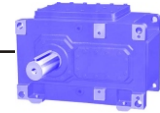


# Quantum - Master

**S Series  
Gear Reducer**

**Helical &  
Bevel Helical**



## S SERIES GEAR

### General information

**Quantum Master S Series Riduttori** gear units come in two basic range ie helical parallel shaft and bevel helical units. These units are design and built to a high quality suitable for most general industrial applications.

Main features in the new design offer:

- ❖ Greater power capacity
- ❖ Reduced noise level
- ❖ Higher efficiency
- ❖ Lesser weight/ Power ratio
- ❖ Longer service life

### Specifications/Materials

Casing : Grey cast iron GG20-25 and machined by CNC up to close tolerance for high quality fitting. Case design optimized for good dissipation of heat and improved thermal capacity. Fabricated steel casing are available on demand.

Gearings : Gear cuts by modern machines to close tolerance and hardened by carbon-nitriding, HRC58-62, depth 0.18-1.2mm on 20CrMnTi material.

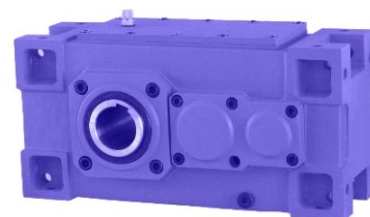
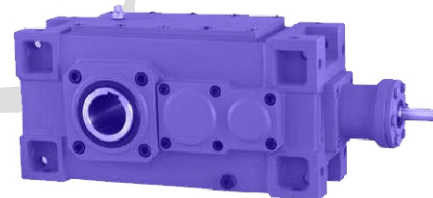
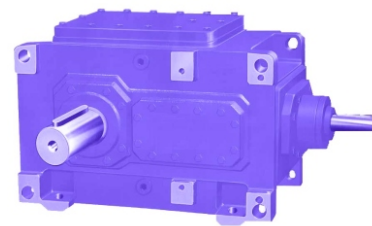
Shafts: Made from 20CrMnTi material, machined generally to m6 fitting, hardened and tempered.

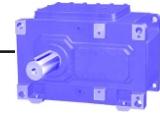
Bearings : Top quality spherical roller and taper bearings designed to 20.000 hours life expectancy. Higher specification is possible on request.

Noise level : For gear below size 13, the indicative noise level measured at 1m from input side is generally below 80db and for the larger units, it is below 86 db. This is subjected to change from time to time.

Backlash : Mechanical backlash is keeps at the optimized level for better performance of gear units..

Standard : Design of gear units is based on AGMA equals to DIN7-6-6





**SELECTION**

**Selection of gear unit**

Selection procedures:

1. Select the type of gear unit
  - 1.1. Parallel shaft helical or right angle bevel helical.
  - 1.2. Calculate the gear ratio =  $\frac{n1}{n2}$
2. Determine the mechanical capacity **Pm**
  - 2.1. Determine the absorbed power **P1**
  - 2.2. Determine the type of load factor f1 from table 14.
  - 2.3. Determine the type of safety factor f2 from table 15.
  - 2.4. Selection of gear refer to Table 1 to 7.

$$Pm \geq P1 * f1 * f2$$

where :- **Pm** = Design power

**P1** = Absorbed power

**f1** = table 14 (load factor)

**f2** = table 15 (safety factor)

3. Thermal rating check
  - 3.1. Thermal ratings are given in two categories :-  
 PG1 = gearbox without additional cooling  
 PG2 = gearbox with additional cooling
  - 3.2. Determine gearbox without additional cooling

$$Ptm = P1 * f3 * f4 * f5 \leq PG1$$

- 3.3. Determine gearbox with additional cooling

$$Ptm = P1 * f3 * f4 * f5 \leq PG2$$

where :- **Ptm** = Thermal designed power

**P1** = Absorbed power

**f3** = table 16 (amb.temperature factor)

**f4** = table 17 (load rate factor)

**f5** = table 18 (duty rate factor)

**PG1** = see tables 8,9,10,11

**PG2** = see tables 8,9,10,11

**Examples**

A foot mounted gearbox is required to transmit power continuously from a motor rated at 315kw at 1450rpm. It is required to drive a fan at 320rpm. The ambient temperature is 30°C and operates in outdoor. Duty is 12hours/day with only 1 stop/start per day.

