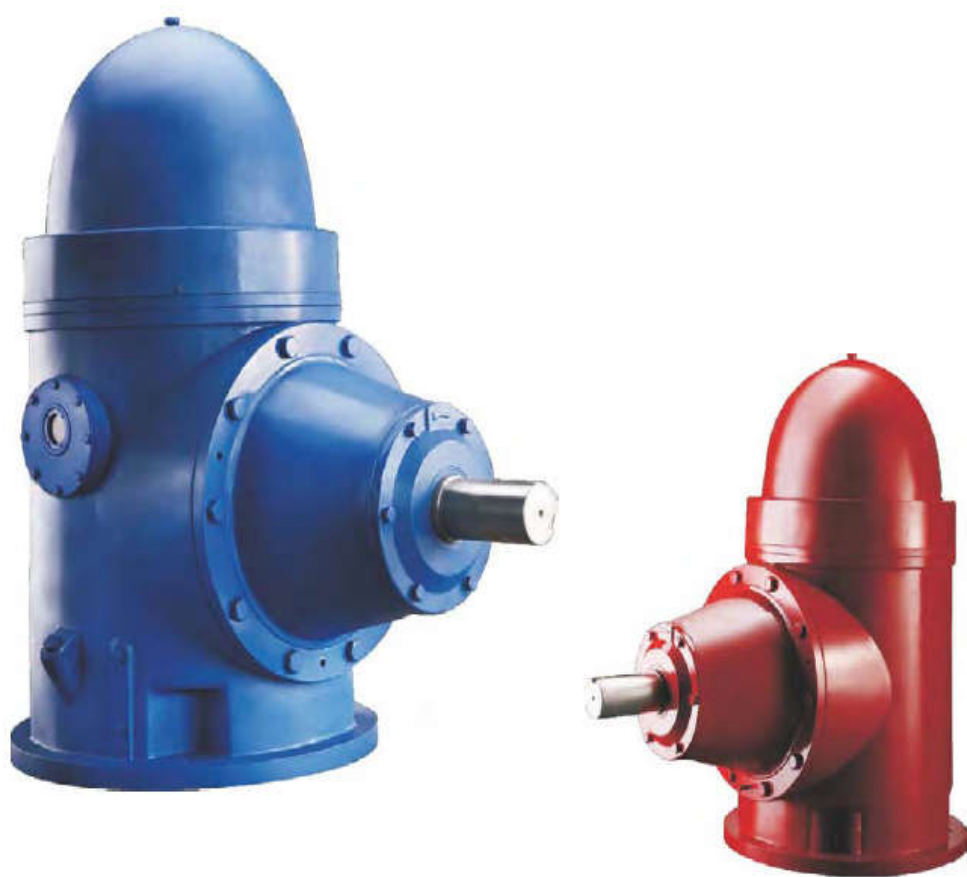




H 系列直角齿轮箱

H Serie Right Angle GearBox



湖南立佳机械制造有限公司

HUNAN PERFECT INDUSTRY CO., LTD.

概述 Overview

H 系列直角齿轮箱可将原动机水平轴功率传给立式泵轴，它具有经济、高效率、节省空间及适宜各种气候条件等特点。

H 系列直角齿轮箱直接与柴油机、卧式电机或汽轮机配套，用于长轴泵、深井泵、斜流泵、轴流泵、液下泵等各种立式泵的传动和变速，也可用于各种立轴机械的直角传动和变速。H 系列直角齿轮箱可直接承受工作机械可能存在的轴向力，简化工作机械的结构。可广泛用于深井取水、消防、海洋工程、农田灌溉、水利工程、市政工程、冶金矿山、石油化工等领域。

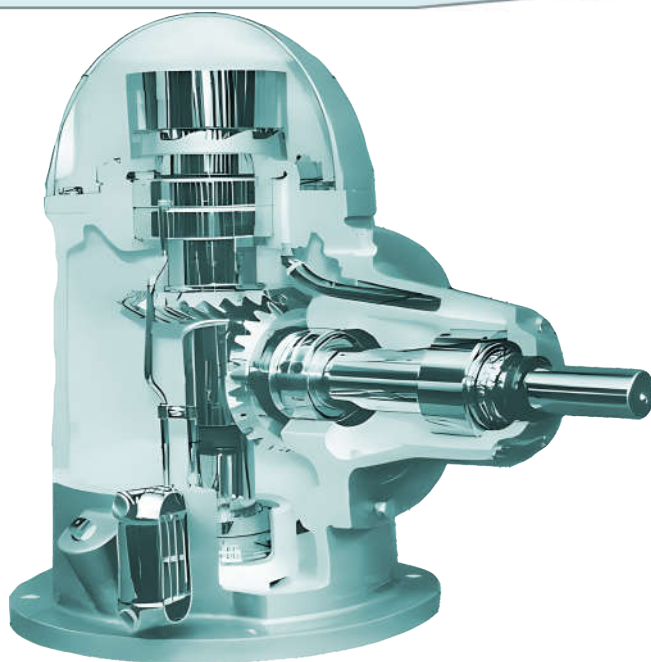
我司 H 系列直角齿轮箱多种型号与传动比可满足高、低速原动机与泵的使用要求。

The H-series right angle gearbox can transfer the power of the horizontal shaft of the prime mover to the vertical pump shaft, and it has the characteristics of economy, high efficiency, space saving, and suitability for various climatic conditions.

