

**SHIPCO**<sup>®</sup>  
**PUMPS**

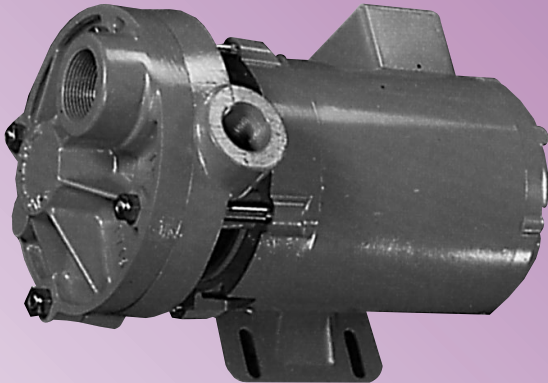
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**PRIDE**

**QUALITY**

**CRAFTSMANSHIP**

**BULLETIN 131**  
*Revised 7/05*



## **MODEL T**

Regenerative  
Turbine Pumps

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# MODEL 151 REGENERATIVE TURBINE PUMPS

SHIPCO® Model 151 close-coupled and pedestal mounted regenerative turbine pumps represent the best, least expensive alternative for low flow (to 30 GPM) applications involving moderate to high pressures (heads to 700 feet).

Combining latest concepts in turbine hydraulic design with computer controlled manufacturing, state-of-the-art Model 151 Pumps deliver high efficiency performance with low NPSH. Costs are controlled through efficient manufacturing, use of standard motors, lower horsepower for given pressure/capacity requirements, longer life, and easy serviceability.

## WATER PASSAGE DESIGN

The Model 151 masters one of the most critical design considerations for regenerative turbines—the shaping of water passageways to achieve highest capacity and pressure with minimum horsepower.

By optimizing water passageway cross-sectional profiles for compatibility with each impeller diameter, SHIPCO® improves both efficiency and pressure in the Model 151, exceeding those realized by all previous techniques.

## IMPELLER PROFILE

Perhaps the most notable improvement in regenerative turbine pump technology incorporated in Model 151 Pumps involves the ability to determine optimum impeller width versus blade length, which controls the required horsepower versus pressure curve for regenerative tur-

bine pumps. By optimizing its ratio for each Model 151 Pump, peak efficiency is improved, and “off-peak” horsepower requirements are reduced as well.

## IMPELLER BLADES

After the most favorable impeller profile has been determined for a particular water passage cross-section, SHIPCO® calculates the number of blades needed to maximize performance of that pump. Blade selection in SHIPCO® designed pumps increases both efficiency and design pressure without accepting the manufacturing difficulties associated with producing contoured blade impellers.

State-of-the-art computer controlled machines simplify manufacturing the various SHIPCO® impellers utilized in the Model 151. The result is a high performance pump exhibiting efficiency characteristics of much more expensive units.

## NPSH REQUIREMENTS

Model 151 regenerative turbine pumps meet low net positive suction head (NPSH) requirements without efficiency loss. SHIPCO® Pumps achieve this goal through low inlet fluid velocity and gentle acceleration to passageway velocity. Special ramps promote an almost shockless entry into the impeller blades where fluids reach their maximum velocities. These specially designed ramps account for the greater inlet efficiency in the Model 151 Pumps.

## STANDARD MATERIALS

	BRONZE FITTED	ALL IRON	ALL BRONZE	316 STAINLESS STEEL
MOTOR BRACKET	CAST IRON ASTM A48	CAST IRON ASTM A48	BRONZE ASTM B62	STAINLESS STEEL AISI 316
COVER	CAST IRON ASTM A48	CAST IRON ASTM A48	BRONZE ASTM B62	STAINLESS STEEL AISI 316
IMPELLER	BRONZE ASTM A48	STAINLESS STEEL AISI 416	BRONZE ASTM B62	STAINLESS STEEL WAUKESHA 88
SLEEVE	BRONZE ASTM B16	STAINLESS STEEL AISI 316	BRONZE ASTM B16	STAINLESS STEEL AISI 316
"O" RINGS	ETHYLENE PROPYLENE	BUNA N	BUNA N	VITON A
SEALS	NI-RESIST®	CERAMIC	CERAMIC	CERAMIC

