HW 型涡壳式混流泵

Model HW Vortex-casing Flow-mixing Pump

使用说明书 operation instruction

安装、使用产品前，请仔细阅读使用说明书

Please carefully read the operation instructions before use of the product.

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概 述 OUTLINE

1、用途：

HW型泵为卧式、单级、单吸、涡壳式混流泵。适用于输送清水或物理、化学性质类似于水的其它液体。被输送液体温度不宜高于50℃。广泛用于农田排灌、工业和城市给排水等多种场合。

HW型泵的性能范围：流量130～9000m^3/h，扬程3.5～22m。

2、特点：

结构简单、使用可靠、装修方便、而且效率高、体形小、重量轻。

3、传动方式：

又直接传动和变速传动。常用动力机是电动机和柴油机。订货时应明确动力机的型号(功率、转数)，以便确定联轴器或皮带轮的规格。

4、水泵方向：

向水泵进口看，叶轮一般为逆时针旋转(650HW-5、-7、-10泵为顺时针旋转)。

5、型号说明：以300HW～8A为例

300-泵进、出口直径mm。

HW型卧式涡壳混流泵。

8-设计扬程m。

A-切割叶轮外径或换用不同性能的叶轮。

1. Purpose:

Model HW pump is a horizontal single stage single suction volute mixed flow pump and suitable for transporting pure water or the other liquid with both physical and chemical natures similar to those of water, with the temperature of the liquid to be transported not over 50℃, for the farm land irrigation, industrial and city water supply and drainage etc. multiple places.

The pump's performance range: flow 130~9000m^3/h, head 3.5~22m.

2. Features:

Simple structure, reliable use, easy installation, high efficiency, small body, light weight.

3. Mode of actuation:

Direct and variable actuations. The common movers are motor and diesel engine. Please note the model (power, rotating speed) of the mover so as to make sure of the norms of the clutch or the belt pulley.

4. Water pump direction:

Viewing from the pump inlet, the impeller rotates counterclockwise generally (clockwise with 650HW-5, -7, -10 pump).

5. Model meaning:

Take 300HW~8A as the example.

300----pump's inlet and outlet diameters.

HW----horizontal volute mixed flow pump.

8----designed head m.

A----cut the impeller's outer diameter or replace it with an impeller of different performance.

结构、功能说明 STRUCTURE AND FUNCTION

1、HW型泵主要由泵盖、叶轮、泵体、泵轴、轴套及轴承体(口径≤350mm)或轴承架(口径≥400mm)等主要零件构成(图1、图2)。

2、泵盖分别与泵体和进水管相接。泵盖平面与叶轮平面之间应有适当间隙。间隙过小会产生摩擦；间隙过大，会导致泵体内的压力水大量回流，使泵的效率降低。实际使用的适宜间隙为0.3～0.7mm(将泵轴推向泵的进口端)，间隙可用增减纸垫厚度来调整。

1. Model HW pump mainly consists of pump cover, impeller, pump casing, shaft, muff and bearing body (aperture≤350mm) or bearing stand (aperture≥400mm) etc. parts (Fig.1 and 2).

2. The pump cover is connected to the pump casing and the water-in pipe separately. There should a proper interval between the planes of both pump cover and impeller, too small interval will produce friction; while too big will cause the pressured water inside of the pump to flow back greatly to have the pump efficiency lowered. The practically used proper interval is 0.3~0.7mm (push the pump shaft to the pump inlet) and the interval can be adjusted through increasing or decreasing the paper pad thickness.

3、轴封装置由填料、填料压盖、填料环和泵体上的填料函组成(150HW和200HW型泵无填料环)。其作用是防止空气吸入泵内和防止水从泵内过多地沿轴流出。

4、轴套用以保泵轴。磨损后可及时更换。

5、泵轴用单列向心球轴承支承。轴承可用润滑油润滑-油量应控制在油标杆的标线间；也可用润滑脂润滑-可在装配水泵时加入。使用中通过拆装前盖和后盖来补充。

6、泵体上端的螺孔，用于加灌引水或联接真空泵抽气引水。

7、为扩大泵的使用范围，满足用户不同要求，可割叶轮外径或换用不同性能的叶轮(加字母“A”等表示)。

8、150～350HW型泵的附件有进、出口呆弯、活弯、底阀和皮带轮或联轴器；400～650HW泵的附件有进、出口呆弯、逆止阀和皮带轮或联轴器。可供用户选用。

9、HW型泵的轴承型号和填料规格见表1、表2。

3. The shaft seal is formed with packing, packing gland, packing ring and the packing box on the pump casing (no packing ring with 150HW and 200HW pumps) and functions to prevent air from being sucked into the pump and too much water from flowing out axially.

4. The muff is used to protect the pump shaft and can be replaced after getting worn out.

5. The pump shaft is supported with a single-line centripetal ball bearing. The bearing can be lubricated with lubricating oil-with he oil amount controlled in between the marking lines of the oil leveler rod; also with lubricating grease-filled during pump assembly or during use by means of removing both front and rear covers.

6. The screw hole on the top of the pump casing is used to prime leading water or link a vacuum pump for exhaust leading water.

7. To widen the pump's range of use and meet with the users' different requirements, cut the outer diameter of the impeller or use an impeller of different performance (expressed with letter “A” etc. Added).

8. The accessories of 150~350HW pump include inlet and outlet dead and flexible elbows, foot valve, belt pulley or clutch; and of 400~650HW pump include inlet and outlet dead and flexible elbows, check valve, belt pulley or clutch. Selectable by users.

9. See Table 1 and 2 for the bearing model and packing norm of model HW pump.

表1 150~350HW型泵的轴承和填料 Table 1 Bearing and packing of model 150~350HW pump

水泵型号 Pump model	轴承型号 Bearing model	填料规格 Packing norm
		油浸石棉盘根 Oil soaked asbestos packing
150HW-5、-8、-12	6306	8×8×135
150HW-6	6307	10×10×157
200HW-5、-8、-10、-12	6308	10×10×188
250HW-5、-8、-7、-11、-12 300HW-5、-8、-7、-12 350HW-8	6311	13×13×228