The H-series right angle gearbox is directly matched with diesel engines, horizontal motors, or steam turbines, and is used for the transmission and speed change of various vertical pumps such as long shaft pumps, deep well pumps, oblique flow pumps, axial flow pumps, and submerged pumps. It can also be used for the right angle transmission and speed change of various vertical shaft machinery. The H-series right angle gearbox can directly withstand the axial forces that may exist in the working machinery, simplifying the structure of the working machinery. It can be widely used in deep well water extraction, fire protection, marine engineering, farmland irrigation, water conservancy engineering, municipal engineering, metallurgy and mining, petrochemical and other fields.

Our H series right angle gearbox has multiple models and transmission ratios that can meet the requirements of high and low speed prime movers and pumps.

三维剖面图 3D sectional view



转速分级 Speed classification

表 1 table 1 Speed classification

立轴转速 Vertical shaft speed (r/min)	水平轴转速 Horizontal axis speed (r/min)							
	增速比——主动:从动 Acceleration ratio - active: passive							
	1:2	4:7	2:3	3:4	4:5	5:6	10:11	1:1
490	245	280	327	368	392	408	445	490
580	290	331	387	435	464	483	527	580
690	345	394	460	518	552	575	627	690
720	360	411	480	540	576	600	655	720
860	430	491	573	645	688	717	782	860
960	480	549	640	720	768	800	873	960
1160	580	663	773	870	928	967	1055	1160
1460	730	843	973	1095	1168	1217	1327	1460
1760	880	1006	1173	1320	1408	1467	1600	1760
3460*	1730	1977	2307	2595	2768	2883	3145	3460

立轴转速 Vertical shaft speed r/min	水平轴转速 Horizontal axis speed (r/min)										
	减速比——主动:从动 Reduction ratio - active: passive										
	11:10	6:5	5:4	4:3	3:2	7:4	2:1	9:4	5:2	3:1	4:1
490	539	588	613	653	735	858	980	1103	1225	1470	1960
580	638	696	725	733	870	1015	1160	1305	1450	1740	2320
690	759	828	863	920	1035	1208	1380	1553	1725	2070	—
720	792	864	900	960	1080	1260	1440	1620	1800	2160	—
860	946	1032	1075	1147	1290	1505	1720	1935	2150	2580	—
960	1056	1152	1200	1280	1440	1680	1920	2160	2400	2880	—
1160	1276	1392	1450	1547	1740	2030	2320	2610	2900	3480	—
1460	1606	1752	1825	1947	2190	2555	2920	3285	3650	—	—
1760	1936	2112	2200	2347	2640	3080	3520	—	—	—	—

参数选择 parameter selection

当用于驱动深井泵时，表 2 中参数已包含有合适的载荷系数，用户可直接选用，其他情况请咨询本公司。

美国齿轮制造协会规定螺旋伞齿轮载荷系数应大于或等于 1.5，不同应用时，载荷系数值不同。另外，其他影响齿轮箱额定功率的因素包括轴承、轴、温度及润滑等，表 2 中均已做考虑。油冷方式的选择应综合考虑推力、转速、通风环境及运行状况等因素。对于配备了油冷器的齿轮箱，其运行时，应通以 20℃ 左右的冷却剂。

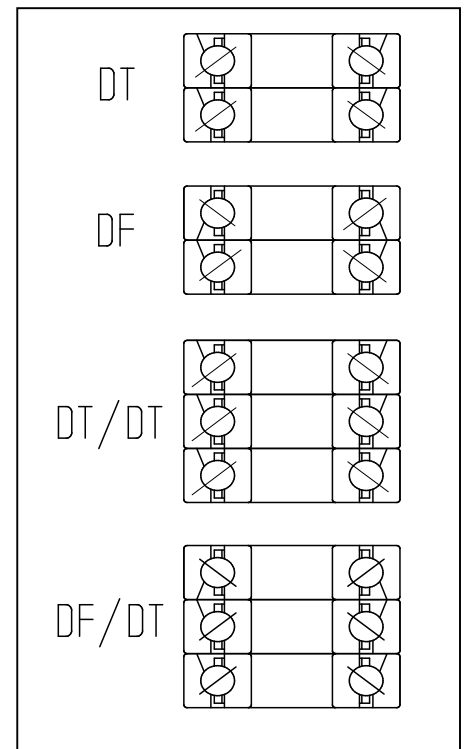
When used to drive deep well pumps, the appropriate load factor is already included in the parameters in Table 2, which users can directly choose. For other situations, please consult our company.

The American Gear Manufacturers Association stipulates that the load factor for spiral bevel gears should be greater than or equal to 1.5, and the value of the load factor varies for different applications.

In addition, other factors that affect the rated power of the gearbox include bearings, shafts, temperature, and lubrication, all of which have been considered in Table 2.

The selection of oil cooling methods should comprehensively consider factors such as thrust, speed, ventilation environment, and operating conditions.

For gearboxes equipped with oil coolers, a coolant of around 20 °C should be used during operation.