## LIMITATIONS

Discharge Pressure ..... 300 PSI  
 Seal Pressure\* ..... 200 PSI  
 Suction Pressure (Min) ..... 26" HG. VAC.  
 Speed ..... 3600 RPM

### TEMPERATURE:

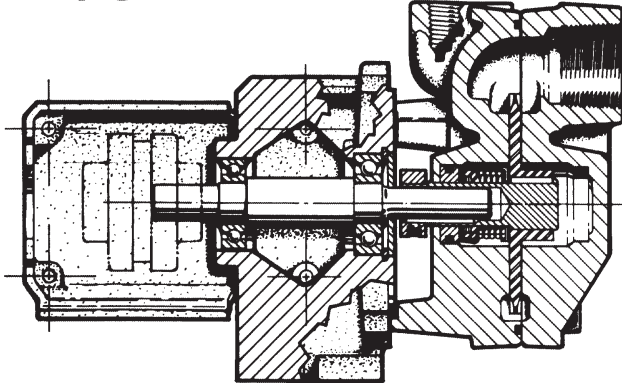
Standard Construction ..... -20°F  
 Ceramic Seal Seat—Water ..... +200°F  
 Ni-Resist® Seal Seat—Water ..... +230°F  
 Silicon Carbide Seal Seat  
 and Internal Seal Flush ..... +250°F

Horsepower: C3-P3 ..... 3 HP  
 C15-P15 ..... 15 HP

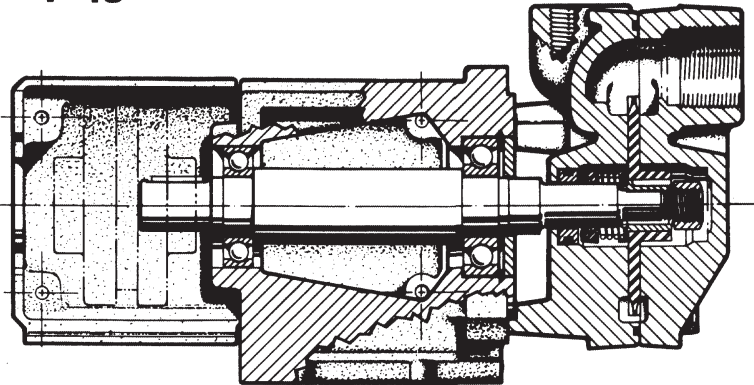
\*Suction Pressure: Plus 50% of Differential Pressure