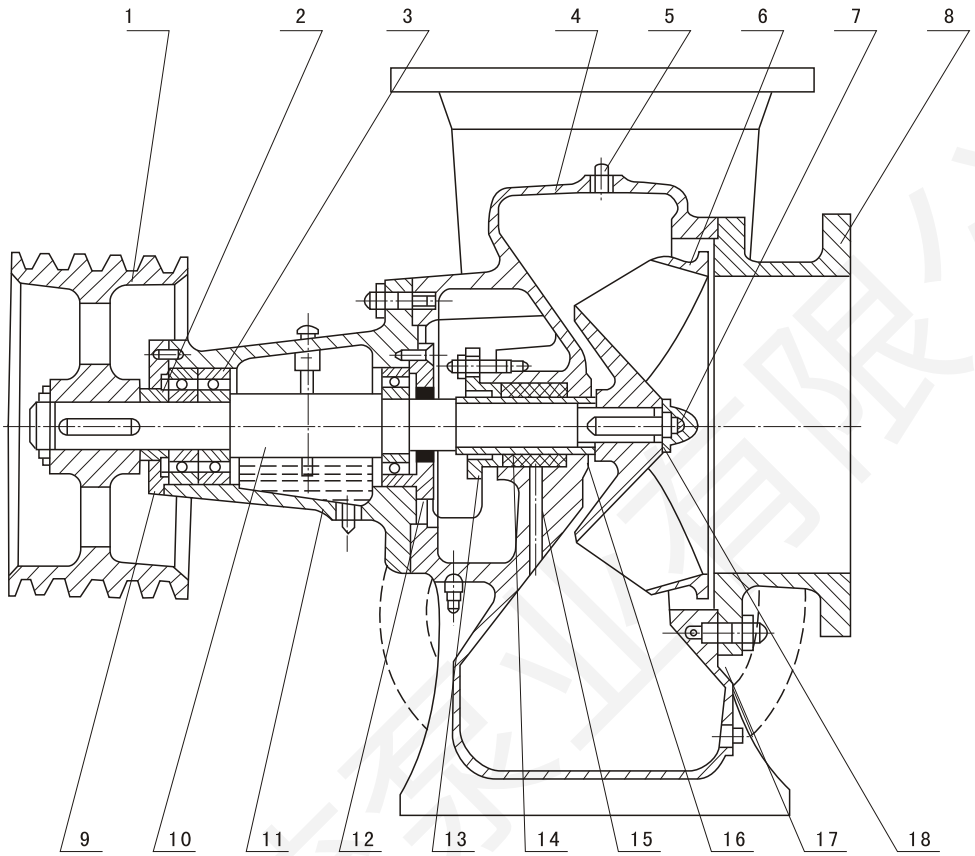

图1 150~350HW型泵结构图(350HW~8泵有向上和水平两种出水型式)
Fig. 1 Structural diagram of model 150~350HW pump
(there are upward and horizontal two water-out types with 350HW~8 pump)

序号 No	名称 Name	序号 No	名称 Name	序号 No	名称 Name	序号 No	名称 Name	序号 No	名称 Name
1	皮带轮(或泵联轴器) Belt pulley (or pump's clutch)	5	丝堵Thread cork	9	后盖Rear cover	13	填料压盖 Packing gland	17	纸垫Paper pad
2	挡套 Retaining sleeve	6	叶轮Impeller	10	泵轴Pump shaft	14	填料Packing	18	叶轮螺母垫 Impeller nut gasket
3	轴承Bearing	7	叶轮螺母 Impeller nut	11	轴承体 Bearing body	15	填料环 Packing ring		
4	泵体Pump casing	8	泵盖Pump cover	12	前盖Front cover	16	轴套Muff		

表2 400~800HW型泵的轴承和填料 Table 1 Bearing and packing of model 400~800HW pump

水泵型号 Pump model	轴承型号 Bearing model	填料规格 Packing norm
		油浸石棉盘根 Oil soaked asbestos packing
400HW-7、-8、-10	6312(或7312AC和7312AC/DT)★	13×13×261
500HW-11	6314	15×15×299
650HW-5、-7、-10	6322(或7322AC和7322AC/DT)★	19×19×437
800HW-10、-16	27324和6324	19×19×437

★请参见10页2、注意事项第⑧点
Please refer to (8) of the precautions, clause 2 on page 9.

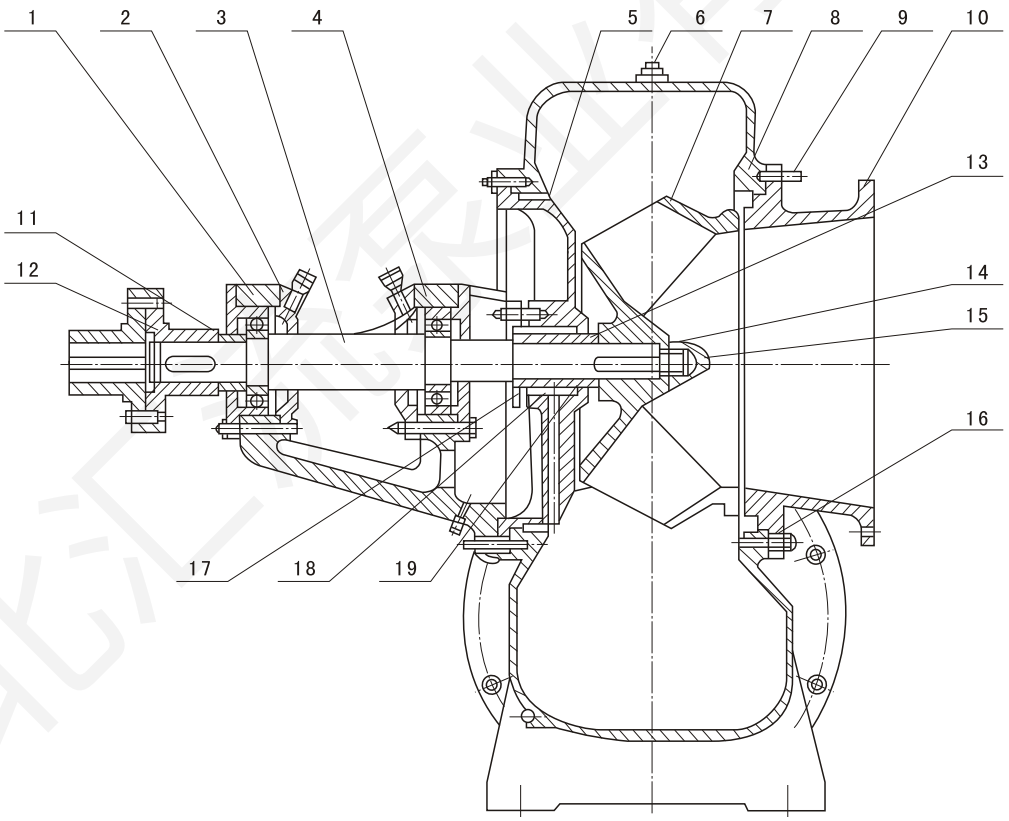

图2 400~800HW型泵结构图
(650HW-5、-7、-10型泵的出水方向与图示相反一向泵进口看，叶轮为顺时针旋转)
Fig. 2 Structural diagram of model 400~800HW pump
(the water-out direction of model 650HW-5, -7, -10 is reversed to that shown in the figure-viewing from the pump's inlet, the impeller moves clockwise)

序号 No	名称 Name	序号 No	名称 Name	序号 No	名称 Name	序号 No	名称 Name	序号 No	名称 Name
1	轴承架 Bearing stand	5	尾盖End cover	9	螺钉Screw	13	轴套Muff	17	填料压盖 Packing gland
2	轴承端盖 Bearing end cover	6	丝堵Thread cork	10	泵盖Pump cover	14	叶轮螺母垫 Impeller nut gasket	18	填料环 Packing ring
3	轴 Shaft	7	叶轮Impeller	11	挡套 Retaining sleeve	15	叶轮螺母 Impeller nut	19	填料Packing
4	轴套Muff	8	泵体Pump casing	12	联轴器Clutch	16	纸垫Paper pad		