**Selection**

- 1.1 Type SHH helical gear reducer
- 1.2 Ratio =  $\frac{1450}{320}$  5.4:1
- 2.1 P1 = 315kw
- 2.2 From table 14 and appendix A, the load factor f1 is 1.25
- 2.3 Safety factor f2 from table 15 assumed at 1.2

$$Pm = 315 * 1.25 * 1.2 = 472.5kw$$

- 2.4 Selection of gear Size 1SHH11 ratio 4.5/1 which is rated at 544.6kW with output speed at 335rpm. The rating is in table 1 and it rating is greater than design power **Pm 472.5kw**

- 3.1 Thermal check on table 8 1SHH11 on outdoor application has a thermal capacity as:  
 PG1 = 220kw and  
 PG2 = 520kw.

- 3.2 Refer to PG2 since PG1 rating is not sufficient.

$$Ptm = 315 * 1.35 * 1 * 1.10 = 490kw$$

Which is lower than 520kw  
 Recommended cooling system can be fan cool or with forced feed cooling system.

**Unit Selected : 2 SHH 11 07 SH 1 B FC**



**SELECTION**

4. Overhung and Radial Loads

4.1 Whenever a sprocket, gear, pulley is mounted on the shaft, a calculation should be made to determine the overhung load in kN on the shaft using the formula as belows:

$$P = \frac{kW \times 9550 \times K}{N \times R}$$

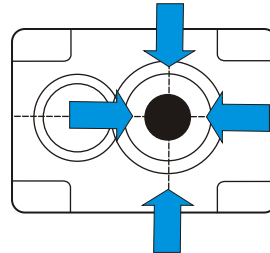
- Where **P** = equivalent overhung load in kN  
**kW** = power on the shaft  
**N** = rpm of the shaft  
**R** = pcd of sprocket, gear, pulley (mm)  
**K** = Factor

Overhung member	K Factor
Sprocket	1
Spur gear	1.25
V Belt pulley	1.5
Flat Belt pulley	3

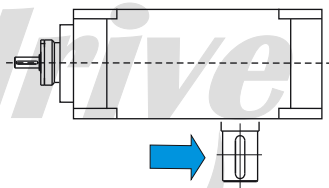
**Notes:**

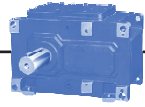
- Over hung load values are for load applied midway
- For overhung load and axial thrust values not listed in Table 13, please consult us along shaft extension