# HORIZONTAL PEDESTAL MOUNTED

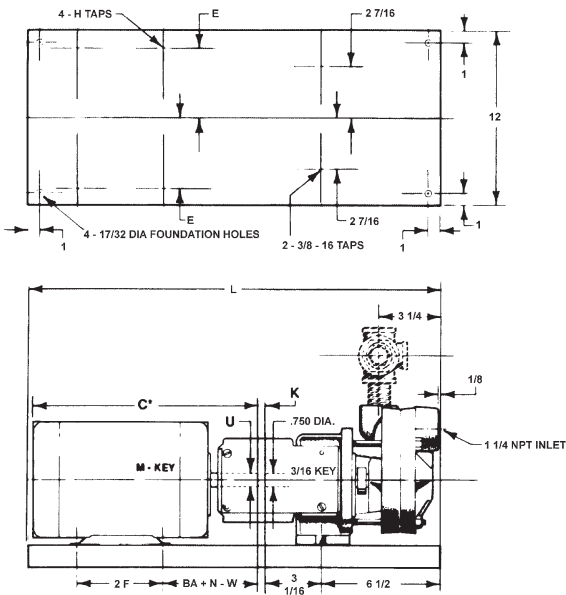
**MODEL  
P-3**



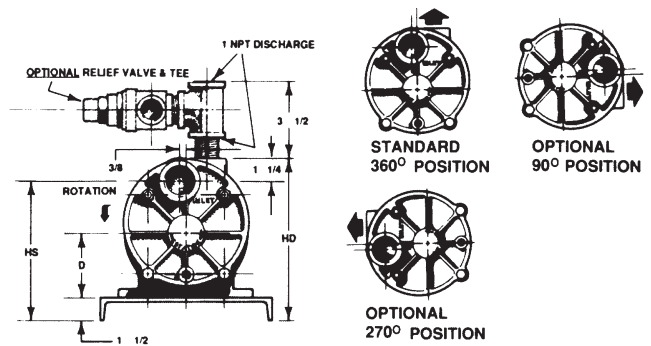
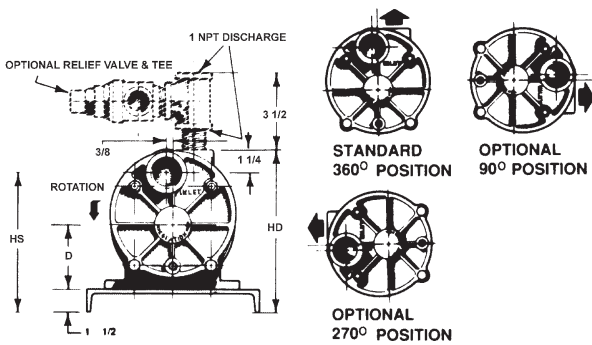
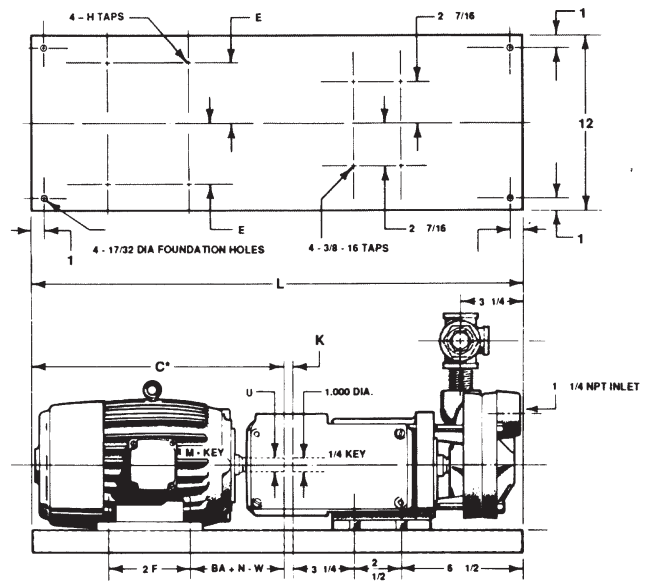
**MODEL  
P-15**



**DIMENSIONS: (IN INCHES)**



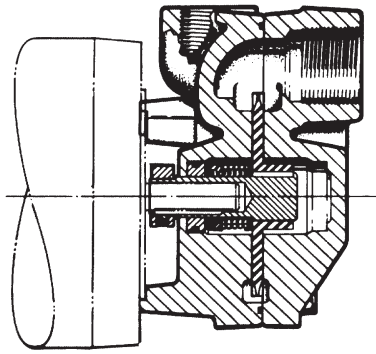
**DIMENSIONS: (IN INCHES)**



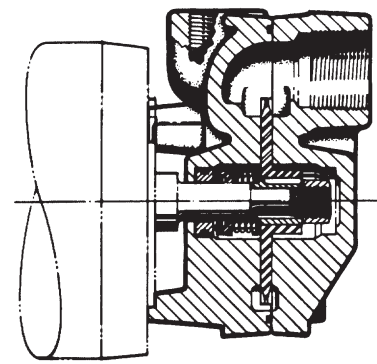
FRAME	D	HD	HS	L (P-3)	L (P-15)
56	3.50	10	8.75	24	
143T	3.50	10	8.75	24	28
145T	3.50	10	8.75	24	28
182T	4.50	11	9.75	26	30
184T	4.50	11	9.75	26	30
213T	5.25	11.75	10.50		33
215T	5.25	11.75	10.50		33