主要技术规格 MAIN TECHNICAL SPECIFICATIONS

1、泵的性能：见HW型泵流量扬程曲线图(图3)和性能表(表3、表4)

2、泵的性能变换：

①改变泵的转速可改变泵的性能，扩大泵的使用范围；

②改变转速的方法：改变皮带轮外径或改变齿轮减速器传动比，也可选用不同转速的动力机。

③水泵转速改变后，其流量(Q)，扬程(H)和功率(N)变化关系如下式所示：

$Q_1= Q\ (n/n_1)$　　$H_1=H(n_1/n)^2$　　$N_1= N(n_1/n)^3$

式中：Q_1，H_1，N_1分别代表转速改变后的流量、扬程和功率。Q，H，N分别代表规定转速下的流量、扬程和功率。

④水泵转速提高时，耗用功率增加，吸上真空度降低，寿命缩短。过分提高转速可能会发生其它事故，故应慎用。

⑤水泵转速过分降低时，泵的使用效益低，为此，应尽量避免泵在过低转速下运行。

为了尽可能扩大泵的使用范围，满足用户不同要求，我公司已经设计和生产了多种不同转速、动力的等的配套。今后在大力发展新产品的同时，也将进一步完善和发展各种适宜的配套，更好的为广大用户服务。请广大用户提供信息、建议和选用。

3、允许吸上真空度〔Hs〕，必需汽蚀余量(NPSH)r临界汽蚀余量(NPSH)c一般情况下可近似地用下面两式表示：

〔Hs〕≈10－(NPSH)c　(NPSH)r≈(NPSH)c+0.3

式中：〔Hs〕允许吸上真空度，m。(NPSH)c临界汽蚀余量，m。(NPSH)r必需汽蚀余量，m。

1. Pump performance: see the flow-head curve chart (Fig.3) and the performance table (Table 3 and 4) of model HW pump.

2. Pump performance variation:

(1)Change of the pump speed can vary the pump performance and widen the pump's range of use.

(2)Way to change the pump speed: change the outer diameter of the belt pulley or the drive ratio of the gear decelerator, also use the mover of different speed.

(3)After the speed change, the variable relationship between the flow(Q), head(H) and power(N) of the pump comes as below:

$Q_1=Q(n/n_1)$　　$H_1=H(n_1/n)^2$　　$N_1=N(n_1/n)^3$

In which: Q_1, H_1, N_1 separately mean the flow, head and power after the speed change. Q, H, N separately mean the flow, head and power under the set speed

(4) When the pump speed is enhanced, the consuming power is increased, the upward suction vacuum lowers and the duration is shortened. Excessive enhancement of speed may cause other accidents to occur, so do it carefully.

(5) When the pump speed is lowered excessively, the pump's efficacy of use may becomes low, so avoid the pump from working in an excessive low speed a can as possible.

To widen the range of use and meet with the users' different requirements, this Co. has designed and made multiple different speed and power completions and, at the same time greatly developing new products in the future, will further perfect and develop various proper completions so as to provide the users with a better service. Please supply information and suggestions and select the product.

3. In general, the allowed upward-suction vacuum [Hs], (NPSH)r and (NPSH)c can be approximately expressed with the two formulas below:

[Hs]≈10-(NPSH)c　　(NPSH)r≈(NPSH)c+0.3

In which: [Hs]allowed upward suction vacuum, m.

(NPSH)ccritical NPSH, m.

(NPSH)rrequired NPSH, m.

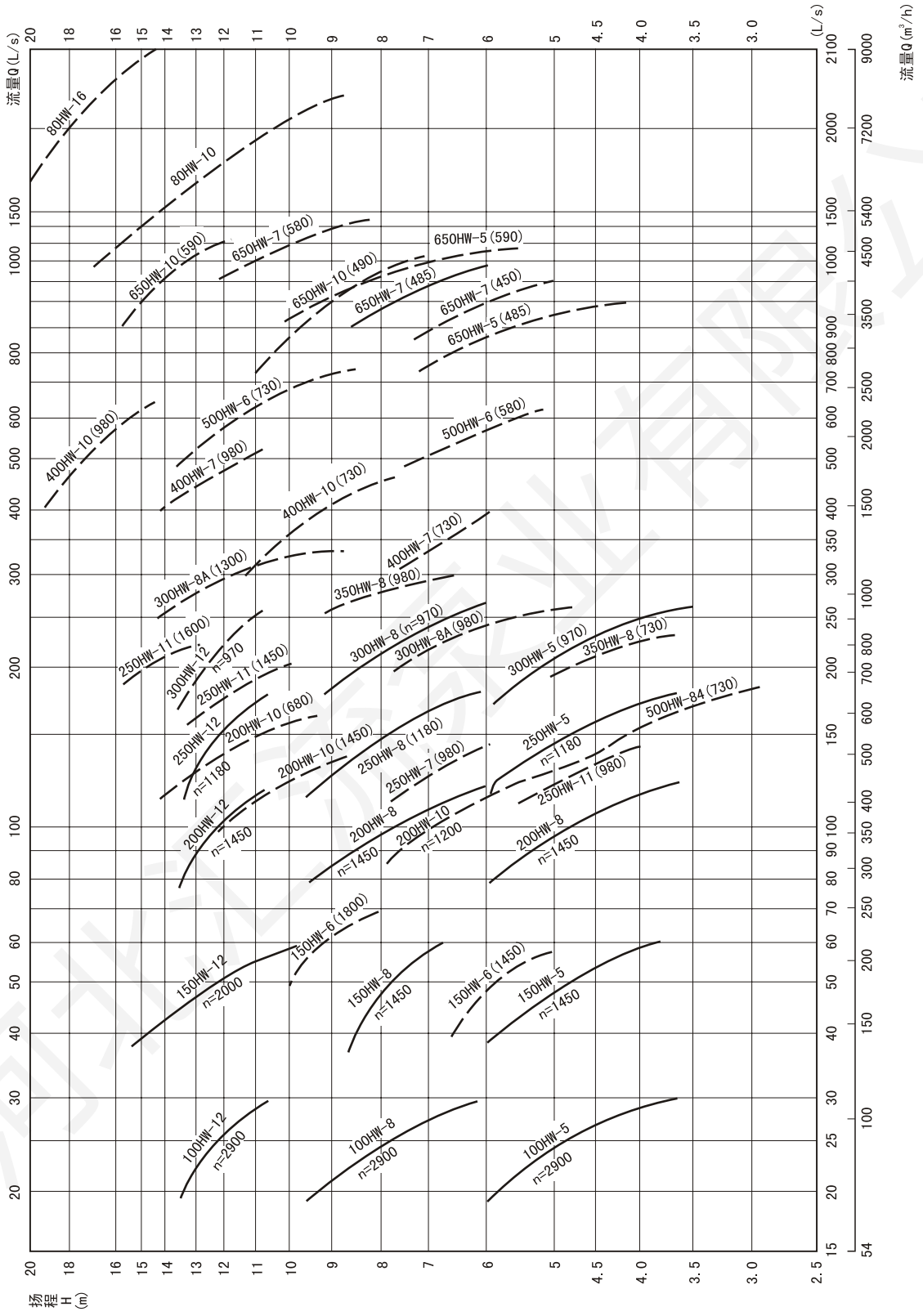

图3 HW型泵流量扬程曲线图(供用户选型)

