

Mixed-flow Pump

Installation and Operation Instruction



Summary

1. Applications

The HW mixed-flow pump is a horizontal, single-stage, single-suction, volute-type pump. It is suitable for transporting clean water or other liquids with physical or chemical properties similar to water. The temperature of the transported liquid should not be higher than 50°C. It is widely used in various occasions such as agricultural irrigation, industrial and urban water supply and drainage.

The performance range of HW type pump: flow rate of 90-9000m³/h, head of 3.5-22m.

2. Features

The HW mixed-flow pump has the advantages of simple structure, reliable use, convenient maintenance, high efficiency, small size and light weight.

3. Transmission Mode

There are direct transmission and variable speed transmission. Commonly used power machines are electric motors and diesel engines. When ordering, the model (power, speed) of the power machine should be specified in order to determine the specifications of the coupling or pulley.

4. Running Direction:

Looking toward the pump inlet, the impeller generally rotates counterclockwise (650HW-5, -7, -10 pumps rotate clockwise)

5. Model Description

Take 100HW-8S as an example

100 ----- Pump Inlet and Outlet Diameters (mm)
HW ----- Horizontal Volute-type Mixed-flow Pump
8 ----- Design Head (m)
S ----- Variant Code

Structure and Function

1.HW pump is mainly composed of pump cover, impeller, pump body, pump shaft, shaft sleeve and bearing body (diameter ≤ 350mm) or bearing frame (diameter ≥ 400mm) and other main parts (Figure 1, Figure 2).

2. The pump cover is connected to the pump body and the water inlet pipe respectively. There should be an appropriate gap between the pump cover plane and the impeller plane. If the gap is too small, friction will occur; if the gap is too large, a large amount of pressure water in the pump body will flow back, reducing the efficiency of the pump. The actual suitable gap is 0.3-0.7mm (push the pump shaft to the inlet end of the pump), and the gap can be adjusted by increasing or decreasing the thickness of the paper pad.
3. The shaft seal device consists of packing, packing gland, packing ring and stuffing box on the pump body (100HW, 150HW and 200HW pumps have no packing ring). Its function is to prevent air from being sucked into the pump and to prevent excessive water from flowing out of the pump along the shaft.
4. The shaft sleeve is used to protect the pump shaft. It can be replaced in time after wear.
5. The pump shaft is supported by a single-row radial ball bearing. The bearing can be lubricated with lubricating oil - the amount of oil should be controlled between the markings of the oil gauge rod; it can also be lubricated with grease - it can be added when assembling the water pump. It can be replenished by disassembling the front cover and the rear cover during use.
6. The screw hole at the upper end of the pump body is used to add water or connect the vacuum pump to extract air and water.
7. In order to expand the use range of the pump and meet the different requirements of users, the outer diameter of the impeller can be cut or replaced with an impeller of different performance (indicated by the letter "A").
8. The accessories of the 150-300HW pump include inlet and outlet dead bends, live bends, bottom valves and pulleys or couplings; the accessories of the 400-650HW pump include inlet and outlet dead bends, check valves and pulleys or couplings. It is available for users to choose.
9. The bearing model and filler specifications of the HW pump are shown in Table 1 and Table 2