Horizontal Unit



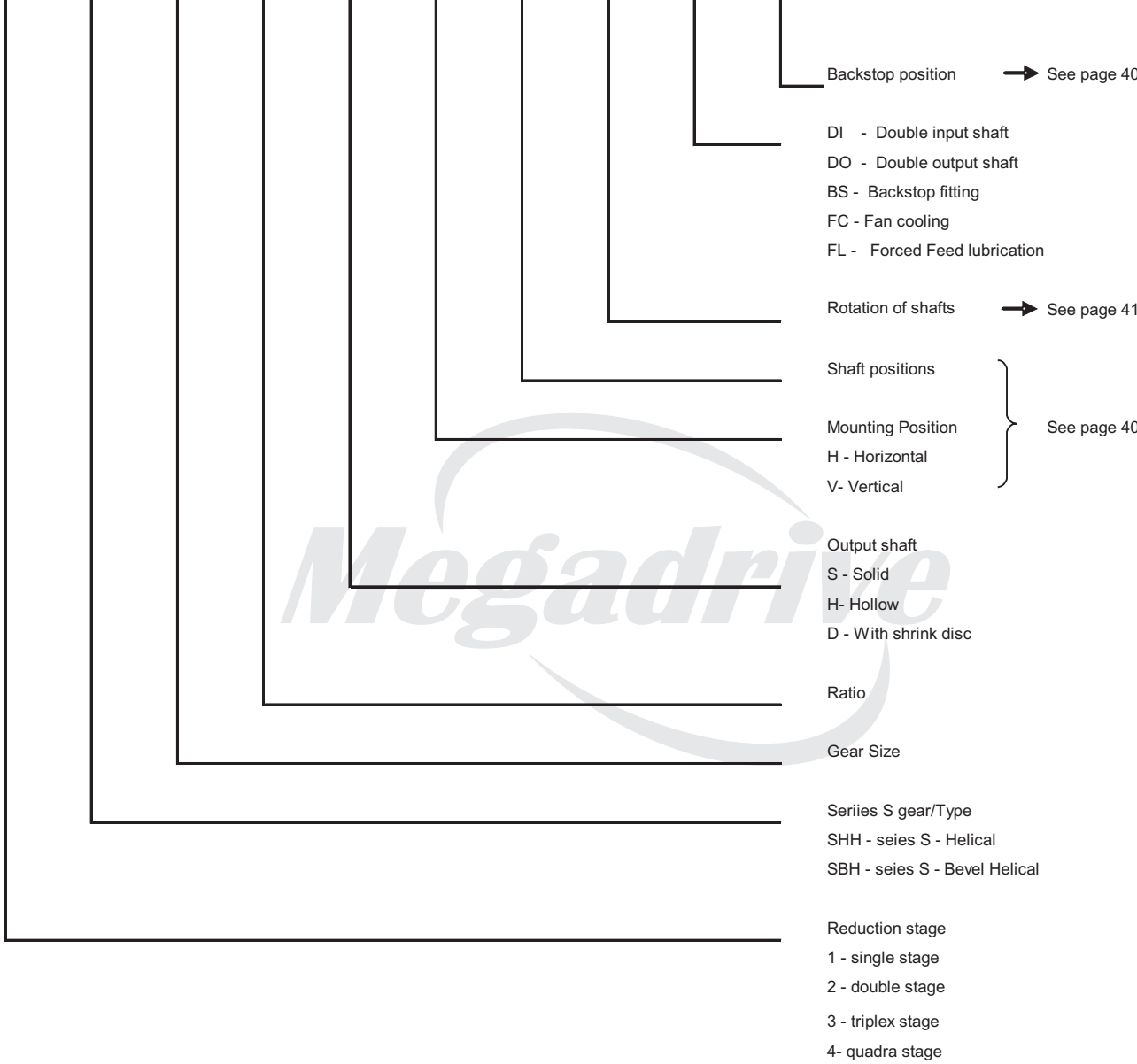
Vertical Unit





**S SERIES GEAR**

2	SHH	05	30	D	H	1	B	BS	AA
---	-----	----	----	---	---	---	---	----	----



Backstop position → See page 40

- DI - Double input shaft
- DO - Double output shaft
- BS - Backstop fitting
- FC - Fan cooling
- FL - Forced Feed lubrication

Rotation of shafts → See page 41

Shaft positions }  
 Mounting Position } See page 40  
 H - Horizontal  
 V- Vertical

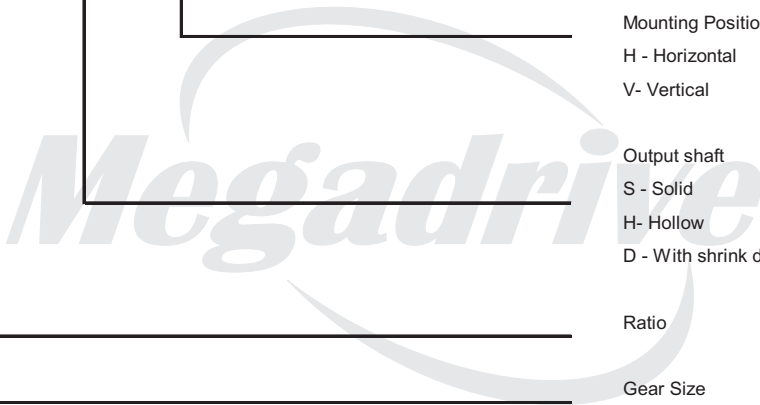
- Output shaft
- S - Solid
- H- Hollow
- D - With shrink disc

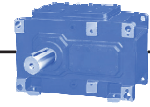
Ratio

Gear Size

- Series S gear/Type
- SHH - seies S - Helical
- SBH - seies S - Bevel Helical

- Reduction stage
- 1 - single stage
- 2 - double stage
- 3 - triplex stage
- 4- quadra stage