Fig.3 Flow-head curve chart of model HW pump (for users to select the model)

表3 HW型泵性能表(基本型) Performance table of model HW pump (basic type)

泵型号 Pump model	流量 Flow		扬程 Head (m)	转速 Speed (r/min)	效率 Efficiency (%)	功率 Power(KW)		临界汽蚀余量 (NPSH) c(m)	泵质量 Pump mass (kg)	直联配套动力机型号 Model of directly completed mover
	(L/s)	(m^3/h)				轴功率 Shaft	配用功率 Complementary			
150HW-5	38 50 60	137 180 216	6.1 5.0 3.7	1450	75.0 82.0 74.0	3.30 2.99 2.94	4	2.7	60	Y112M-4
150HW-8	38 50 60	137 180 216	8.7 8.0 6.8	1450	82.0 82.0 82.0	4.78 4.78 4.78	5.5	2.7	60	Y132S-4
150HW-12	38 50 60	137 180 216	15.3 12.5 9.7	2900	75.0 82.0 74.0	7.60 7.47 7.71	11	6.0	55	△160M-2
200HW-5	100 100 100	360 360 360	5.0 5.0 5.0	1450	81.5 81.5 81.5	6.01 6.01 6.01	7.5	4.0	105	△Y132M-4
200HW-8	75 100 120	270 360 432	9.6 8.0 6.0	1450	76.0 83.5 75.0	9.29 9.39 9.41	11	4.0	105	Y160M-4
200HW-12	75 100 120	270 360 430	13.5 12.5 10.8	1450	83.5 83.5 83.5	14.68 14.68 14.68	18.5	4.0	105	△Y180M-4
250HW-5	150 150 150	540 540 540	5.0 5.0 5.0	1180	82.0 82.0 82.0	8.97 8.97 8.97	11	4.0	190	
250HW-8	93 123 148	335 444 553	6.5 5.4 4.1	970	77.0 84.0 76.0	7.67 7.78 7.74	11	2.7	190	△Y160L-6
250HW-8	113 150 180	407 540 648	9.6 8.0 6.0	1180	77.0 84.0 76.0	13.81 14.01 13.93	18.5	4.0	190	
250HW-8	139 184 221	500 664 796	14.5 12.1 9.1	1450	77.0 84.0 76.0	25.6 26.0 25.9	30	6.4	190	Y200L-4
250HW-12	113 150 180	407 540 648	13.5 12.5 10.8	1180	84.0 84.0 84.0	21.8 21.8 21.8	30	4.0	190	
300HW-5	220 220 220	792 792 792	5.0 5.0 5.0	970	83.0 83.0 83.0	12.99 12.99 12.99	15	4.0	230	Y180L-6
300HW-8	165 220 264	594 792 950	9.6 8.0 6.0	970	78.0 85.0 77.0	19.90 20.30 20.10	22	4.0	230	Y220L2-6
300HW-8A	141 161 188	507 581 678	4.4 3.9 2.8	730	82.0 84.0 78.0	7.56 7.48 6.75	11	3.0	230	Y180L-8
300HW-8A	189 217 253	680 780 910	8.0 7.0 5.0	980	82.0 84.0 78.0	18.44 18.08 16.22	22	4.0	230	Y200L2-8
300HW-8A	251 288 335	902 1035 1207	14.1 12.3 8.8	1300	82.0 84.0 78.0	43.16 42.17 37.79	55	5.0	230	
300HW-12	165 220 264	594 792 950	13.5 12..5 10.8	970	85.0 85.0 85.0	31.72 31.72 31.72	37	4.0	230	△Y250M-6

表4 HW型泵性能表(变型) Performance table of model HW pump (varied type)

泵型号 Pump model	流量 Flow		扬程 Head (m)	转速 Speed (r/min)	效率 Efficiency (%)	功率 Power(KW)		临界汽蚀余量 (NPSH) c(m)	泵质量 Pump mass (kg)	直联配套动力机型号 Model of directly completed mover
	(L/s)	(m^3/h)				轴功率 Shaft	配用功率 Complementary			
150HW-6	39 50 56	140 180 200	6.6 6.0 5.0	1450	75.0 82.0 78.0	3.36 3.59 3.52	5.5	3.0	68	Y132S-4
150HW-6	49 62 69	174 223 248	10.1 9.2 7.7	1800	75.0 82.0 78.0	6.46 7.07 6.72	11	4.0	68	
200HW-10	83 100 125	300 360 450	8.0 7.0 5.1	1200	77.0 83.5 70.0	8.45 8.22 8.12	11	4.0	130	
200HW-10	100 125 150	360 450 540	12.0 10.0 7.0	1450	77.0 83.5 77.0	15.27 14.68 14.32	18.5	5.0	130	Y180M-4
200HW-10	111 139 167	400 500 600	14.5 12.5 9.5	1600	77.0 83.5 77.0	20.49 19.91 20.20	30	5.5	130	
250HW-7	111 125 139	400 450 500	8.0 7.0 6.3	980	81.0 84.0 79.0	10.75 10.22 11.87	15	4.0	168	Y180L-6
250HW-11	111 125 139	400 450 500	5.5 4.8 4.0	980	83.0 78.4 73.6	7.22 7.5 7.4	11	4.0	169	160L-6
250HW-11	153 180 200	550 650 720	13.2 11.6 9.8	1450	83.0 84.0 80.0	23.85 24.37 24.02	30	6.0	169	Y200L-4
250HW-11	178 200 222	640 720 800	15.5 14.3 11.8	1600	83.0 84.0 80.0	32.59 33.38 32.11	37	6.5	169	
350HW-8	186 207 228	670 745 819	5.2 4.4 3.7	730	85.0 85.5 81.5	11.16 10.44 10.15	15	4.5	330	Y200L-8
350HW-8	250 278 306	900 1000 1100	9.4 8.0 6.7	980	85.0 85.5 81.5	27.10 25.50 24.66	30	5.0	330	Y225M-6
400HW-7	300 350 380	1080 1260 1368	7.8 6.8 6.2	730	84.0 86.0 84.0	27.31 27.13 27.50	30	4.0	486	Y250M-8
400HW-7	403 470 510	1450 1692 1836	14.1 13.3 11.2	980	84.0 86.0 84.0	66.32 65.90 66.67	75	5.5	486	Y315S-6
400HW-8	310 310 310	1116 1116 1116	8.4 8.4 8.4	730	86.0 86.0 86.0	29.67 29.67 29.67	45	4.0	492	Y280M-8