Figure1 Construction Section of Model 100~350HW Mixed-flow Pumps

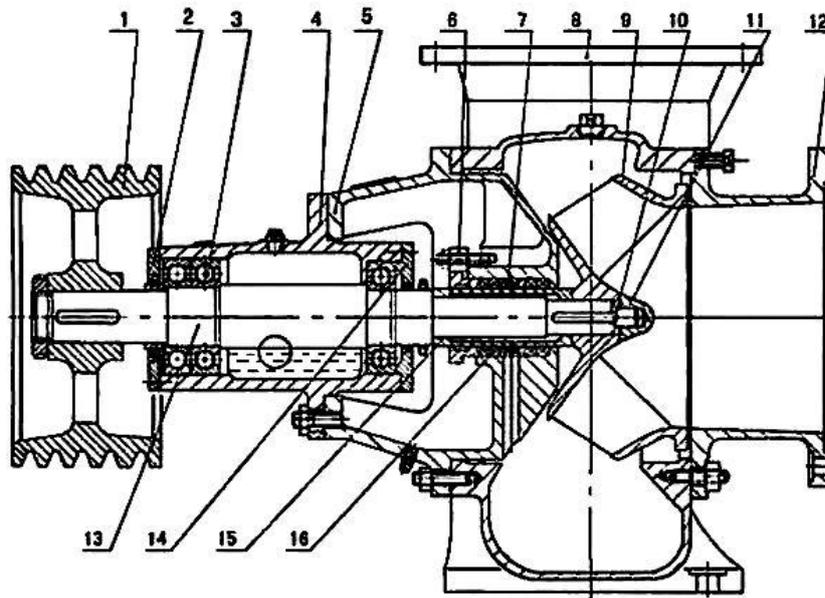
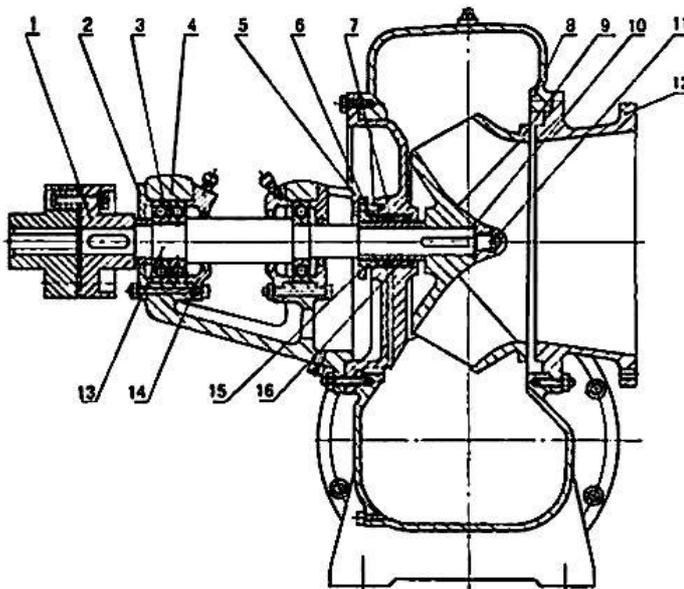


Figure2 Construction Section of Model 400~800HW Mixed-flow



- | | | |
|--------------------|--------------------|--------------------|
| 1 Pulley(Coupling) | 7 Packing Ring | 13 Shaft |
| 2 Rear End Cover | 8 Pump Volute | 14 Frond End Cover |
| 3 Bearing | 9 Impeller | 15 Shaft Sleeve |
| 4 Bearing Housing | 10 Impeller Washer | 16 Packing |
| 5 Tail Cover | 11 Impeller Nut | |
| 6 Packing Gland | 12 Pump Cover | |

Table 1 Bearing and Packing of Model 100~350HW Mixed-flow Pumps

Pump Model	Bearing Model	Packing Specification
		Oil Asbestos Immersed Packing
100HW-8S	306	8×8×141
150HW-5、-8、-12	306	8×8×135
150HW-6	307	10×10×157
200HW-5、-8、-10、-12	308	10×10×188
250HW-5、-8、-7、-11、12 300HW-5、-7、-8、-12 350HW-8	311	13×13×228

Table 2 Bearing and Packing of Model 400~800HW Mixed-flow Pumps

Pump Model	Bearing Model	Packing Specification
		Oil Asbestos Immersed Packing
400HW-7、-8、-10	312, or (46312 and 446312)	13×13×261
500HW-6	314	13×13×261
650HW-5、-7、-10	46322, or (46322 and 446322)	19×19×437
800HW-10、-16	27324 and 324	19×19×437

Main Technical Specifications

1. Pump performance: See the HW pump flow head curve (Figure 3) and performance table (Table 3, Table 4 and Table 5)
2. Pump performance change:
 - (1) Changing the pump speed can change the pump performance and expand the pump's application range;
 - (2) Methods for changing the speed: change the outer diameter of the pulley or change the gear reducer transmission ratio, or use a power machine with different speeds.
 - (3) After the pump speed changes, the change relationship between its flow (Q),

head (H) and power (N) is shown in the following formula:

$$Q1=Q\frac{n}{n1} \quad H1=H(\frac{n1}{n})^2 \quad N1=N(\frac{n1}{n})^3$$

In the formula: Q1, H1, N1 represent the flow rate, head and power after the speed is changed. Q, H, N represent the flow rate, head and power at the specified speed.

(4) When the pump speed increases, the power consumption increases, the suction vacuum decreases, and the service life is shortened. Excessively increasing the speed may cause other accidents, so it should be used with caution.

(5) When the pump speed decreases too much, the pump's efficiency is low. Therefore, the pump should be avoided from running at too low a speed as much as possible.