推力轴承形式选择 Selection of thrust bearing

立轴(空心轴)上部采用可承受较大推力的轴承，可满足大多数泵及不同扬程要求。多数情况下，齿轮箱自身的推力主要用于减少水泵作用于立轴“推力轴承”的负荷，因而有一个最小的向下推力以防止立轴“推力轴承”分离。

除非特别注明，H 系列齿轮箱一般按图示 DT 方式布置，对应表 2 中所示“标准”推力。

The upper part of the vertical shaft (hollow shaft) adopts bearings that can withstand large thrust, which can meet the requirements of most pumps and different heads. In most cases, the thrust of the gearbox itself is mainly used to reduce the load of the water pump on the vertical shaft thrust bearing, so there is a minimum downward thrust to prevent the separation of the vertical shaft thrust bearing.

Unless otherwise specified, the H-series gearbox is generally arranged in the DT manner shown in the diagram, corresponding to the "standard" thrust shown in Table 2.

如果承受有“向上推力”或者“向下推力”不够时，可采用图示 DF 方式布置，对应表 2 中所示“双向”推力。

If there is insufficient "upward thrust" or "downward thrust", the DF arrangement shown in the diagram can be used, corresponding to the "bidirectional" thrust shown in Table 2.

如果“向下推力”超过表2中标准推力值，可按重型选取，对应图示DT/DT布置方式。
重型还可按图示DF/DT方式布置，此时，向下推力对应表2中“标准”推力值，而向上推力按表2中“双向”选取。

If the "downward thrust" exceeds the standard thrust value in Table 2, it can be selected according to heavy load, corresponding to the DT/DT layout shown in the diagram.

Heavy loads can also be arranged according to the DF/DT method shown in the diagram. At this time, the downward thrust corresponds to the "standard" thrust value in Table 2, while the upward thrust is selected according to the "two-way" in Table 2.

表2 推力值

Table 2 Thrust Value

型号	立轴转速	功率	标 准		重 型		双向
TYPE	Vertical shaft speed	POWER	Standards		Heavy Duty		two-way
			单一向下推力 Single downward thrust(N)				向下或向上推力最大(N)
	r/min	HP/KW	最小 minimum	最大 Maximum	最小 minimum	最大 Maximum	Maximum downward or upward thrust
H20	1160	15/11		6230	3337	10200	6230
	1460	17/13		5785		9800	5785
	1760	20/15		5340		8900	5340
	3460	30/22		4450		7100	4450
H40	1160	30/22	4000	19580			11500
	1460	35/26	3780	18690			11100
	1760	40/30	3560	17800			10700
H60	860	34/25	6450	26700			16000
	960	38/28	6100	25580			15200
	1160	43/32	5780	24500			14700
	1460	52/39	5560	23100			13800
	1760	60/45	5340	22200			13350
H80	860	46/34	9120	32900	6675	43200	19600
	960	50/37	8980	31540		42100	19100
	1160	58/43	8680	30700		40500	18250
	1460	69/51	8000	28500		36900	16910
	1760	80/60	7560	26700		35600	13350
H110	860	63/47	10450	32900	8000	43200	19600
	960	69/51	9920	31540		42100	19100
	1160	80/60	9790	30700		40500	18250
	1460	95/71	9120	28500		37800	16910
	1760	110/82	8450	26700		35600	13350

表 2 推力值

Table 2

Thrust Value

型号	立轴转速		功率	标 准		重 型		双向
TYPE	Vertical shaft speed		POWER	Standards		Heavy Duty		two-way
				单一向下推力 Single downward thrust(N)			向下或向上推力最大(N)	
	r/min		HP/KW	最小 minimum	最大 Maximum	最小 minimum	最大 Maximum	Maximum downward or upward thrust
H125	720	63/47		12900	37800	12460	54300	22700
	860	72/54		12000	35600	11800	51600	21400
	960	80/60		11780	34790	11560	50400	21000
	1160	90/67		11350	33400	11100	48000	20000
	1460	110/82		10680	31150	10200	44900	18700
	1760	125/93		9790	28900	9800	42300	17400
H150	720	75/56		13570	43600	14000	66750	26250
	860	87/65		13130	41830	13350	63630	24900
	960	95/71		12890	40120	13000	62120	24100
	1160	110/82		12240	39160	12460	59180	23600
	1460	130/97		11570	36930	11570	55620	22250
	1760	150/112		11120	35600	11120	53400	21360
H200	720	100/75		16000	53400	15130	72085	30000
	860	115/86		14680	48950	14240	68080	28000
	960	130/97		14100	47680	13920	65610	27000
	1160	145/108		13570	45400	13350	63630	25360
	1460	172/128		12680	42270	12680	60000	23580
	1760	200/149		12000	40000	12000	57850	22690
H300	720	150/112		16700	60700	16700	83660	36500
	860	174/130		15800	57850	16000	79650	34700
	960	188/140		15500	56100	15600	77210	33200
	1160	215/160		14900	54300	14900	74310	32500
	1460	258/192		14000	51200	14000	69860	30700
	1760	300/224		13350	48950	13350	66750	29400
H350	720	174/130		18900	72530	18700	89000	43600
	860	201/150		18000	68970	17800	84500	41400
	960	221/165		17700	67300	17400	82400	40300
	1160	252/188		16700	64100	16700	79200	38300
	1460	300/224		15800	60500	15600	74300	36500
	1760	350/261		15130	57850	15100	71200	34700
H425	720	215/160		20700	83200	21100	111200	49840
	860	246/183		19800	79650	20200	106800	47610
	960	268/200		19100	77230	19700	103700	46510
	1160	306/228		18500	73870	18700	97900	44500
	1460	365/272		17350	69860	17800	93400	41830
	1760	425/317		16900	66750	16900	89000	40050