MODEL HW VORTEX-CASING FLOW-MIXING PUMP

泵型号 Pump model	流量 Flow		扬程 Head (m)	转速 Speed (r/min)	效率 Efficiency (%)	功率 Power(KW)		临界汽蚀余量 (NPSH) c(m)	泵质量 Pump mass (kg)	直联配套动力机型号 Model of directly completed mover
	(L/s)	(m^3/h)				轴功率 Shaft	配用功率 Complementary			
400HW-10	305 389 478	1098 1400 1720	11.5 9.94 7.55	730	83.0 86.0 83.5	41.5 44.3 42.4	55	4.0	496	Y315S-8
400HW-10	409 522 641	1474 1880 2309	20.7 18..0 13.6	980	83.0 86.0 83.5	100.1 107.1 102.4	110	5.0	496	Y315L2-6
500HW-6	469 550 606	1690 1980 2180	7.6 6.2 5.3	580	83.4 87.0 80.4	41.9 38.4 39.1	55	5.5	770	Y315M-10
500HW-6	591 692 762	2127 2492 2744	12.0 9.8 8.4	730	83.4 87.0 80.4	83.4 76.4 78.1	90	6.0	770	Y315L1-8
650HW-5	736 920 1000	2650 3312 3600	7.15 5.1 4.0	485	86.0 85.0 79.0	60.0 54.1 49.6	75	5.5	1940	
650HW-5	896 1120 1216	3224 4032 4379	10.58 7.55 5.92	590	86.0 85.0 79.0	108.1 97.5 89.3	110	6.0	1940	Y355M-10
650HW-7	850 944 1100	3060 3400 3960	7.4 6.5 5.0	450	85.0 88.0 85.0	72.5 68.4 63.4	90	5.3	1940	
650HW-7	915 1017 1185	3295 3663 4244	8.6 7.6 5.9	485	85.0 88.0 85.0	90.8 86.1 80.6	110	5.5	1940	Y355L-12
650HW-7	1115 1238 1442	4014 4457 5193	62.7 11.18 8.59	590	85.0 88.0 85.0	163.3 154.2 142.9	200	6.0	1940	Y450-10
650HW-10	889 1111 1389	3200 4000 5000	15.8 14.0 10.4	590	81.0 88.0 85.0	170.0 173.3 166.6	200	6.0	1940	Y450-10
650HW-10	738 923 1154	2658 3322 4153	10.9 9.7 7.2	490	81.0 88.0 85.0	97.4 99.7 95.8	110	5.5	1940	
800HW-10	1329 1661 1993	4784 5980 7176	14.8 12.2 8.6	490	85 88 80	227 225 210	250	5.5	3433	Y450-64-12
800HW-16	1600 2000 2400	5760 7200 8640	21.5 17.7 12.5	590	85 88 80	397.0 394.6 367.0	450	6.5	3433	Y500-50-10

泵的安装 PUMP INSTALLAITION

HW型泵常用落地式安装，也可采用半落井安装。半落井安装时可减少落地安装吸程高和因进水管长而增加的损失。

1、安装原则：

①泵的安装高度：最高上水面不应高于轴承下端，最低上水面取决于泵的允许吸上真空高〔Hs〕(应减支管路损失)。

②水泵应尽量可能靠近水源，以缩短进水管路，减少管路损失。

③管路应直和短。一般在进口用一个弯管。利用水泵底脚基础浇斜，可省去出水弯管。

2、注意事项：

①用皮带传动时，水泵和动力机的皮带轮应对正。皮带轮和皮带外宜设安全罩。

②泵盖不宜直接接弯管。应先接直管后再接弯管，以保证进口处流速分布均匀。

③管路各连接法兰间，应加橡皮垫或石棉线，以防漏水和漏气。

④进水管伸入进水池的位置应合适。进水管距进水池一般为(1～1.5)D、(D为进水管口径)小泵取大值，大泵取小值。

⑤出水口应淹没在出水池的水里，并尽快靠近水面，以减少扬程损失。

⑥进水口前应有网罩，以防水草杂物进入泵内打碎或堵塞流道。

⑦泵装在船上使用并采用润滑油(稀油)润滑时，应考虑到泵在上水时引起船头压低或船身倾侧，必须保证泵轴在泵运行时保持水平位置，以免轴承因缺油而损坏。

⑧650HW型泵一般采用单列向心推力球轴承7322AC两套。其中650HW-7和10的泵当转速为590r/min时，采用7322AC/DT和7322AC各一套。在装配和使用时，必须保证有适宜的轴向游动间隙(调整纸垫厚度)，使轴承有良好的承载能力和使用寿命。(对400HW-10泵当转速为590r/min时，采用7312AC/DT/和7312AC各一套，也有同样要求)。

Model HW pump is usually ground installed and also half-way installed in a well, the latter can reduce the additional loss with the former due to a high suction range and a longer water-in pipe.

1. Installation principle:

(1)Installation height: the maximum upper water surface should not be higher than the lower end of the bearing and lowest upper water surface is depended upon the pump's allowed upward-suction vacuum[Hs] (should reduce the branch pipeline's loss).

(2)Get the pump close to the water source as can as possible so as to shorten the water-in pipeline and reduce the pipeline loss.

(3)Have the pipeline straight and short. Use one bent pipe in the inlet generally. Use a slanting pour of the foot basis of the pump can save the water-out bent pipe.

2. Precautions:

(1)In case of belt drive, the belt pulleys of both pump and mover should be aligned. Set a safety cover on the belt pulley and the outside of the belt.

(2)Do not have the pump cover directly connected to an elbow till a straight pipe connected first so as to make sure of a uniformly distributed flowrate at the inlet.

(3)Fill rubber pad or asbestos threads in between the connecting flanges of the pump so as to prevent air or water leak.

(4)The position for the water-in pipe to stretch into the water pool should be so proper as the distance to the pool wall from it is generally (1~1.5)D (D as the water-in pipe aperture), use the big value for a small pump and a small value for a big pump.

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

(6)Set a screen cover before the water inlet to prevent waterweeds etc. impurities from going into the pump to break or block up the geat.

(7)When the pump is placed on a ship for use and lubricated with lubricating oil (thin oil), the pump shaft should be ensured to be kept at the horizontal place so as to prevent the bearing from injury due to lack of oil, as the pump's priming will cause the ship head pressed low or the side of the ship body inclined.

(8)In general, model 650HW pump uses two sets of single-line centripetal thrust ball bearing 7322AC, of which, model 650HW-7and -10 pumps use each set of 7322AC/DT and 7322AC with the speed at 590r/min. During assembly and use, a suitable axial walking interval should be made sure (adjust the paper pad thickness) to have the bearing a good loading capacity and duration. (The same requirements are also applicable for 400HW-10 pump when it uses each set of 7312 AC/DT and 7312AC with the speed at 590r/min).