In order to expand the application range of the pump as much as possible and meet the different requirements of users, our factory has designed and produced a variety of matching products with different speeds and powers. In the future, while vigorously developing new products, we will further improve and develop various suitable matching products to better serve the majority of users. Please provide information, suggestions and selection.

3. Allowable suction vacuum (Hs), required NPSH (NPSH) r and critical NPSH (NPSH) c Under normal circumstances, it can be approximated by the following two formulas: (Hs) ≈ 10-(NPSH) c

$$(NPSH) r \approx (NPSH) c + 0.3$$

In the formula: (Hs) - allowable suction vacuum, m. (NPSH)c—— Critical NPSH, m. (NPSH)r—— Required NPSH, m.

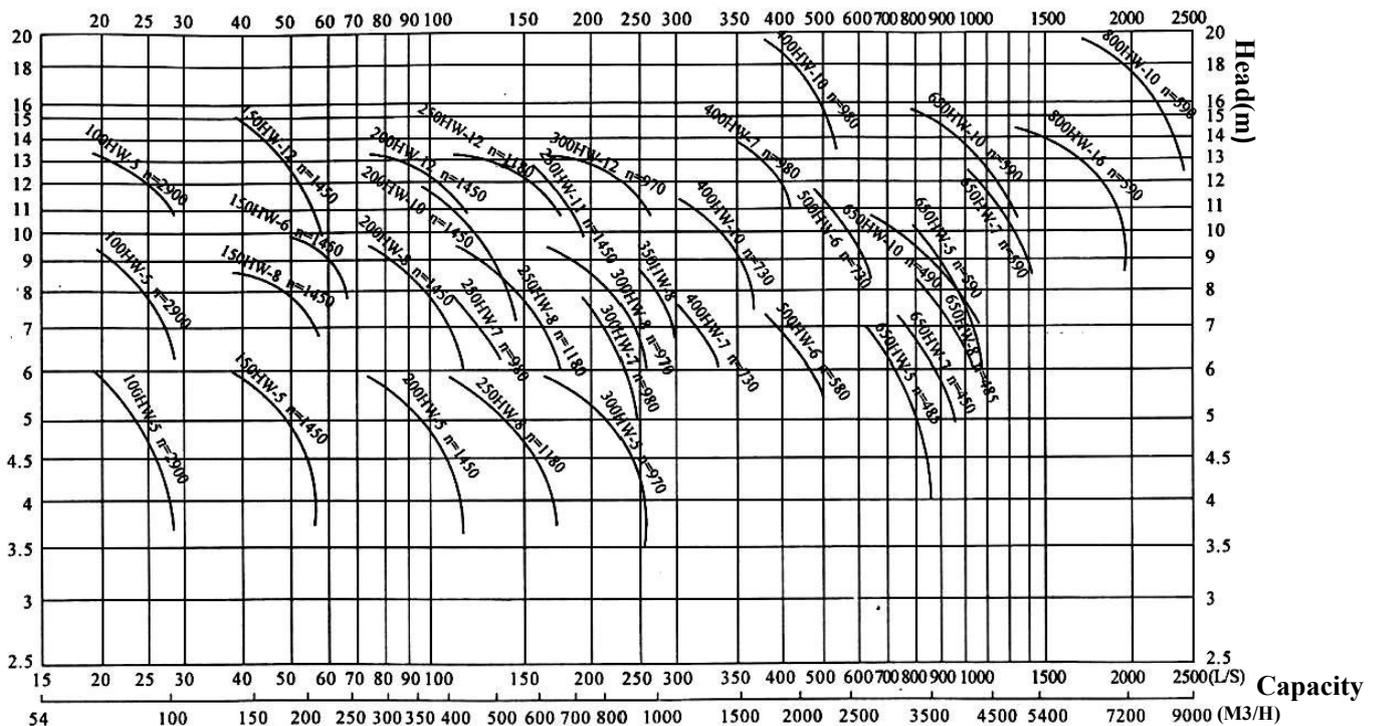


Figure3 HW Mixed-flow Pump Quick Selection Chart

Table3 HW Mixed-flow Pump Performance Parameters (Basic Type)