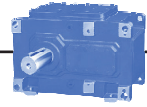


**POWER RATINGS**

**HELICAL GEAR UNIT - SINGLE STAGE 1SHH**

**Table 1 -- Power Ratings - Parallel Shaft Helical Gear Reducer - 1SHH**

Nominal			Size 1SHH																	
Gear Ratio (iN)	Input Speed (n1)	Output Speed (n2)	Nominal Power Rating - kW Pn																	
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
1.3	1500	1200	61.5	83.1	111.1	156.4	221	293.1	388.1	513.6	682.4	907.5	1209							
	1000	800	43.2	56.9	74.4	105.7	151	205.8	280.3	372	480.8	586.1	870							
	750	600	33.5	43.7	56.1	79.8	113.2	151.9	204.9	271.5	375.2	498.9	685.7							
1.4	1500	1070	57.2	76.5	103.5	147.5	209.2	271.5	351.5	483.2	664.1	891.6	1196							
	1000	715	39.9	53	70.1	100	142.3	192.1	258.8	355.8	466.8	561.7	856							
	750	535	31.3	39.8	51.8	75.5	110	146.7	194.1	266.6	363.3	487.3	672.7							
1.6	1500	940	52.9	72.1	99.2	139.2	194.1	254.4	334.2	459.3	632.8	853.8	1151	1588	2151.7	2981.8				
	1000	625	36.7	49.5	68	96.1	134.8	177.9	234	322.5	442	596.2	819.3	1133	1541.6	2147.4				
	750	470	29.2	39.9	53.9	75.5	105.7	138	181.2	249	343.9	463.6	641.5	888.3	1211.7	1691.4				
1.8	1500	835	48.6	67.7	93.8	132.3	186.5	241.1	312.7	433.2	600.5	813.9	1104	1521	2075.2	2870.8				
	1000	555	33.5	47.1	66.9	92.7	129.4	169.3	222.1	307.3	419.4	568.2	782.7	1080	1479.1	2054.7				
	750	415	25.9	36.3	51.8	73.3	102.5	132.6	172.5	188.2	325.6	441	611.3	845.2	1157.8	1613.8				
2.0	1500	750	42.1	60.3	86.3	120.6	170.4	226.4	299.7	411.6	567.1	769.7	1046	1444	1969.6	2733.9				
	1000	500	29.2	42.2	59.3	83.8	118.6	157.3	209.2	287.9	395.7	536.9	737.4	1020	1397.1	1946.9	2745.7	3857.1	5166.9	
	750	375	22.7	32.4	46.4	64.7	91.7	121.6	161.7	222	306.2	414	575.7	795.6	1092.1	1524.3	2155	3041.1	4069.5	5572.2
2.2	1500	670	38.9	53.9	75.5	106.9	152	208.3	284.6	384.9	521.8	716.9	985.3	1333	1844.5	2562.5				
	1000	445	27	37.8	52.9	74.5	105.7	144.6	197.3	267.4	363.3	499.2	695.4	942.2	1301.2	1814.3	2589.4	3662	4864	
	750	335	20.5	29.1	41	57.9	82	141.2	153.1	206.8	282.5	388.1	542.3	735.2	1014.4	1416.5	2024.5	2875.1	3814	5210
2.5	1500	600	34.5	48.6	69	97.1	137	189.7	264.2	356.8	481.9	666.3	921.7	1244	1743.2	2440.6				
	1000	400	23.8	34.5	48.6	67.7	94.9	131.4	183.3	248	335.3	463.6	647.9	875.4	1224.7	1720.5	2409.4	3433.5	4692.6	
	750	300	18.4	25.9	37.8	53	73.4	102.5	142.3	191.9	259.8	359	504.6	682.4	953	1340	1877.9	2686.4	3671.7	5007.4
2.8	1500	535	29.2	41	57.2	84.1	124	173.5	241.5	326.4	441	612.4	850.6	1146	1605.2	2229.4				
	1000	360	20.5	29.2	39.9	58.3	86.3	119.6	167.1	218.6	306.2	424.8	595.1	804.2	1129.8	1569.6	2208.9	3174.8	4312	
	750	170	16.2	22.6	31.3	45.1	66.9	92.8	129.4	174.5	237.2	345.5	462.5	625.3	879.7	1222.5	1717.3	2475.1	3361.3	4562.1
3.2	1500	475	24.8	35.3	50.7	72.2	103.5	151	218.9	297.5	404.3	554.1	764.4	1067	1465.1	2074.1	2865.4	4085.7	5422.4	7186
	1000	315	17.3	24.5	35.6	50.7	72.3	104.6	151	204.9	280.3	386	534.7	749.3	1026.3	1457.5	1958.8	2890.2	3888.4	5182
	750	235	14.1	19.2	27	38.3	56.1	80.9	117.6	159.6	217.8	299.7	415.1	582.2	797.8	1134.1	1571.8	2246.6	3020.6	4039.3
3.6	1500	425	21.6	29.9	44.2	60.7	91.7	126.5	193	252.9	363.3	477.5	688.9	968.1	1304.4	1865	2598	3672.8	4807.9	6596.3
	1000	280	15.1	20.6	30.2	42.2	63.7	88.5	133.7	175	252.3	331.4	480.8	677	911	1304.4	1826.2	2582.9	3445.3	4737.9
	750	210	11.9	16.5	23.8	32.9	49.6	67.7	103.5	135.9	195.2	255.8	373	526.1	706.1	1013.4	1414.4	2000.8	2676.7	3685.7
4.0	1500	375	18.4	24.5	36.7	49	74.4	105.9	167.1	221.2	323.4	429.1	614.5	834.4	1180.5	1676.3	2313.4	3213.6	4295.9	6091.8
	1000	250	13	17.5	25.9	34.8	51.8	74.1	115.4	152.9	224.3	295	426.9	580.4	823.6	1172.9	1618.1	2253.1	3059.4	4347.6
	750	187	9.8	13.4	19.5	26.5	39.9	56.6	89.5	118.1	173.6	228.4	331	450.7	636.1	953	1250.5	1744.3	2370.6	3372
4.5	1500	335	15.1	20.6	31.3	41.2	59.3	89.2	147.7	194.1	280.3	368.5	533.7	757.9	1074.8	1473.7	2024.5	2823.3	3918.6	5295.2
	1000	220	10.3	14.3	21.6	28.9	41	61.8	102.5	134.8	194.1	254.8	370.9	526.1	748.2	1027.4	1413.3	1974.9	2783.4	3756.9
	750	166	7.6	10.3	16.2	21.6	32.4	48.1	78.7	102.9	149.9	197	286.8	407.5	577.9	795.6	1094.2	1526.5	2152.8	2904.2
5.0	1500	300	11.9	17.5	27	36	51.8	77.5	130.5	170.6	246.9	330.3	486.2	655.5	931.4	1271	1811.1	2522.6	3394.7	4743.2
	1000	200	8.7	12.3	18.4	24.7	35.6	53.9	90.6	118.6	171.5	229.4	337.5	455	645.8	884	1259.2	1756.1	2405.1	3368.8
	750	150	6.5	9.2	14.1	18.7	28.1	42.2	70.1	91.2	132.6	178	260.9	351.5	498.1	682.4	970.2	1355.1	1858.5	2606.7
5.6	1500	270	10.8	14.3	21.6	28.5	43.2	67.7	117.6	155.9	227.5	293.1	419.4	572.5	839.8	1111.5	1686	2197	3008.7	4072.7
	1000	180	7.6	10.1	15.1	19.6	29.2	46.1	80.9	106.9	157.4	201.9	291.1	396.8	582.2	771.9	1172.9	1527.6	2113.8	2878.3
	750	134	5.4	7.1	11.9	15.3	22.7	35.3	63.7	84.3	121.9	155.9	224.3	307.3	448.5	597.3	903.4	1177.2	1637.5	2221.8