# HORIZONTAL CLOSE COUPLED

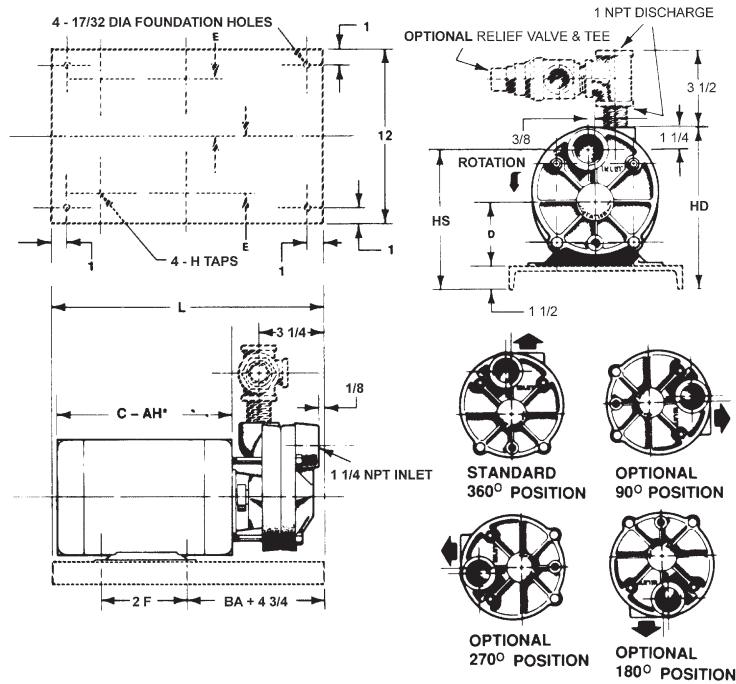
**MODEL  
C-3**



**MODEL  
C-15**

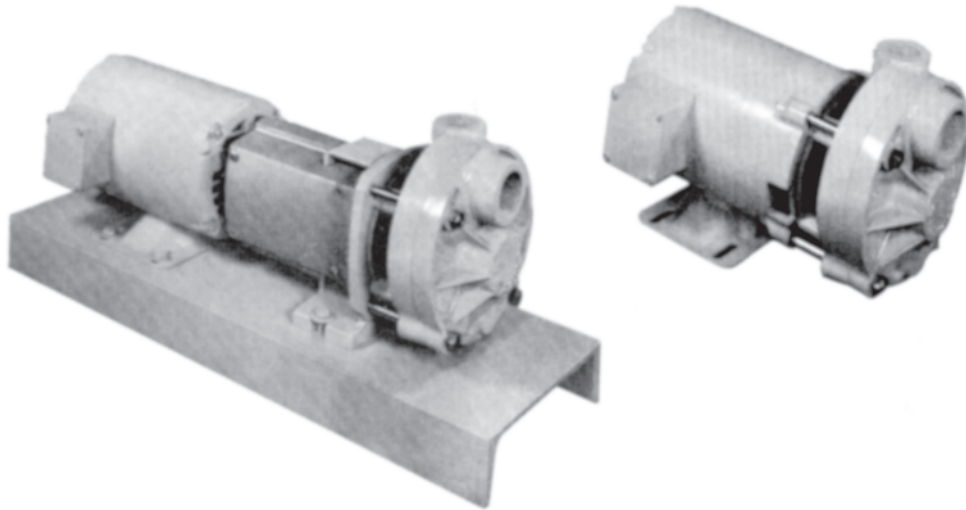


## DIMENSIONS: (IN INCHES)



FRAME	D	HD	HS	L	C-AH
56	3.50	10.00	8.75	18	13
143TC	3.50	10.00	8.75	18	13
145TC	3.50	10.00	8.75	18	13
182TC	4.50	11.00	9.75	20	14.50
184TC	4.50	11.00	9.75	20	14.50

## DESIGN DETAILS



### STANDARD DESIGN FEATURES

**Steep Head vs. Capacity Curve.** Pumping capacity varies only slightly as pressure changes. High Shut-off pressure overcomes temporary line resistance.

**Standard Motor.** Close-coupled Model 151 Pumps use standard “C” face motors. Service and replacement motors up to three horsepower are stock items anywhere in the U.S. and at SHIPCO®.

**Self-Adjusting Impeller.** A hydrodynamic film on each side of the impeller positions it for long life. The impeller exerts no thrust load on bearings. Pump operates equally well in a vertical or horizontal position.

**Mechanical Seals.** Bronze fitted pumps have EPR rubber, high temperature carbon and Ni-resist® seats for best hot water service. Optional seats and materials also available.