Pump Model	Capacity		Head m	Speed RPM	Efficiency %	Power (Kw)		Critical NPSH m	Pump Weight Kg
	L/S	m³/h				Shaft Power	Matched Power		
150HW-5	38	137	6.1	1450	75.0	3.30	4	2.7	60
	50	180	5.0		82.0	2.99			
	60	216	3.7		74.0	2.94			
150HW-8	38	137	8.7	1450	82.0	4.78	5.5	2.7	60
	50	180	8.0						
	60	216	6.8						
150HW-12	38	137	15.3	2900	75.0	7.60	11	6.0	55
	50	180	12.5		82.0	7.47			
	60	216	9.7		78.0	7.71			
200HW-5	100	360	5.0	1450	81.5	6.01	7.5	4.0	105
200HW-8	75	270	9.6	1450	76.0	9.29	11	4.0	105
	100	360	8.0		83.5	9.39			
	120	432	6.0		75.0	9.41			
200HW-12	75	270	13.5	1450	83.5	14.68	18.5	4.0	105
	100	360	12.5						
	120	430	10.8						
250HW-5	150	540	5.0	1180	82.0	8.97	11	4.0	190
250HW-8	93	335	6.5	970	77.0	7.67	11	2.7	190
	123	444	5.4		84.7	7.78			
	148	533	4.1		76.0	7.74			
	113	407	9.6	1180	77.0	13.81	18.5	4.0	
	150	540	8.0		84.0	14.01			
	180	648	6.0		76.0	13.93			
	139	500	14.5	1450	77.0	25.6	30	6.4	
184	664	12.1	84.0		26.0				
221	796	9.1	76.0		25.9				
250HW-12	113	407	13.5	1180	84.0	21.8	30	4.0	190
	150	540	12.5						
	180	648	10.8						
300HW-5	220	792	5.0	970	83.0	12.99	15	4.0	230
300HW-8	165	594	9.6	970	78.0	19.90	22	4.0	230
	220	792	8.0		85.0	20.30			
	264	950	6.0		77.0	20.10			
300HW-12	165	594	13.5	970	85.0	31.72	37	4.0	230
	220	792	12.5						
	264	950	10.8						

Table4 HW Mixed-flow Pump Performance Parameters (Improved Type)

Pump Model	Capacity		Head	Speed	Efficiency	Power (Kw)		Critical NPSH	Pump Weight
	L/S	m³/h	m	RPM	%	Shaft Power Kw	Matched Power Hp/Kw	m	Kg
100HW-8S (4HBC-35)	27	98	7	2900	78	2.42	4/3	4.0	29
	25	90	8		81	2.42			
	19	70	10		80	2.38			
150HW-6 (6HBC-35)	39	140	6.6	1450	75.0	3.36	7/5.5	3.0	68
	50	180	6.0		82.0	3.59			
	56	200	5.0		78.0	3.52			
	49	174	10.1	1800	75.0	6.46	12/7.5	4.0	
	62	223	9.2		82.0	7.07			
	69	248	7.7		78.0	6.72			
200HW-10 (8HBC-35)	83	300	8.0	1200	77.0	8.46	15/11	4.0	130
	100	360	7.0		82.0	8.39			
	125	450	5.1		70.0	8.10			
	100	360	12.0	1450	77.0	15.3	30/18.5	5.0	
	125	450	10.0		82.0	14.9			
	150	540	7.0		77.0	14.4			
	111	400	14.5	1600	77.0	20.5	40/30	5.5	
	139	500	12.5		82.0	20.2			
167	600	9.5	77.0		20.2				
250HW-7 (10HBC-30)	111	400	8.0	980	81.0	10.74	20/15	4.0	168
	125	450	7.0		84.0	10.29			
	139	500	6.3		79.0	10.88			
250HW-11 (10HBC-40)	111	400	5.5	980	83.0	7.2	15/11	4.0	169
	125	450	4.8		78.4	7.5			
	139	500	4.0		73.6	7.4			
	153	550	13.2	1450	82.3	24.0	40/30	6.0	
	180	650	11.6		83.4	24.6			
	200	720	9.8		80.0	24.0			
	178	640	15.5	1600	82.3	32.8	60/37	6.5	
	200	720	14.3		83.4	32.8			
222	800	11.8	79.3		32.4				
300HW-7 (12HBC ₂ -40)	141	507	4.4	730	82.0	7.4	11	3.0	230
	161	581	3.9		84.0	7.3			
	188	678	2.8		78.0	6.6			
	189	680	8.0	980	82.0	18.1	22	4.0	
	217	780	7.0		84.0	17.1			
	253	910	5.0		78.0	15.9			