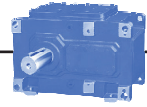


**TORQUE RATINGS**

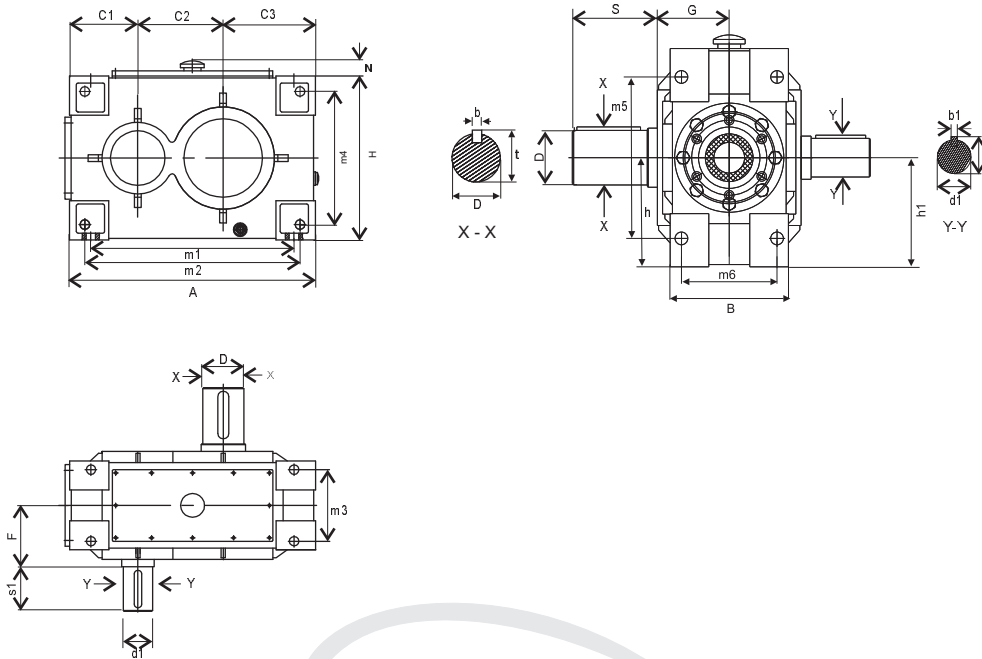
**HELICAL GEAR UNIT - SINGLE STAGE 1SHH**