外形安装图及尺寸表 OUT-FORM INSTALLATION DRAWING AND DIMENSION TABLE

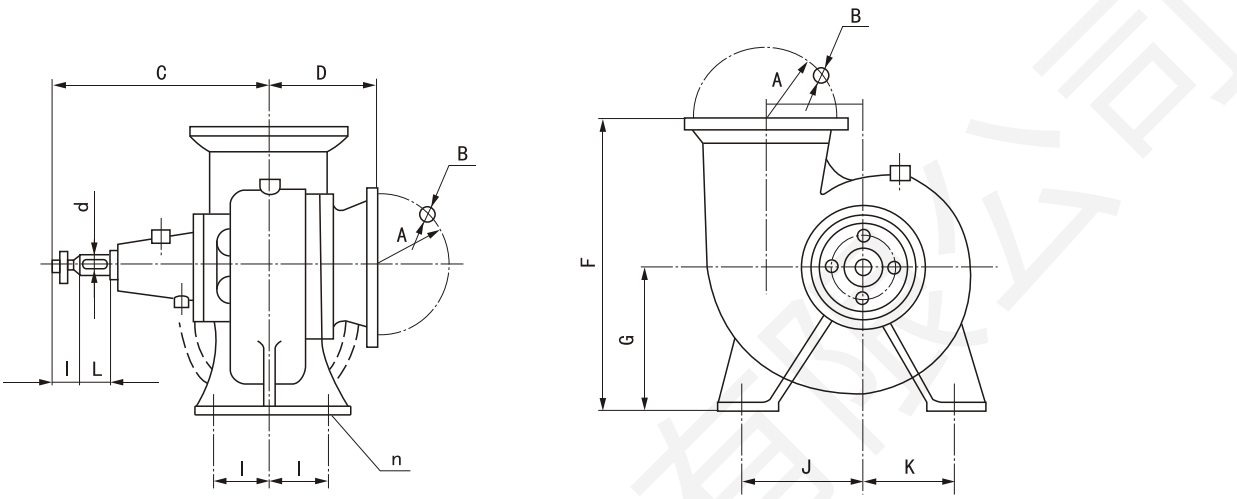

图4 150HW~300HW和350HW~8泵向上出水外形安装图
Fig.4 Out-form and installation diagram of model 150~300HW and 350HW~8 pump with the water out upward

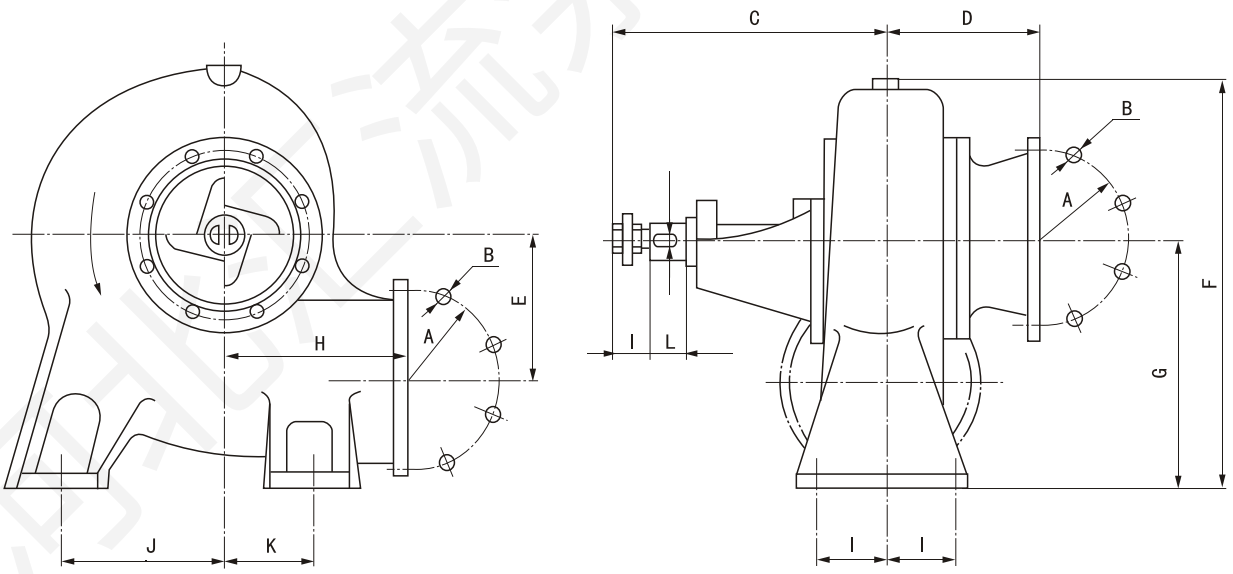

图5 400HW~800HW和350HW~8泵水平出水外形安装图(650HW型泵的出水方向和叶轮转向与图示相反)
Fig.5 Out-form and installation diagram of model 150~300HW and 350HW~8 pump with the water out horizontally (both water out direction and impeller moving direction of model 650HW pump are reversed to that shown in the figure)

表5 HW型泵外形安装尺寸表 Table 5 Out-form and installation dimensions of model HW pump

泵型号 Pump model	A	B	C	D	E	F	G	I	J	K	n	轴伸 Shaft extension L×d	螺纹长1 Thread length 1	H
150HW-5	Φ225	8-Φ17.5	360	160	158	400	212	80	170	120	4-Φ18.5	42×28	14	-
150HW-6	Φ210	6-Φ14	384	163	155	390	205	78	154	110	4-Φ18	49×30	14	-
150HW-8	Φ225	8-Φ17.5	344	178	145	400	212	80	170	120	4-Φ18.5	42×28	14	-
150HW-12	Φ225	8-Φ17.5	340	170	128	350	170	80	170	120	4-Φ18.5	42×28	14	-
200HW-5	Φ280	8-Φ17.5	430	188	200	500	265	100	220	150	4-Φ18.5	58×35	16	-
200HW-8	Φ280	8-Φ17.5	430	188	194	500	265	100	220	150	4-Φ18.5	58×35	16	-
200HW-12	Φ280	8-Φ17.5	406	210	180	500	265	100	220	150	4-Φ18.5	58×35	16	-
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	Φ335	6-Φ17.5	570	225	237	590	315	120	270	190	4-Φ24	82×50	18	-
250HW-7	Φ320	8-Φ17.5	596	251	232	585	297	123	262	164	4-Φ24	107×54	18	-
250HW-11	Φ320	8-Φ17.5	596	251	232	585	297	123	262	164	4-Φ24	107×54	18	-
250HW-12	Φ335	6-Φ17.5	546	249	221	590	315	120	270	190	4-Φ24	82×50	18	-
300HW-5	Φ395	6-Φ22	572	260	290	725	375	150	330	230	4-Φ24	82×50	18	-
300HW-$\frac{8}{7}$	Φ395	6-Φ22	572	260	282	725	375	150	330	230	4-Φ24	82×50	18	-
300HW－12	Φ395	6-Φ22	540	300	265	725	375	150	330	230	4-Φ24	82×50	18	-
350HW－8上	Φ445	8-Φ22	608	290	290	780	400	150	320	200	4-Φ24	107×54	18	-
350HW-8平	Φ445	8-Φ22	608	290	255	903	545	150	300	200	4-Φ24	107×54	18	380
400HW-7	Φ495	8-Φ22	718	306	300	1082	670	190	320	230	4-Φ30	82×55	18	450
400HW-8	Φ495	8-Φ22	718	306	300	1082	670	190	320	230	4-Φ30	82×55	18	450
400HW-10	Φ495	8-Φ22	718	306	300	1082	670	190	320	230	4-Φ30	82×55	18	450
500HW-6	Φ600	10-Φ22	849	331	400	1246	750	195	425	335	4-Φ30	105×65	20	565
650HW-5	Φ770	10-Φ27	1132	480	570	1670	1000	290	550	430	4-Φ34	130×95	35	735
650HW-7	Φ770	10-Φ27	1132	480	570	1670	1000	290	550	430	4-Φ34	130×95	35	735
650HW-10	Φ770	10-Φ27	1132	480	570	1670	1000	290	550	430	4-Φ34	130×95	35	735
800HW-10	Φ920	12-Φ33	1368	640	705	2050	1250	400	700	600	4-Φ34	165×110	37	1059
800HW-16	Φ1015	12-Φ33	1368	640	705	2050	1250	400	700	600	4-Φ34	165×110	37	1059