	251	902	14.1		82.0	42.3			
	288	1035	12.3	1300	84.0	41.4	55	5.0	
	335	1207	8.8		78.0	37.1			
350HW-8 (14HBC-40)	186	670	5.2		85.0	11.16			330
	207	745	4.4	730	85.5	10.44	20/15	4.5	
	228	819	3.7		81.5	10.15			
	250	900	9.4		85.0	27.10			
	278	1000	8.0	980	85.5	25.50	40/30	5.0	
	306	1100	6.7		81.5	24.66			
400HW-7 (16HBC-40)	300	1080	7.8		84.0	27.31			486
	350	1260	6.8	730	86.0	27.13	40/30	4.0	
	380	1368	6.2		84.0	27.50			
	403	1450	14.1		84.0	66.32			
	470	1692	13.3	980	86.0	65.90	100/75	5.5	
	510	1836	11.2		84.0	66.67			

Table5 HW Mixed-flow Pump Performance Parameters (Improved Type)

Pump Model	Capacity		Head	Speed	Efficiency	Power (Kw)		Critical NPSH	Pump Weight
	L/S	m³/h	m	RPM	%	Shaft Power Kw	Matched Power Hp/Kw	m	Kg
400HW-8	310	1116	8.4	730	86.0	29.67	45	4.0	492
400HW-10 (16HBC-30)	305	1098	11.5		83.0	41.5			496
	389	1400	9.94	730	86.0	44.3	66/55	4.0	
	478	1720	7.55		83.5	42.4			
	409	1474	20.7		83.0	100.1			
	522	1880	18.0	980	86.0	107.1	165/110	5.0	
500HW-6 (20HBC-40)	469	1690	7.6		83.4	41.9			770
	550	1980	6.2	580	87.0	38.4	60/55	5.5	
	606	2180	5.3		80.4	39.1			
	591	2127	12.0		83.4	83.4			
	692	2492	9.8	730	87.0	76.4	120/95	6.0	
650HW-5 (26HBC-50)	736	2650	7.15		86.0	60.0			1940
	920	3312	5.1	485	85.0	54.1	90/75	5.5	
	1000	3600	4.0		79.0	49.6			
	896	3224	10.58		86.0	108.1			
	1120	4032	7.55	590	85.0	97.5	150/115	6.0	
	1216	4379	5.92		79.0	89.3			
	850	3060	7.4 6.5		85.0	72.5			
	944	3400	5.0	450	88.0	68.4	120/90	5.3	
	1100	3960			85.0	63.4			

650HW-7 (26HBC-40)	915	3295	8.6		85.0	90.8	135/100	5.5	1940
	1017	3663	7.6	485	88.0	86.1			
	1185	4244	5.9		85.0	80.6			
	1115	4014	12.7		85.0	163.6	221/180	6.0	
	1238	4457	11.18	590	88.0	154.2			
1442	5193	8.59		85.0	142.9				
650HW-10 (26HBC-30)	889	3200	15.8		81.0	170.0	250/180	6.0	1940
	1111	4000	14.0	590	88.0	173.3			
	1389	5000	10.4		85.0	166.6			
	738	2658	10.9		81.0	97.4	150/115	5.5	
	923	3322	9.7	490	88.0	99.7			
1154	4153	7.2		85.0	95.8				
800HW-10	1329	4784	14.8		85	227	310/250	5.5	3433
	1661	5980	12.2 8.6	490	88	225			
	1993	7176			80	210			
800HW-16	1600	5760	21.5		85	397.0	550/450	6.5	3433
	2000	7200	17.7	590	88	394.6			
	2400	8640	12.5		80	367.0			

Pump Installation

HW pumps are usually installed in floor-standing style, but can also be installed in a semi-drop well. Semi-drop well installation can reduce the suction height of floor-standing installation and the loss caused by the long water inlet pipe.

1. Installation principles

(1) Pump installation height: The highest water surface should not be higher than the lower end of the bearing, and the lowest water surface depends on the allowable suction vacuum height (H_s) of the pump (reducing branch pipe losses).

(2) The water pump should be as close to the water source as possible to shorten the water inlet pipe and reduce pipe losses.

(3) The pipe should be as straight and short as possible, and generally use a bend at the inlet. The water outlet bend can be omitted by pouring the water pump foot foundation.

2. Precautions:

(1) When using belt drive, the pulleys of the water pump and the power machine should be aligned. Safety covers should be installed outside the pulleys and belts.

(2) The pump cover should not be directly connected to the bend. The straight pipe should be connected first and then the bend to ensure uniform flow velocity distribution at the inlet.

(3) Rubber pads or asbestos wires should be added between the connecting flanges of the pipeline to prevent water and air leakage.

(4) The position of the water inlet pipe extending into the water inlet pool should be appropriate. The distance between the water inlet pipe and the water inlet pool wall is generally $(1-1.5)D$, (D is the diameter of the water inlet pipe). The larger value is used for small pumps and the smaller value is used for large pumps.

