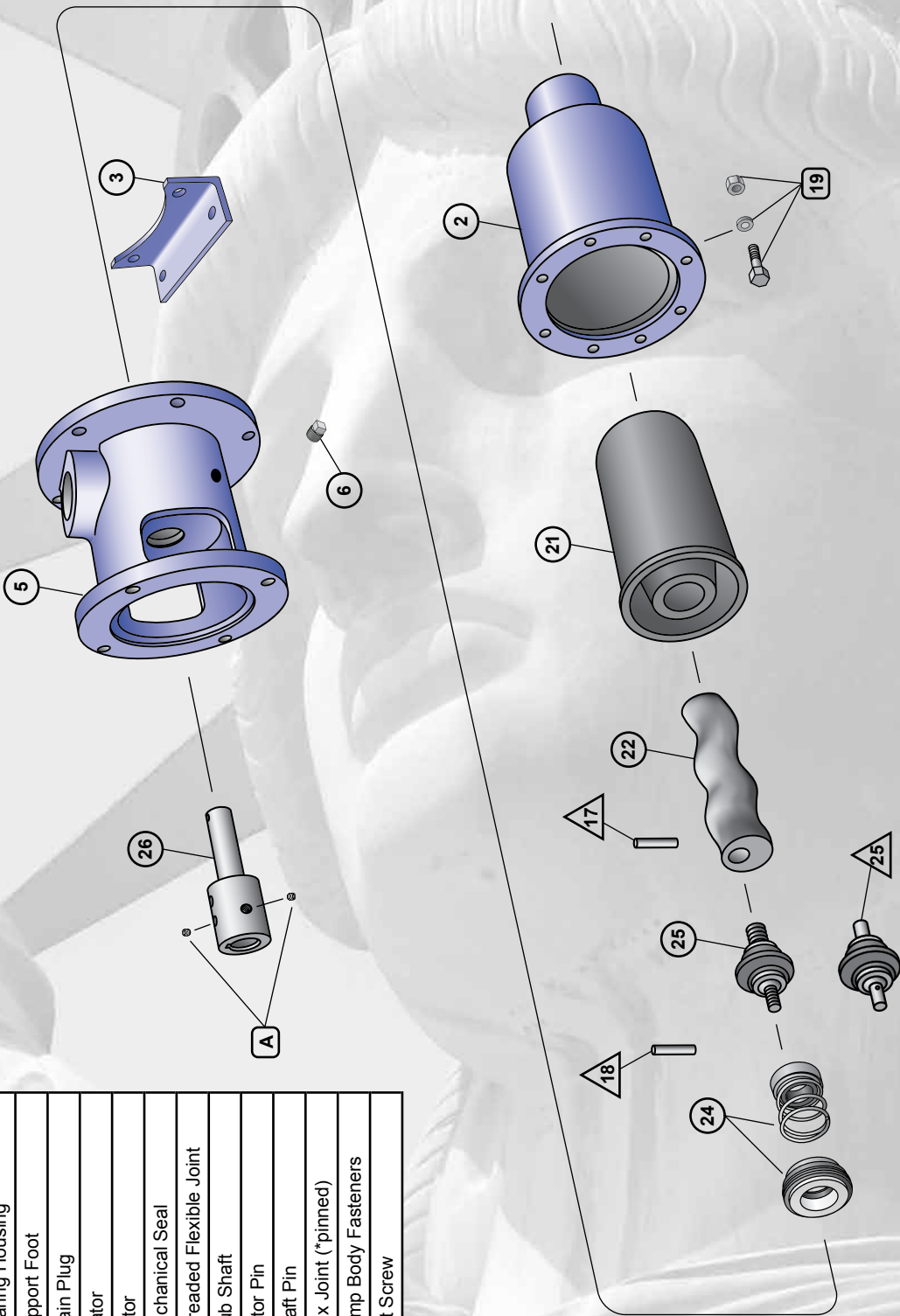
INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