表 2 推力值

Table 2

Thrust Value

型号	立轴转速	功率	标 准		重 型		双向
TYPE	Vertical shaft speed	POWER	Standards		Heavy Duty		two-way
			单一向下推力 Single downward thrust(N)				向下或向上推力最大(N)
	r/min	HP/KW	最小 minimum	最大 Maximum	最小 minimum	最大 Maximum	Maximum downward or upward thrust
H500	720	250/186	23360	83200	23360	111200	49840
	860	290/216	22250	79650	22470	106800	47610
	960	315/235	21870	77160	21670	103700	46510
	1160	360/268	20700	73870	20470	97900	44500
	1460	430/321	19580	69860	19580	93400	41830
	1760	500/373	18690	66750	18690	89000	40050
H600	720	300/224	24500	89000	24250	115700	53400
	860	348/260	23140	84500	23360	111200	50730
	960	378/282	22670	82400	22770	107100	49720
	1160	432/322	21800	79200	21580	102300	47610
	1460	516/385	20500	74300	20470	97900	44500
	1760	600/447	19580	71200	19580	93400	42720
H750	720	375/280	27600	89000	27800	115700	53400
	860	435/324	26250	84500	26700	111200	50730
	960	473/353	25300	82800	26000	107100	49720
	1160	540/403	24500	79200	24500	102300	47610
	1460	645/481	23140	74300	23580	97900	44500
	1760	750/559	22250	71200	22250	93400	42720
H1000	490	280/209	34500	108000	37500	125000	60000
	580	329/245	32000	102000	34200	120000	57800
	720	402/300	30700	97000	30900	115700	53400
	860	488/364	29340	93400	29700	111200	50730
	960	544/406	28500	91700	29200	107100	49720
	1160	660/492	27600	87300	28500	102300	47610
	1460	830/619	26250	84500	27200	97900	44500
	1760	1000/74	24000	79100	25000	93400	42720
H1360	490	670/500	35000	108000	38600	125000	60000
	580	845/630	32600	102000	35400	120000	57800
	720	1020/75	31200	97000	31800	115700	53400
	860	1207/90	29800	93400	30600	111200	50730
	960	1360/10	29700	91700	30200	107100	49720
	1160	1676/12	28200	87300	29500	102300	47610
	1460	2038/15	26900	84500	28300	97900	44500

表 2A 不同转速下功率与轴承推力值

立轴转速 (r/min)	490	580	690	720	860	960	1160	1460	1760	2000	2200	2400*	2800*	3000*
1760 r/min 时 功率的%	30	43	48	50	58	63	72	86	100	105	111	116	128	133
1760 r/min 时 推力的%	150	144	136	134	126	122	115	106	100	96	92	90	85	83

注：1、表 2 中参数仅针对 FIG. 1 所示转动方向，其他转动方向请咨询本公司；
2、如果立轴转速超过 2200r/min，请与本公司联系。

Table 2A Power and Bearing Thrust Values at Different Rotational Speeds

Vertical axis speed (r/min)	490	580	690	720	860	960	1160	1460	1760	2000	2200	2400*	2800*	3000*
% of power at 1760r/min	30	43	48	50	58	63	72	86	100	105	111	116	128	133
% of thrust at 1760r/min	150	144	136	134	126	122	115	106	100	96	92	90	85	83

Note: 1. The parameters in Table 2 are only for the rotation direction shown in FIG.1.
For other rotation directions, please consult our company.
2.if the vertical shaft speed exceeds 2200r/min, please contact our company.

外形尺寸(依据 NEMA 标准)External dimensions(according to NEMA standards)