(5) The water outlet should be submerged in the water of the water outlet pool and as close to the water surface as possible to reduce the head loss.

(6) There should be a mesh cover in front of the water inlet to prevent water grass and debris from entering the pump and breaking or blocking the flow channel.

(7) When the pump is installed on a ship and lubricated with lubricating oil (thin oil), it should be considered that the pump will cause the bow to be depressed or the hull to tilt when it is filled with water. It must be ensured that the pump shaft remains in a horizontal position when the pump is running to prevent the bearing from being damaged due to lack of oil.

(8) The 650HW type pump generally uses two sets of single-row radial thrust ball bearings 46322. For the 650HW-7 and 10 pumps, when the speed is 590r/min, one set of 446322 and one set of 46322 are used. During assembly and use, it is necessary to ensure that there is an appropriate axial clearance (adjust the thickness of the paper pad) so that the bearing has a good load-bearing capacity and a long service life (for the 400HW-10 pump, when the speed is 980r/min, one set of 446312 and one set of 46312 are used, and the same requirements apply).

3. External installation drawing and dimension table

(1) HW type pump and external installation drawing are shown in Figures 4 and 5

(2) The external installation dimensions of HW type pump are shown in Table 6.

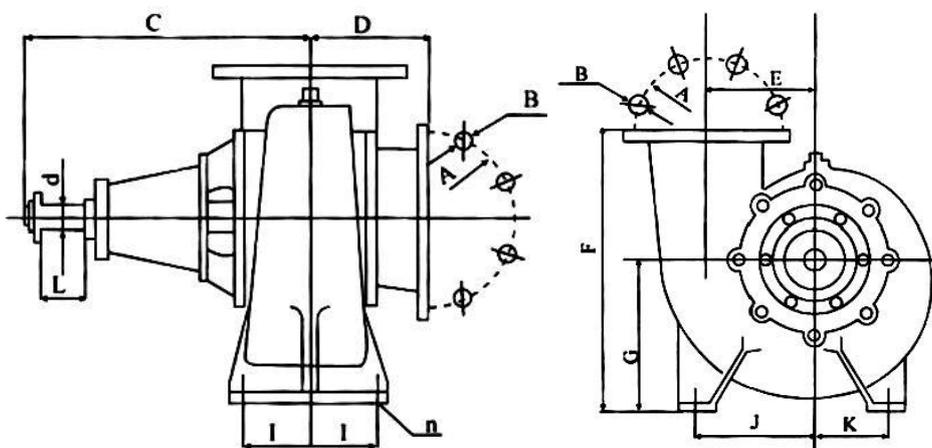


Figure 4 100HW-300HW and 350HW-8 Pumps with Water Discharge Upwards

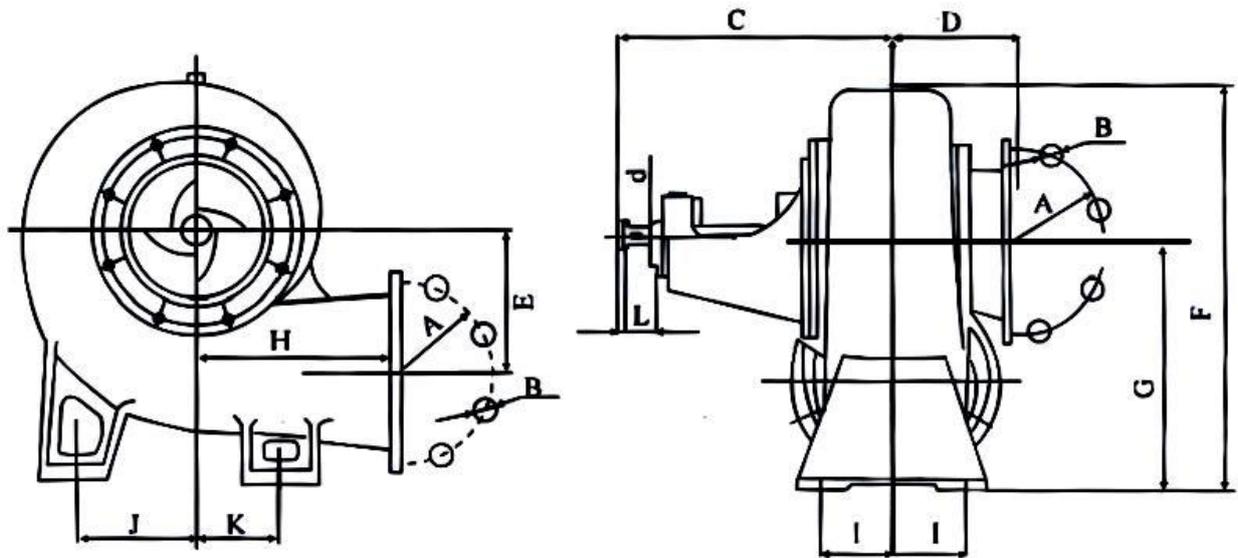


Figure 5 400HW-800HW and 350HW-8 Pump Horizontal Discharge Installation
 (the water discharge direction and impeller rotation direction of the 650HW pump are opposite to the figure)

Table 6 HW Mixed-flow Pump Installation Dimensions

Pump Model	A	B	C	D	E	F	G	I	J	K	n	Lxd	1	H
100HW-8S	φ142	6-φ9	314	124	97	278	135	47	100	78	4-φ12	53×28	12	
150HW-5	φ225	8-φ17.5	360	160	158	400	212	80	170	120	4-φ18.5	42×28	14	—
150HW-8			344	178	145									
150HW-12			340	170	128									
150HW-6	φ210	6-φ14	384	163	155	390	205	78	154	110	4-φ18	49×30	14	
200HW-5	φ280	8-φ17.5	430	188	200	500	265	100	220	150	4-φ18.5	58×35	16	—
200HW-8			430	188	194									
200HW-12			406	210	180									
200HW-10	φ270	6-φ18	449	192	200	520	270	110	240	150	4-φ18	56×35	16	
250HW-5	φ335	6-φ17.5	546	249	220	590	315	120	270	190	4-φ24	82×50	18	—
250HW-8			570	225	237									