**Table 1a -- Nominal Output Torque - Parallel Shaft Helical Gear Reducer - 1SHH**

Gear Ratio (iN)	Size 1SHH																	
	Nominal Output Torque in Nm - $T_n$																	
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
<b>1.25</b>	515	680	889	1262	1803	2457	3347	4441	5740	6997	10386							
<b>1.4</b>	533	708	937	1336	1901	2566	3457	4753	6235	7503	11434							
<b>1.6</b>	561	757	1040	1469	2060	2719	3576	4928	6754	9110	12519	17313	23556	32813				
<b>1.8</b>	576	811	1152	1596	2227	2914	3822	5288	7217	9778	13469	18588	25452	35356				
<b>2</b>	558	807	1133	1601	2266	3005	3996	5499	7558	10255	14085	19479	26685	37186	52443	73671	98688	
<b>2.24</b>	579	812	1136	1599	2269	3104	4235	5739	7797	10714	14924	20221	27925	38937	55571	78589	104385	111811
<b>2.5</b>	568	824	1161	1617	2266	3138	4377	5921	8006	11069	15469	20901	29240	41077	57525	81975	112036	119552
<b>2.8</b>	544	775	1059	1547	2290	3173	4433	5799	8123	11269	15787	21334	29972	41638	58598	84221	114388	121023
<b>3.15</b>	525	743	1080	1538	2192	3172	4578	6213	8498	11703	16211	22717	31115	44188	59386	87624	117887	157106
<b>3.55</b>	515	703	1031	1440	2173	3019	4561	5969	8606	11304	16399	23091	31072	44490	62287	88096	117510	161597
<b>4</b>	497	669	990	1330	1979	2831	4409	5841	8569	11269	16308	22172	31462	44805	61812	86069	116870	166079
<b>4.5</b>	447	621	938	1255	1780	2683	4450	5852	8426	11061	16101	22838	32479	44599	61351	85729	120825	163084
<b>5</b>	415	588	879	1180	1700	2574	4327	5664	8190	10954	16116	21727	30837	42211	60127	83854	114844	160861
<b>5.6</b>	403	536	802	1040	1550	2446	4293	5672	8351	10712	15445	21053	30889	40954	62229	81048	112149	152710



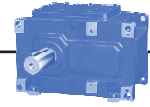
## 1SHH - DIMENSIONS



Gear Size	Dimensions																			
	A	m1	m2	m3	B	H	c1	c2	c3	N	m4	m5	m6	F	G	h1	D (m6)	b	t	S
01	248	190	210	76	98	170	94	80	74	25	135	110	76	78	78	80	38	10	41	58
02	270	210	235	85	108	190	97.5	90	82.5	25	155	130	85	85	85	90	45	14	48.5	82
03	290	225	250	90	116	224	105	100	85	44	170	146	90	85	85	100	50	14	53.5	82
04	325	260	285	100	125	230	123	112	90	44	190	165	100	90	90	112	55	16	59	82
05	355	290	315	101	127	260	133	125	97	44	220	195	101	95	95	125	60	18	64	105
06	390	325	345	112	140	300	144.5	140	105.5	44	255	234	112	105	105	140	70	20	74	105
07	435	355	385	120	155	340	156	160	119	60	288	260	120	110	110	160	75	20	79.5	105
08	490	405	430	135	170	380	183	180	127	60	320	295	135	120	120	180	85	22	90	130
09	550	435	480	155	200	420	208	200	142	60	350	307	155	140	140	200	95	25	100	130
10	625	510	545	165	210	470	233	224	168	60	390	350	165	145	145	224	110	28	116	165
11	680	550	580	188	240	530	255	250	175	70	430	400	188	170	170	250	120	32	127	165
12	755	620	650	200	255	590	287.5	280	187.5	70	295	455	200	180	180	280	130	32	137	200
13	860	700	735	225	290	670	327.5	315	217.5	70	540	510	225	180	180	315	150	36	158	200
14	935	770	805	245	315	750	355	355	225	70	620	585	245	215	215	355	170	40	179	240
15	1035	850	890	270	350	840	392.5	400	242.5	100	700	655	270	240	240	400	180	45	190	240
16	1185	980	1000	320	400	940	452.5	450	282.5	100	805	755	320	250	250	450	200	45	210	280
17	1360	1170	1170	350	430	1050	510	500	350	100	910	860	350	275	275	500	220	50	231	280
18	1460	1240	1240	380	475	1190	565	560	335	100	1030	970	380	285	285	560	240	56	252	330