使用和保养 USE AND MAINTENANCE

1、试车：

泵在安装完成后，需进行试运转，以检查泵的转向和清除安装中的毛病。

2、开车顺序：

①关闭出口闸阀或逆止阀。

②加引水：先开机并将水从泵体上部的螺孔加入，或打开逆止阀使出水池中的水倒灌加水；或接用真空泵抽气引入(当真空泵抽出泵内空气后，抽出为水时，即可开动水泵和停止真空泵)。

③当动力机达到正常转速后，开大闸阀，然后调节填料的松紧，如泵的运转和轴承温度正常，振动轻微，则可继续运行(使用逆止阀时，在出水后应将阀盖吊起，以减少阻力)。

3、使用与保养：

①轴承采用稀润滑油时，应经常检查和控制轴承体的油位在油标杆二根标线间；轴承采用干油(润滑脂)润滑时，应定时补充适量油量。对150～350HW型泵(可拆去前盖和后盖来补充)对400～800HW型泵可通过油杯来补充。

②经常检查轴承的温升。一般不得高于环境温度35℃，但最高不得超过75℃。

③注意泵运转时有无摩擦和撞击声。如泵盖与叶轮摩擦，可在泵盖和泵体间增加纸垫。实际使用适宜间隙0.3～0.7mm。

④填料的调整必须适当，液体应从填料压盖处成滴状间继漏出。填料太紧，轴会发热和功率增加，填料太松，液体泄漏会过多，效率降低。

⑤如电机与泵直联，两轴的轴心线应在一直线上。

⑥检查进水管路有无漏气现象。

⑦注意功率是否突然增大或降低，流量是否突然减少。如有，应停车排除。

⑧经常检查各螺栓是否因振动而松动。

1. Trial:

Take a trial movement after the pump is installed to check the moving direction of it and remove the defect in the installation.

2. Sequence of trial:

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

(2)Fill leading water: first start the pump and fill water into it through the screw hole on the top of it or open the check valve to let the water in the water-out pool back primed in; or directly use a vacuum pump to lead water by means of exhausting (when the vacuum pump exhausts the air inside of the pump completely and gets water out, start the pump and stop the vacuum pump).

(3)When the mover reaches the normal speed, open the gate valve fully and adjust the packing tightness. Have the pump go on moving in case of a normal movement and bearing temperature and a slight vibration (when the check valve is used, lift the bonnet when water goes out so as to reduce resistance).

3. Use and maintenance

(1)When the bearing uses thin oil for lubricating, often check and control the oil level with the bearing body in between two marking lines on the oil leveler rod; and when it uses dry oil (lubricating grease), supplement a proper amount of oil in a periodic time by means of removing both front and rear covers for model 150~350HW pump and the oil cup for model 400~800HW pump.

(2)Often check the bearing's temperature rise, which should not be over the ambient one by 35℃ generally and by 75℃ to the utmost extent.

(3)Pay attention to both frictional and collided sounds which may occur during the pump movement. In case of friction between both pump cover and impeller, add paper pad in between both pump cover and casing. The applicable interval in the actual use is 0.3~0.7mm.

(4)Adjust the packing properly to have the liquid intermittently leak in drops from the packing gland. Too tight packing will cause the shaft heated and the power increased while too loose will cause excessive liquid leak and a lowered efficiency.

(5)In case of direct link between both pump and motor, have the axial lines of both on a same straight line.

(6)Check if there is air which leaks from the water-in pipeline.

(7)Pay attention to the power to see if it is suddenly enlarged or lowered and if the flow is suddenly reduced, stop the pump to troubleshoot if it is.

(8)Often check if the bolts get loose due to vibration.

⑨在冬季，停车后应将泵和管路内存水放出。

⑩泵工作3000小时或半年后，应更换润滑油或润滑脂。以后每1000小时或一年后换油一次。泵工作20000小时或三年后，应解体检查和保养。

对于要长期停用的泵，应将运转部分拆下，作防锈处理后妥善保管。

(9)Drain out the water remained in both pump and pipeline after stop in case of winter.

(10)Replace the lubricating oil or grease after 3000h work of the pump or in half a year and then once every 1000h or every year. Disassemble the pump for check and maintenance after 20000h work or in three years.

For the pump to be stopped for a long time, remove the moving part and take rustproof treatment, then keep it well.

故障原因及排除方法 FAILURES CAUSES AND TROUBLESHOOTING

故障现象 Failure	可能产生的原因 Possible causes	排除方法 Troubleshooting
1、泵不出水 No water out of the pump	a．引水不够或真空泵抽吸泵内空气不够 Insufficient led water or insufficiently air exhausted from inside of the pump b．进水管路漏气 Air leaks from water-in pipeline c．吸程太高 Too high suction stroke d．水泵转向不对 Wrong rotating direction of pump e．输水总高度超过规定 Total water transporting height is over the set one	a．继续加灌或抽气 Go on priming or exhausting b．检查和排除 Check and remove c．降低水泵安装位置 Lower the pump position d．改变 Change it e．减少 Reduce it
2、泵刚出水就中断 Water cut off just out of the pump	a．水中有过多气泡 Too much bubble inside of water b．进水管中窝储空气 Air exists in the water-in pipeline c．进水管路漏气 Air leaks from water-in pipeline d．进水管路或叶轮被水草杂物堵塞 Water-in pipeline or impeller blocked up by waterweeds impurities	a．增加进水管浸入水中的深度 Make the water-in pipe deeper in water b．排除 Exhaust it c．拧紧螺栓，调整垫料，堵塞缝隙 Tighten bolts, adjust the pad, block up the space d．消除 Remove it
3、出水量不足 Insufficient out water	a．进水管路或叶轮有水草杂物 Waterweeds impurities exist in water-in pipeline or impeller b．转速不够或功率不够 Insufficient speed or power c．输水高度过高 Excessive water transportation height d．泵盖及叶轮上密封环磨损，密封间隙过大 Seal rings on both pump cover and impeller are worn out, too big sealing interval e．闸阀开得太小或逆止阀有障碍物堵塞 Gate valve is not enough opened or check valve blocked up by obstructs f．进水管浸入水中深度不够 Insufficiently submerged depth of water-in pipe	a．清除 Remove it b．调整 Adjust it c．降低 Lower it d．修复或调整纸垫 Repair or adjust paper pad e．适当开放闸阀，清除障碍物 Open gate valve properly, remove the obstructs f．增加浸入深度 Make it submerged deeper