250HW-12			546	249	221									
250HW-7 250HW-11	φ320	8-φ17.5	596	251	232	585	297	123	262	164	4-φ24	107×54	18	
300HW-5	φ395		572	260	290									
300HW-8			572	260	282									

300HW-12		6-Φ22	540	300	265	725	375	150	330	230	4-Φ24	82×50	18	
300HW-7 300HW-10	φ380	8-Φ18	596	245	282	710	360	150	320	200	4-Φ22	107×54	18	—
350HW-8(Upwards)	φ445	8-Φ22	608	290	290	780	400	150	320	200	4-Φ22	107×54	18	—
350HW-8(Horizontal)	φ445	8-Φ22	608	290	255	903	545	150	300	200	4-Φ22			380
400HW-7 400HW-10	Φ495	8-Φ22	717	305	300	1082	670	190	320	230	4-Φ30	82×55	18	450
500HW-6	φ600	10-Φ22	851	332	370	1226	755	190	430	330	4-Φ35	106×65	20	565
650HW-5	φ770	12-Φ27	1132	480	570	1670	1000	290	550	430	4-Φ34	130×95	35	735
650HW-7														
650HW-10														
800HW-10	Φ920	12-Φ33	1368	640	705	2050	1250	400	700	600	4-Φ34	165×110	37	1059
800HW-16	φ1015													

Use and Maintenance

1. Test run: After the pump is installed, it needs to be tested to check the pump's direction and eliminate installation problems.

2. Start-up sequence:

(1) Close the outlet gate valve or check valve.

(3) Add water: First start the machine and add water from the screw hole on the upper part of the pump body, or open the check valve to allow the water in the outlet pool to backflow and add water; or use a vacuum pump to extract air and draw water (when the vacuum pump extracts the air in the pump and the pumped out is water, the water pump can be started and the vacuum pump can be stopped).

(4) When the power machine reaches the normal speed, open the gate valve, and then adjust the tightness of the packing. If the pump operation and bearing temperature are normal and the vibration is slight, it can continue to run (when using a check valve, the valve cover should be lifted after the water is discharged to reduce resistance).

3. Use and maintenance:

(1) When the bearing is lubricated with thin oil, the oil level of the bearing body should be checked and controlled regularly between the two marking lines of the

oil gauge rod; when the bearing is lubricated with dry oil (grease), the appropriate amount of oil should be added regularly. For 150-300HW pumps (the front cover and rear cover can be removed for replenishment) and for 400-500HW pumps, the oil can be replenished through the oil cup.

(2) Check the temperature rise of the bearing regularly. Generally, it should not be higher than the ambient temperature by 35°C, but the maximum should not exceed 75°C.