Ratio	Dimensions	Gear Size																	
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
i=1.25~2.8	d1 (m6)	35	38	42	Ø45	Ø50	Ø55	Ø65	Ø70	Ø80	Ø90	Ø110	Ø110	Ø130	Ø140	Ø150	Ø160	Ø180	Ø200
	s1	58	58	82	82	82	82	105	105	130	130	165	165	200	200	240	240	280	280
	b1	10	10	12	14	14	16	18	20	22	25	28	28	32	36	36	40	45	45
	t1	38	41	45	48.5	53.5	59	69	74.5	85	95	106	116	137	148	158	169	190	210
i=3.15~4.5	d1 (m6)	24	28	32	Ø38	Ø42	Ø50	Ø55	Ø60	Ø65	Ø70	Ø80	Ø85	Ø95	Ø110	Ø120	Ø140	Ø150	Ø160
	s1	36	42	58	58	82	82	105	105	130	130	130	130	165	165	200	200	240	240
	b1	8	8	10	10	12	14	16	18	18	20	22	22	25	28	32	36	36	40
	t1	27	31	35	41	45	53.5	59	64	69	74.5	85	90	100	116	127	148	158	169
i=5~5.6	d1 (m6)	20	24	28	Ø30	Ø32	Ø38	Ø42	Ø50	Ø55	Ø60	Ø65	Ø75	Ø85	Ø95	Ø110	Ø120	Ø130	Ø140
	s1	36	36	42	58	58	58	82	82	82	105	105	105	130	130	165	165	200	200
	b1	6	8	8	8	10	10	12	14	16	18	18	20	22	25	28	32	32	36
	t1	23	27	31	33	35	41	45	54	59	64	69	80	90	100	116	127	137	148