故障原因及排除方法 FAILURES CAUSES AND TROUBLESHOOTING

故障现象 Failure	可能产生的原因 Possible causes	排除方法 Troubleshooting
4、耗用功率太大 Too heavy consumed power	a．转速太高 Too high speed b．传动轴弯曲 Drive shaft bent c．填料压得太紧 Too tightly pressed packing d．轴承磨损或损坏 Bearing worn out or injured e．皮带太紧 Too tight belt	a．降低 Lower it b．校直 Make it straight c．旋松压盖螺母或将填料取出打扁一些 Loosen the gland nut or take packing out to make it flatter d．更换 Replace it e．适当放松 Loosen it properly
5、杂声和振动 Noise and vibration	a．轴中心没有对正 Shaft centers not aligned b．轴弯曲，轴承磨损过大 Shaft bent, bearing too much worn out c．底脚螺栓松动 Foot bolt loose d．叶轮局部堵塞 Partially blocked up impeller e．吸程太高，发生汽蚀 Too high suction stroke, steam erosion happened f．泵吸入杂物 Pump sucks impurities in	a．找正 Make tem aligned b．校直或更换 Make it straight or replace it c．旋紧 Tighten it d．消除 Settle it e．降低水泵安装位置 Lower the pump position f．消除 Remove it
6、轴承发热 Bearing heated	a．润滑油量不足 Insufficient lubricating oil b．润滑油质量不好或不清洁 Bad quality or unclean lubricating oil c．轴中心没有对正 Shaft centers not aligned d．轴承磨损 Bearing worn out e．皮带太紧 Too tight belt	a．加油 Fill oil b．清洗轴承更换合适的润滑油 Clean bearing and replace lubricating oil with proper one c．找正 Make them aligned d．更换 Replace it e．适当放松 Loosen it properly
7、填料发热 Packing heated	a．填料压得太紧及四周紧度不匀 Packing is pressed too tightly and uneven tightness around it b．填料压得偏斜，使轴套摩擦不匀 Packing is pressed slantingly, making the muff an uneven friction	a．旋松压盖螺母，调整填料紧度 Loosen gland nut, adjust packing tightness b．松开压盖，重新均匀地上紧 Loosen gland, retighten it evenly
8、填料处漏水太多 Too much water leaks from the packing	a．填料未压紧 Packing not pressed tightly b．填料装置不当 Improper packing device c．填料规格不符或磨损 Improper packing norm or packing worn out d．轴套磨损 Muff worn out	a．适当旋紧压盖螺母 Screw in the gland nut properly b．调整填料搭口，使之错开一定角度 Adjust packing hasps to have them spaced in a certain angle c．更换 Replace it d．更换 Replace it

管径 Pipe diameter (mm)	流　量 Capacity (L/s)																							
	1	2	4	6	8	10																		
25	32.7	13.0																						
38	3.5	14	55				15	20																
50	0.8	3.1	13	29					25	30														
65		1.6	3.2	7.1	13	20					40	50												
75		0.4	0.8	3.3	5.9	9.6	21.6						60	70										
100			0.23	0.8	1.3	2.1	6.8	8.6	13	19.4					80	90								
125				0.23	0.4	0.63	1.3	2.7	4.1	5.9	10.7						100	110						
150					0.16	0.26	0.58	1.1	1.6	2.3	4.2	6.4	9.4						120	130				
175						0.11	0.27	0.5	0.74	1.05	1.9	2.9	4.3	5.8	7.7	9.6					140	160		
200							0.13	0.26	0.37	0.53	0.93	1.5	2.1	2.9	3.7	4.7	6.1	7.2	8.5				180	200
250								0.07	0.12	0.18	0.30	0.48	0.68	0.93	1.2	1.5	1.9	2.3	2.8	3.3	3.7	4.9	5.2	
300										0.07	0.12	0.19	0.27	0.37	0.49	0.61	0.76	0.9	1.1	1.3	1.5	2.0	2.4	3.0

直管摩擦损失简表(供估计用)100m直管损失米数以新铸铁管为标准，旧管加倍。

Brief table for the frictional loss of a straight pipe(for evaluation), the lost meters of a 100m straight pipe takes the newly cast iron pipe as the standard and multiple for the old one.

阀及弯管折合直管长度 (每个)

The length of a straight pipe converted into from both valve and elbow(each)

种　类 Variety	折合直管直径倍数 Convert into the times of the diameter of a straight pipe	备　注 Remark
全开闸阀 Fully opened gate valve	13	未畅开加倍 Multiple in case of unopen
标准弯管 Standard elbow	25	
逆止阀 Back valve	100	
底阀 Foot valve	100	部分堵塞加倍 Partial block-up multipled

注：例如100mm直径管，底阀折合100倍直径等于100×100=10000mm=10m直径长度，假定流量为8L/s，直管每100m损失1.3m，则10m损失0.13m，即一个100mm底阀，流量为8L/s时，则损失扬程0.13m。

Note:For instance, a 100mmdiameter pipe, the foot valve has a 100×100=10000mm=10m diameter when which is converted into 100 times that of the pipe's diameter. Suppose the flow is 8L/s, looked into the above table, the loss of the straight pipe is 1.3m each 100m, then the one for 100mm is 0.13m, that is, for a 100mm foot valve with a flow 8L/s, its head low is 0.13m.

一定管路直径之最大流量限制

LIMIT OF THE MAXIMUN FLOW FOR A PIPE WITH A CERTAIN DIAMETER

管路直径 Pipeline diameter (mm)	最大流量 Maximum flow (L/s)	最大流速 Maximum flow rate (m/s)	管路直径 Pipeline diameter (mm)	最大流量 Maximum flow (L/s)	最大流速 Maximum flow rate (m/s)
25	1	2.04	125	30.0	2.44
38	2.5	1.69	150	43.0	2.45
50	4.17	2.12	175	60.0	2.49
65	6.67	2.01	200	83.3	2.69
75	10.0	2.26	250	133.0	2.72
100	18.4	2.33	300	192.0	2.71

注：超过此限使管路损失显著增加。

Note: The pipeline loss would be made greatly increased once the limit is over.