(3) Pay attention to whether there is friction and impact sound when the pump is running. If the pump cover and impeller rub, a paper pad can be added between the pump cover and the pump body. The actual suitable gap is 0.3-0.7mm.

(4) The packing must be adjusted appropriately, and the liquid should leak intermittently from the packing gland in the form of drops. If the packing is too tight, the shaft will heat up and the power will increase. If the packing is too loose, the liquid will leak too much and the efficiency will decrease.

(5) If the motor is directly connected to the pump, the axis lines of the two shafts should be in a straight line.

(6) Check whether there is any air leakage in the water inlet pipe.

(7) Pay attention to whether the power suddenly increases or decreases, and whether the flow rate suddenly decreases. If so, stop the machine to eliminate the problem.

(8) Check whether the bolts are loose due to vibration.

(9) In winter, the water in the pump and pipes should be drained after stopping the machine.

(10) The lubricating oil or grease should be replaced after the pump has worked for 1000 hours or half a year. After that, change the oil every 1000 hours or one year.

Breakdown and Troubleshooting

Fault Phenomenons	Causes	Solutions
No water coming	1. Insufficient water or insufficient air in the vacuum pump 2. Leakage in the water inlet pipe 3. Suction range is too high	1. Continue to add or pump air 2. Check and eliminate 3. Lower the installation position of the water pump

out of the pump	<ol style="list-style-type: none"> 4. The water pump is not turning in the right direction 5. The total water delivery height exceeds the specified value 	<ol style="list-style-type: none"> 4. Change 5. Reduce
The pump stops just after it starts to discharge water.	<ol style="list-style-type: none"> 1. There are bubbles in the water 2. There is air trapped in the water inlet pipe 3. The water inlet pipe is leaking 4. The water inlet pipe or impeller is blocked by water plants and debris 	<ol style="list-style-type: none"> 1. Increase the depth of the water inlet pipe immersed in water 2. Eliminate 3. Tighten the screws, adjust the gasket, and block the gap 4. Eliminate
Insufficient water output	<ol style="list-style-type: none"> 1. There are water plants or debris in the water inlet pipe or impeller 2. The speed is not enough or the power is not enough 3. The water delivery height is too high 4. The sealing ring on the pump cover and impeller is worn and the sealing gap is too large 5. The gate valve is opened too small or the check valve is blocked by obstacles 6. The water inlet pipe is not immersed deep enough in the water 	<ol style="list-style-type: none"> 1. Eliminate 2. Adjust 3. Reduce 4. Repair or adjust the paper pad appropriately to eliminate obstacles 5. Open the gate valve appropriately to eliminate obstacles 6. Increase the immersion depth
Too much power consumption	<ol style="list-style-type: none"> 1. The speed is too high 2. The transmission shaft is bent 3. The packing is pressed too close 4. The bearing is worn or damaged 5. The belt is too tight 	<ol style="list-style-type: none"> 1. Lower 2. Straighten 3. Loosen the gland nut or remove the packing and flatten it 4. Replace 5. Loosen appropriately
Noise and vibration	<ol style="list-style-type: none"> 1. The shaft center is not aligned 2. The shaft is bent and the bearing is worn too much 3. The base bolts are loose 4. The impeller is partially blocked 5. The suction range is too high, causing cavitation 6. The pump sucks in debris 	<ol style="list-style-type: none"> 1. Alignment 2. Straightening or replacement 3. Tightening 4. Elimination 5. Lowering the pump installation position 6. Elimination
Bearing heating	<ol style="list-style-type: none"> 1. Insufficient lubricating oil 2. Poor or unclean lubricating oil 3. Shaft center is not aligned 4. Bearing is worn 5. Belt is too tight 	<ol style="list-style-type: none"> 1. Lubricate 2. Clean the bearing and replace the appropriate lubricant 3. Align 4. Replace 5. Relax appropriately
	<ol style="list-style-type: none"> 1. The packing is pressed too tightly and the 	<ol style="list-style-type: none"> 1. Loosen the gland nut and adjust

Packing heating	<p>tightness around is uneven</p> <p>2. The packing is pressed skewed, causing uneven friction on the sleeve</p>	<p>the packing tightness</p> <p>2. Loosen the gland and tighten it evenly again</p>
Too much water leakage at the packing	<p>1. Packing is not compacted</p> <p>2. Improper packing installation</p> <p>3. Packing specifications are not met or worn</p> <p>4. Bushing is worn</p>	<p>1. Tighten the gland nut properly</p> <p>2. Adjust the packing joint to stagger it at a certain angle</p> <p>3. Replace</p> <p>4. Replace</p>