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7.0 APM SERIES - PARTS LIST

APM Series Parts	
Part No.	Part Name
2	Suction Body
5	Bearing Housing
3	Support Foot
6	Drain Plug
21	Stator
22	Rotor
24	Mechanical Seal
25	Threaded Flexible Joint
26	Stub Shaft
17	Rotor Pin
18	Shaft Pin
25	Flex Joint (*pinned)
19	Pump Body Fasteners
A	Set Screw



△ \*Optional for Pinned Pump Components

# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

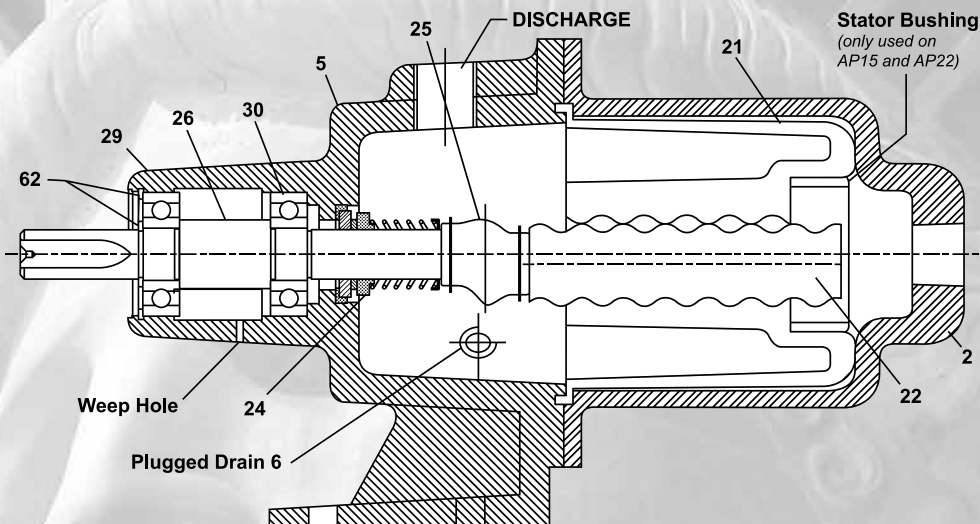
Pump Model: AMERICAN AP & APM - SERIES

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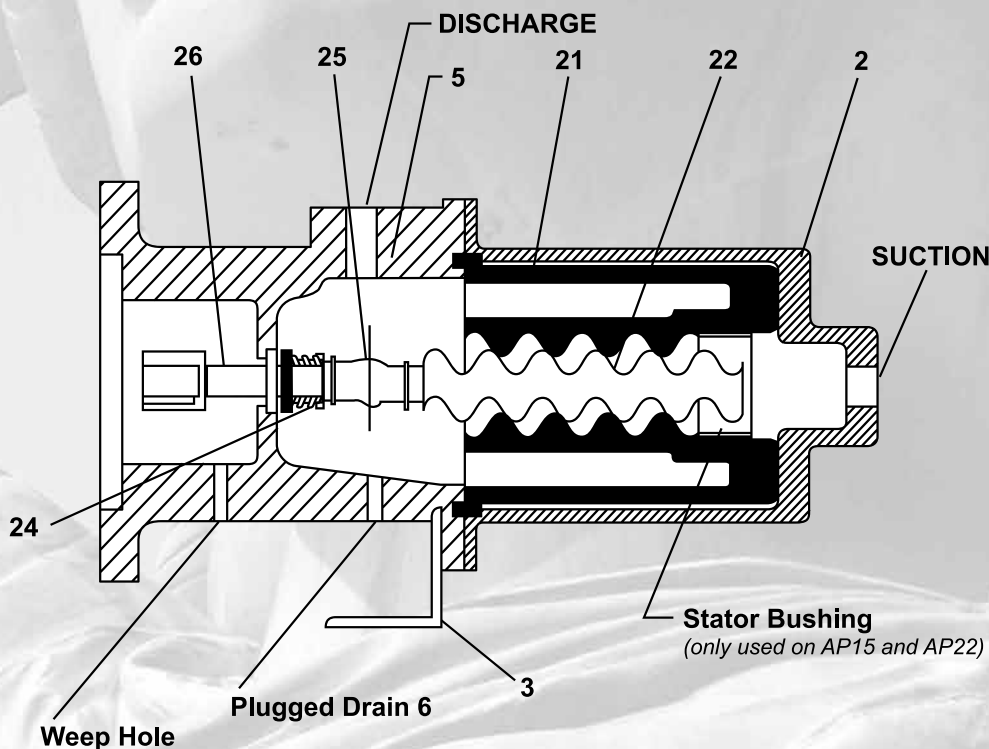