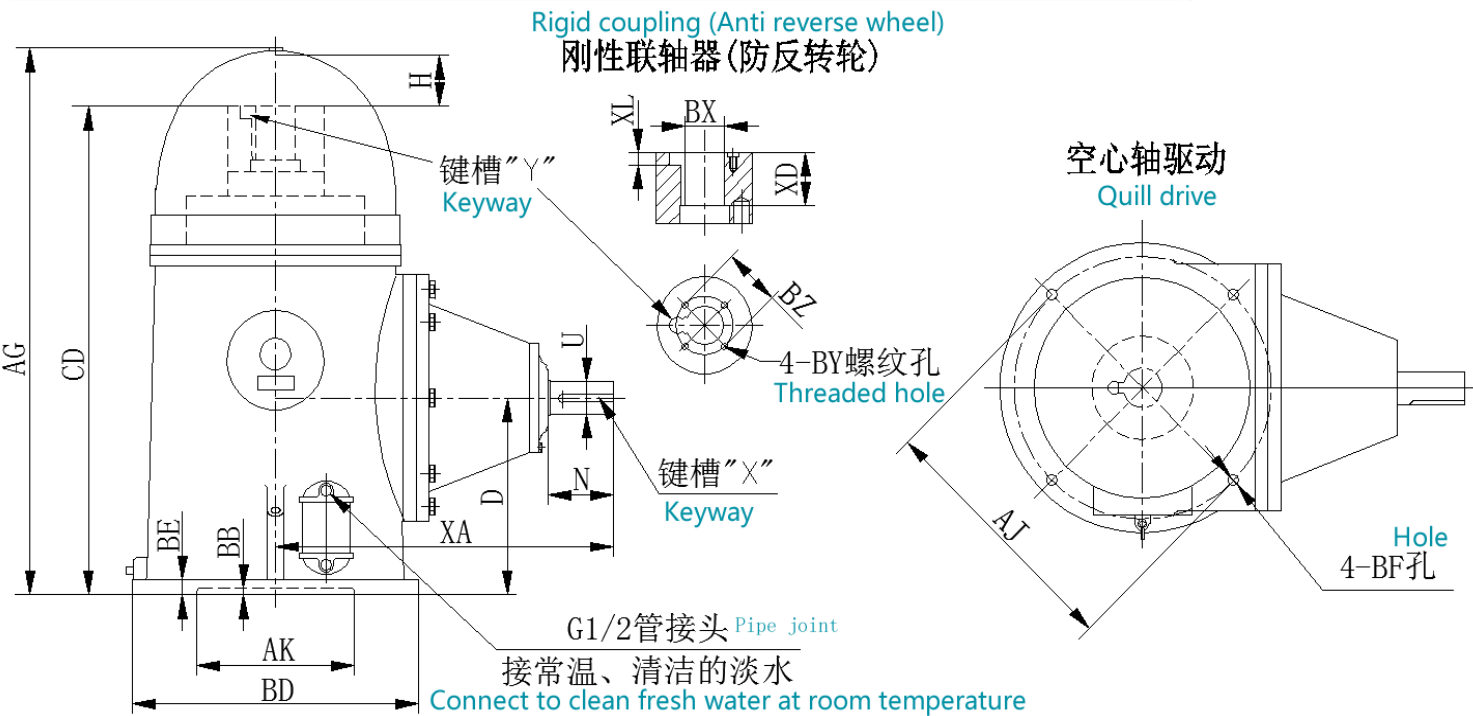


表3 外形尺寸 Table 3 External Dimensions
(mm)

型号 Type	CD	D	U	XA	N	AG	H	BE	BD	AJ	AK	BB	BF	键槽 X Keyway	Max.BX		XD
															FIG.1,4	FIG.2,3	
H20	368	162	28	330	70	457	76	16	254	232	210	5	11.5	C8X4X60	25	无	32
H40	514	228.5	38	406	90	629	102	19	419	375	343	5	18	C10X5X70	38	38	45
H60	514	228.5	38	406	90	629	102	19	419	375	343	5	18	C10X5X70	40	42	45
H80	514	228.5	48	419	90	629	102	19	419	375	343	5	18	C14X5.5X70	40	无	45
H110	635	289	50	445	90	749	102	25	419	375	343	5	18	C14X5.5X80	50	50	54
H125	635	289	50	445	90	749	102	25	419	375	343	5	18	C14X5.5X80	50	50	54
H150	762	336.5	60	521	120	876	102	25	508	375	343	5	18	C18X7X100	55	55	60
H200	762	336.5	60	521	120	876	102	25	508	375	343	5	18	C18X7X100	55	55	60
H300	870	381	70	610	140	1016	133	29	508	375	343	5	18	C20X7.5X125	60	60	66
H350	978	419	70	737	140	1168	178	32	622	559	343	10	24	C20X7.5X125	60	60	76
H425	1003	419	75	762	145	1168	159	32	622	559	343	10	24	C20X7.5X125	60	60	85
H500	1003	419	90	787	170	1168	159	32	622	559	343	10	24	C25X9X140	75	75	85
H600	1080	419	95	838	190	1295	203	32	622	559	343	10	24	C25X9X140	75	80	100
H750	1162	482.5	100	914	190	1372	197	38	775	660	559	10	24	C28X10X170	90	90	100
H1000	1405	545	110	1043	210	1610	153	35	920	860	600	7	8-28	C28X10X170	100		
H1360	1507	550	130	1290	250	1725	153	35	1250	1180	1120	-5	8-28	C32X11X240	110		

注：①重型推力传动时尺寸 CD 和 H 可能有变化，减速比为 7:4~4:1 时尺寸 XA、U、N 和 X 可有变化，请与本公司联系。

②增速比为 3:4~1:2 时，尺寸 D、CD、AG、XA、U、N 和 X 可能有变化，请与本公司联系。

③FIG. 2~FIG. 4 所示旋向、重型推力、减速比为 7:4~3:1、增速比为 3:4~1:2 等 4 种情况均按特殊定单生产。

④公差：轴径 $U_{-0.025}^0$ ，底座槽 $AK_{+0.05}^{+0.127}$ ，联轴器孔 $BX_{+0.01}^{+0.05}$ 。

⑤也可在直径φ375的圆周上布置 4 个 M16 深 25 的螺孔。

Note: ① The dimensions CD and H may vary during heavy-duty thrust transmission, and the dimensions XA, U, N, and X may vary when the reduction ratio is between 7:4 and 4:1. Please contact our company.