**300# Case Working Pressure.** Rigid structure is designed for maximum casing strength.

**100% Tested.** Every pump is fully tested to verify performance prior to shipment.

**Volatile Fluid Handling.** Turbine impeller handles vapors up to 20% by volume, minimizing the possibility of vapor locks.

**“O” Ring Gaskets.** “O” ring seals are used throughout the Model 151 Pumps to assure sealing and ease of service.

**Shaft Sleeve.** Units up to three horsepower have a shaft sleeve under the mechanical seal. Larger units have a 316 stainless steel shaft with an impeller sleeve.

**Water Flinger.** A water flinger provides added protection to ball bearings in the event of seal leakage.

**Simple Construction.** Model 151 Pumps contain only three major components, allowing for easy service.

**End Suction. Top Discharge.** Model 151 Pumps fit into small spaces easily. Discharge can be rotated in 90°, 180° and 270° positions.

**Best Efficiency.** New pump design optimizes efficiency for each size.

**Non-Cavitating.** Model 151 Pumps may be operated under adverse inlet conditions without audible or measurable cavitation.

**Low NPSH.** New inlet design provides superior fluid handling ability at low head inlet conditions.

### OPTIONAL DESIGN FEATURES

**Construction Materials.** Bronze fitted, all iron, all bronze, and 316 stainless steel are available stock materials.

**Bearing Pedestals.** All models can be pedestal mounted for flexible drive.

**Internal Flush Line.** Internal passageway flushes mechanical seal seats. When used with the optional silicon carbide seal seat, allows operation in water up to 250°.

**External Water Seal Connection.** Tapped opening can be provided for seal flushing from an external source.

## TYPE 151 REGENERATIVE TURBINE SERIES (3500 RPM)

FT.TDH	PSIG	PUMP MAXIMUM CAPACITY AT RATED HORSEPOWER (3500 RPM)								
				3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
462.00	200			3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
438.90	190			3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
415.80	180			3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
392.70	170			3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
369.60	160			3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
346.50	150			3 151C		6 151E	9 151G	12 151J	15 151M	GPM Pump Type
323.40	140		3 151C			6 151E	9 151G	12 151J	15 151M	GPM Pump Type
300.30	130		3 151C			6 151E	9 151G	12 151J	15 151M	GPM Pump Type
277.20	120	3 151B				6 151E	9 151G	12 151J	15 151M	GPM Pump Type
254.10	110	3 151B			6 151E		9 151G	12 151J	15 151M	GPM Pump Type
231.00	100	3 151B		6 151D	9 151E		12 151J	15 151M	22½ 151P	GPM Pump Type
207.90	90	3 151B	6 151D		9 151E		12 151J	15 151M	22½ 151P	GPM Pump Type
184.80	80	3 151B	6 151D		9 151E		12 151J	15 151M	22½ 151P	GPM Pump Type
161.70	70	3 151B	6 151D	9 151E		12 151G	15 151J	22½ 151M		GPM Pump Type
138.60	60	3 151B	6 151D	9 151E		12 151G	15 151J	22½ 151M		GPM Pump Type
23.10 to 115.50	10 to 50	3 151B	6 151D	9 151E	12 151G	15 151J	22½ 151M			GPM Pump Type
<b>MOTOR HP</b>		1/3	1/2	3/4	1	1½	2	3	5	

## TYPE 151 REGENERATIVE TURBINE SERIES (1750 RPM)

FT. TDH	PSIG	PUMP MAX. CAP. AT RATED HP (1750 RPM)					
138.60	60	3 151D		6 151J	9 151P	GPM Pump Type	
115.50	50	2 151C	3 151D	6 151J	9 151P	GPM Pump Type	
92.40	40	2 151C	3 151D	6 151J	9 151M	GPM Pump Type	
69.30	30	2 151C	3 151D	6 151G	9 151M	12 151P	GPM Pump Type
46.20	20	2 151C	3 151D	6 151G	9 151L	12 151P	GPM Pump Type
23.10	10	2 151C	3 151D	6 151G	9 151L	12 151P	GPM Pump Type
<b>MOTOR HP</b>		1/3			1/2		