## 8.0 AMERICAN AP & APM SERIES - CROSS SECTIONAL DRAWINGS

AP Series Parts	
AP-15/22/33/44/56/67	
Part No.	Part Name
2	Suction Body
5	Bearing Housing
6	Drain Plug
21	Stator
22	Rotor
24	Mechanical Seal
29 / 30	Bearing
25	Threaded Flexible Joint
26	Drive Shaft
62	Retaining Ring
17	Rotor Pin*
18	Shaft Pin*
25	Flex Joint (pinned)*
19	Pump Body Fasteners
Inlet Flange: NPT (end)	
Outlet Flange: NPT (top)	
Drain Opening (R1): 1/4" NPT	



APM Series Parts	
APM-15/22/33/44/56/67	
Part No.	Part Name
2	Suction Body
5	Bearing Housing
3	Support Foot
6	Drain Plug
21	Stator
22	Rotor
24	Mechanical Seal
25	Threaded Flexible Joint
26	Stub Shaft
17	Rotor Pin*
18	Shaft Pin*
25	Flex Joint (pinned)*
19	Pump Body Fasteners
Inlet Flange: NPT (end)	
Outlet Flange: NPT (top)	
Drain Opening (R1): 1/4" NPT	





# INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Pump Model: AMERICAN AP & APM - SERIES

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## 9.0 TROUBLESHOOTING CHART

#	Faults										Causes & Remedy
	Pump does not start	Pump does not prime	Capacity is not reached	Head is not reached	Pump discharge irregular	Pump operating noisily	Pump has seized or has stopped delivering	Motor over-heating	Stator wearing prematurely	Shaft seal leaking	
	A	B	C	D	E	F	G	H	I	K	
1	X							X			Pressure between stator and rotor too great (new condition) or stator too tight to rotate pump by hand using a suitable tool
2		X									Check direction of rotation in accordance with arrow on the pump; change motor rotation if necessary
3		X	X		X	X	X				Check suction line and shaft seals for leaks
4		X	X		X	X					Check suction head - if necessary, increase diameter of suction line - fit larger filters - fully open suction valve
5		X	X		X						Check viscosity of the pumped medium
6	X		X					X			Check pump speed - check speed and amperage of the drive motor - check voltage and frequency
7			X		X						Avoid airlocks in pumped medium
8	X		X				X	X	X		Check delivery head - open gate valve in the delivery line fully, remove blockage in the delivery line
9		X	X		X		X		X		Pump running completely or partially dry. Check whether sufficient pumped medium is present on suction side
10		X	X								Increase the pump speed for thin medium and high suction volume.
11		X			X	X					Reduce the speed for viscous mediums - risk of cavitation
12						X					Check end clearance of the coupling rod pins; possibly coupling rod pin is incorrectly fitted
13	X	X	X				X				Check whether foreign bodies in the pump; dismantle pump, remove foreign bodies - replace defective parts
14		X	X	X			X				Stator and Rotor worn; dismantle pump and replace defective parts
15		X	X			X	X				Joint parts and/or stub shaft worn; dismantle pump and replace defective parts
16		X	X				X		X		Suction line partially or wholly blocked
17	X	X					X	X	X		Check temperature of the medium - stator expansion too great - stator jammed on rotor - possibly stator is burnt out
18	X	X	X					X		X	Gland packing: replace unserviceable rings - loosen gland - tighten gland
19	X	X					X		X		Solid content and/or size too large - reduce speed: fit strainer upstream of pump, with suitable mesh size
20	X	X							X	X	Solids settling out and hardening when pump shut down - flush out pump immediately - if necessary, dismantle and clean
21	X	X					X		X	X	Medium hardens after dropping below a certain temperature limit - heat pump