② When the growth rate is between 3:4 and 1:2, there may be changes in dimensions D, CD, AG, XA, U, N, and X. Please contact our company.

③ The four situations shown in FIG.2 to FIG.4, including rotation direction, heavy thrust, reduction ratio of 7:4 to 3:1, and increase ratio of 3:4 to 1:2, are all produced according to special orders.

④ Tolerance: shaft diameter $U_{-0.025}^0$, Base groove $AK_{+0.05}^{+0.127}$, Coupling hole $BX_{+0.01}^{+0.05}$.

⑤ It can also be measured in diameter ϕ Install 4 M16 deep 25 screw holes on the circumference of 375.

订货须知 Ordering Instructions

用户订购 H 系列齿轮箱时，请提供以下数据：

型号：_____。

传动比（见表 1）：_____，泵转速：_____ r/min，原动机转速：_____ r/min。

旋转方向：_____（参见 FIG. 1~FIG. 4）。

最大向下推力：_____，向上推力：_____（推力值见表 2）。

泵轴功率：_____。 泵轴直径（BX）：_____。

运行方式：连续_____ 间断_____。

When users order the H series gearbox, please provide the following data:

model: _____, gear ratio (Refer to Table 1) : _____,

pump speed: _____ r/min, Prime mover speed: _____ r/min.

Rotation direction: _____ (Refer to FIG.1 to FIG.4) .

Maximum downward thrust: _____, Upward thrust: _____ (The thrust value Refer to Table 2).

pump shaft power: _____, Pump shaft diameter (BX) : _____.

Operation mode: Continuous _____ Interruption _____.

旋转方向 Rotation direction



FIG.1

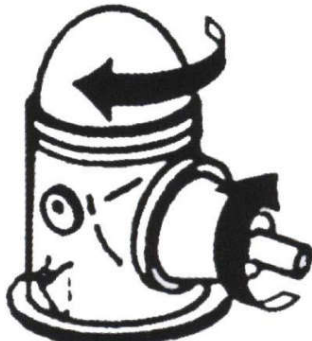


FIG.2

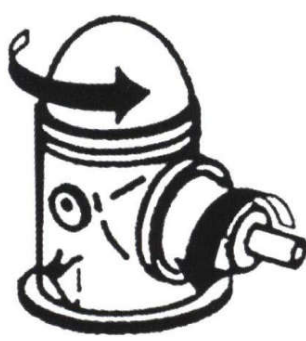


FIG.3

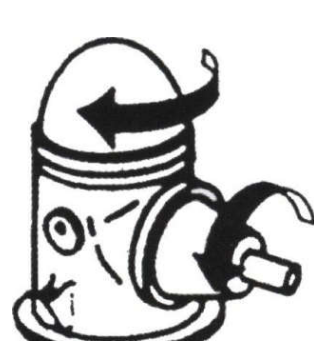


FIG.4

运输重量与尺寸 Transport weight and dimensions

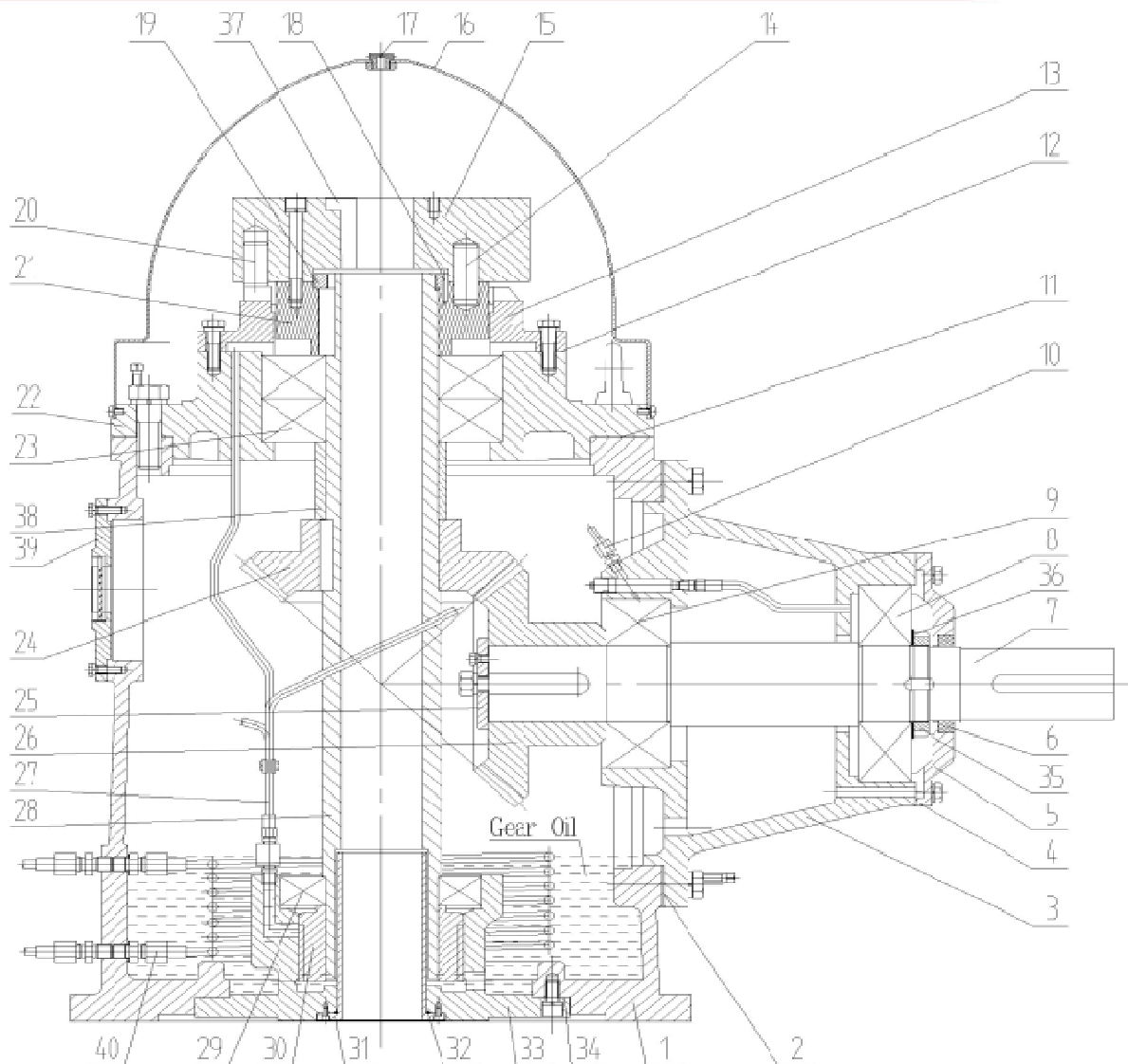
型号 Model	净重 Suttle kg	毛重 Gross weight--- kg			包装箱尺寸 Dimensions---mm			体积 volume m ³
		中国 China	集装箱 Container	胶合板箱 Plywood Case	长度 Length	宽度 Width	高度 Height	
H20	55	66	72	80	635	485	940	0.29
H40	110	120	127	135	635	485	940	0.29
H60	115	125	130	140	635	485	940	0.29
H80	130	140	145	155	635	485	940	0.29
H110	175	186	195	200	635	485	940	0.29
H125	180	190	198	205	635	485	940	0.29
H150	290	310	320	330	840	585	1120	0.55
H200	290	310	320	330	840	585	1120	0.55
H300	410	455	455	480	1020	765	1295	1.1
H350	630	680	680	705	1170	765	1320	1.2
H425	720	770	770	795	1170	765	1320	1.2
H500	730	780	780	805	1170	765	1320	1.2
H600	930	1010	----	1050	1270	790	1500	1.5
H750	1370	1480	----	1540	1450	965	1550	2.2
H1000	2200	2480	----	1560	2050	1100	1800	4.1
H1360	2800	3000	----	3080	2200	1450	1950	6.2

注：实际重量与尺寸会略有变化。 Note: Actual weight and size may vary slightly.

表 3A：标准驱动部分联接尺寸 Table 3A: Standard Drive Connection Dimensions

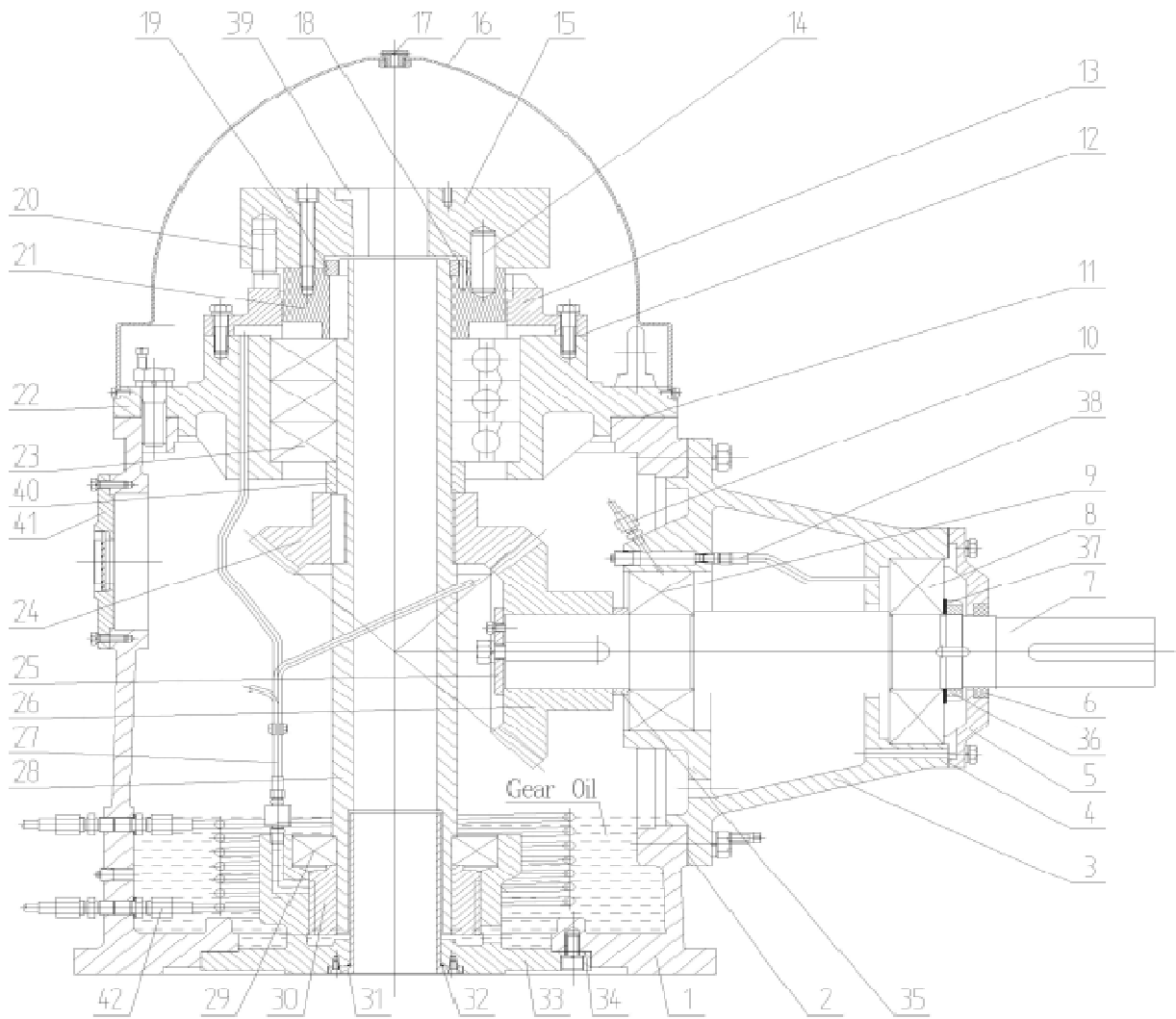
孔 Hole BX	螺栓圆周 BZ Bolt circumference	螺纹 Thread BY	深度 Depth XL	键槽 Y(宽×深) Keyway Y (Width × Deep)
Φ25	Φ46	4 - M6	9	8×3.3
Φ30	Φ60	4 - M8	9	8×3.3
Φ35	Φ60	4 - M8	11	10×3.3
Φ40	Φ70	4 - M8	13	12×3.3
Φ45	Φ70	4 - M8	15	14×3.8
Φ50(H125)	Φ80(H125)	4 - M10	15	14×3.8
Φ50	Φ90	4 - M10	15	14×3.8
Φ55	Φ90	4 - M10	17	16×4.3
Φ60	Φ100	4 - M10	19	18×4.4
(Φ65)	(Φ100)	4 - M10	19	18×4.4
Φ70	Φ140	4 - M10	21	20×4.9
(Φ75)	(Φ140)	4 - M10	21	20×4.9
Φ80	Φ140	4 - M10	23	22×5.4
Φ90	Φ150	4 - M10	26	25×5.4
Φ100	Φ160	4 - M10	29	28×6.4
Φ110	Φ160	4 - M12	29	28×6.4

直角齿轮箱部件结构图(FIG.1)Structural diagram of right angle gearbox components



No.	NAME	No.	NAME	No.	NAME	No.	NAME
1	Box Body	13	Ratchet Wheel	25	Armor Plate	37	Taper Key
2	Pads	14	Dowels	26	Drive Bevel Gear	38	Shaft Sleeve
3	Bearing Block	15	Non-reverse Coupling	27	Oil Pipe Pack No.2	39	Glass Cover Pack
4	Paper Pad	16	Dust Cover	28	Vertical Shaft	40	Oil Cooler
5	End Cover	17	Abat-vent	29	Lower Bearing		
6	Lip Type Seal	18	Dowels	30	Pump Pulley		
7	Horizontal Shaft	19	Circinal Nut	31	Lining		
8	Dexter Bearing	20	Dowels	32	Oil Ring Packing		
9	Left Bearing	21	Flywheel	33	Base		
10	Oil Pipe Pack No.1	22	Upper Cover	34	Paper Pad		
11	Pads	23	Upper Bearing	35	Circinal Nut		
12	Paper Pad	24	Driven Bevel Gear	36	Gasket		

直角齿轮箱部件结构图(FIG.1)Structural diagram of right angle gearbox components



No.	NAME	No.	NAME	No.	NAME	No.	NAME
1	Box Body	13	Ratchet Wheel	25	Armor Plate	37	Gasket
2	Pads	14	Dowels	26	Drive Bevel Gear	38	Oil Pipe Pack No.3
3	Bearing Block	15	Non-reverse Coupling	27	Oil Pipe Pack No.2	39	Taper Key
4	Paper Pad	16	Dust Cover	28	Vertical Shaft	40	Shaft Sleeve
5	End Cover	17	Abat-vent	29	Lower Bearing	41	Glass Cover Pack
6	Lip Type Seal	18	Dowels	30	Pump Pulley	42	Oil Cooler
7	Horizontal Shaft	19	Circinal Nut	31	Lining		
8	Dexter Bearing	20	Dowels	32	Oil Ring Packing		
9	Left Bearing	21	Flywheel	33	Base		
10	Oil Pipe Pack No.1	22	Upper Cover	34	Paper Pad		
11	Pads	23	Upper Bearing	35	Shaft Sleeve		
12	Paper Pad	24	Driven Bevel Gear	36	Circinal Nut		