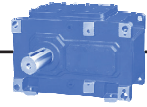


**POWER RATINGS**

**HELICAL GEAR UNIT - TWO STAGE 2SHH**

**Table 2 -- Power Ratings - Parallel Shaft Helical Gear Reducer - 2SHH**

Nominal			Size 2SHH																
Gear Ratio	Input Speed	Output Speed	Nominal Power Rating - kW $P_n$																
			04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
(iN)	(n1)	(n2)																	
6.3	1500	240	39.5	57.1	77.1	120.4	165.8	233.4	322.1	447.8	610.4	835.3	1220.8	1742.4	2314.8	3307.4	4551.4		
	1000	160	27.9	39.5	52.8	82.4	115.2	161.6	222.9	310.5	422.4	578.7	847.0	1210.2	1645.3	2303.2	3168.0	4590.5	6318.7
	750	120	20.7	30.3	40.8	63.4	88.8	125.7	172.2	239.8	325.3	445.7	652.7	933.6	1281.0	1779.4	2450.0	3545.0	5157.6
7.1	1500	210	36.0	51.8	69.7	109.9	151.1	212.3	292.6	406.6	554.4	759.3	1109.9	1584.0	2104.7	3006.5	4030.8		
	1000	140	25.4	36.0	48.1	75.0	104.6	146.8	202.8	282.0	384.4	525.9	769.9	1100.4	1495.3	2094.1	2884.0	4173.4	5980.2
	750	106	18.8	27.5	37.0	57.6	80.3	114.1	156.3	217.6	295.7	405.6	593.5	849.1	1164.8	1617.8	2227.2	3223.0	4688.7
8	1500	185	33.8	45.5	64.5	99.9	137.3	191.8	264.0	366.5	495.3	716.0	984.2	1382.4	1973.7	2615.0	3717.2		
	1000	125	22.8	31.2	44.8	67.6	98.3	133.1	182.7	254.5	343.2	496.4	682.2	958.9	1370.7	1826.9	2584.1	3588.3	5300.1
	750	94	18.0	24.4	34.9	51.8	72.9	102.5	140.5	196.5	265.1	382.3	525.9	739.2	1056.0	1407.7	1992.7	2765.7	4098.4
9	1500	167	30.7	40.8	59.2	85.6	125.7	174.9	239.8	332.7	446.7	646.3	888.1	1248.2	1783.6	2373.9	3361.3		
	1000	111	21.2	28.6	40.8	58.1	87.2	121.5	165.8	230.3	309.5	447.8	615.7	864.9	1232.9	1648.5	2333.8	3239.9	4791.1
	750	83	15.9	21.7	31.7	44.4	67.6	93.0	127.8	177.5	238.7	345.4	474.2	666.4	953.6	1269.4	1798.4	2495.4	3698.2
10	1500	150	27.5	37.0	52.8	77.1	115.2	157.4	215.5	300.0	404.5	586.1	804.7	1130.0	1615.7	2152.2	3044.5		
	1000	100	19.1	25.4	37.0	52.8	79.2	108.8	150.0	208.1	280.9	405.6	557.6	783.6	1120.5	1493.2	2113.1	2932.6	4342.3
	750	75	14.8	19.6	28.2	40.2	61.3	84.5	115.2	160.6	215.5	312.6	429.8	603.0	862.8	1149.0	1627.3	2258.8	3349.7
11.2	1500	134	24.3	33.4	47.6	69.7	101.4	140.5	194.4	269.3	365.4	528.0	726.6	1020.1	1458.4	1942.0	2749.9		
	1000	89	16.9	23.3	32.8	47.6	70.8	97.2	134.2	187.0	253.5	366.5	503.8	706.5	1010.6	1346.4	1907.2	2646.4	3918.9
	750	67	12.7	18.0	25.4	37.0	53.9	75.0	103.5	143.7	195.4	282.0	387.6	544.9	778.3	1037.0	1468.9	2038.1	3022.3
12.5	1500	120	22.2	29.6	42.3	62.4	87.7	123.1	174.3	241.9	328.5	475.2	652.7	917.7	1311.6	1746.7	2472.1		
	1000	80	14.8	20.7	29.6	42.3	60.2	85.6	120.4	168.0	228.1	329.5	548.0	634.7	908.2	1210.2	1711.8	2377.1	3525.0
	750	60	11.7	15.9	22.2	32.8	46.5	66.6	93.0	128.9	175.3	253.5	348.5	489.0	700.2	931.4	1319.0	1831.2	2717.1
14	1500	107	19.6	26.4	38.1	55.5	78.2	110.9	156.3	217.6	294.7	426.7	586.1	822.7	1177.5	1568.2	2283.1	3081.5	4559.9
	1000	71	13.3	18.6	26.4	38.1	53.9	77.1	107.8	150.0	203.9	295.7	405.4	570.3	815.3	1085.6	1536.5	2133.2	3163.8
	750	54	10.4	13.8	20.1	29.2	41.2	59.2	83.5	116.2	157.4	228.1	338.5	439.3	627.3	836.4	1182.8	1642.1	2439.4
16	1500	94	16.9	23.3	32.8	50.3	74.5	103.5	140.5	195.4	265.1	382.3	525.9	739.2	1056.0	1407.7	1992.7	2765.7	4096.3
	1000	62	11.7	15.9	22.8	33.8	51.8	71.9	97.2	135.2	183.8	265.1	364.4	511.2	731.9	974.7	1379.2	1913.5	2840.7
	750	47	8.5	12.2	18.0	26.4	40.2	56.0	75.0	104.6	141.6	203.9	280.9	393.9	562.9	750.9	1061.3	1473.2	2189.1
18	1500	83	14.8	20.7	29.6	45.0	64.0	90.9	121.5	170.1	237.6	344.3	473.1	663.5	949.4	1264.1	1792.1	2484.8	3682.3
	1000	56	10.6	14.4	20.8	30.7	44.4	62.9	84.5	117.3	164.8	238.7	327.4	459.4	656.9	875.5	1240.8	1719.2	2552.4
	750	42	8.0	11.2	15.9	23.3	33.8	48.6	64.5	90.9	126.8	183.8	252.4	353.8	505.9	673.8	955.7	1322.2	1965.3
20	1500	75	13.8	19.1	27.0	40.2	62.4	81.4	108.8	150.0	216.5	312.6	441.5	610.4	886.0	1182.8	1668.5	2323.2	3442.6
	1000	50	9.6	12.7	19.1	28.1	43.3	56.6	76.1	100.4	150.0	216.5	294.7	414.0	591.4	787.8	1108.8	1541.8	2291.6
	750	38	7.2	10.1	14.8	21.2	33.8	43.3	58.1	80.3	115.2	166.9	226.6	311.6	443.6	593.5	776.2	1182.8	1726.6



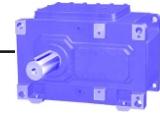
**TORQUE RATINGS**

**HELICAL GEAR UNIT - TWO STAGE 2SHH**

**Table 2a -- Nominal Output Torque - Parallel Shaft Helical Gear Reducer - 2SHH**

Gear Ratio (iN)	Size 2SHH																
	Nominal Output Torque in Nm - $T_n$																
	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
6.3	1666	2358	3152	4919	6876	9646	13305	18533	25212	34542	50556	72234	98204	137473	189090	273996	377148
7.1	1733	2456	3282	5117	7136	10014	13834	19237	26222	35874	52519	75063	102001	142848	196730	284686	407936
8	1742	2384	3423	5165	7511	10169	13959	19444	26221	37925	52121	73260	104722	139576	197426	274147	404928
9	1824	2461	3511	4999	7503	10454	14265	19815	26629	38527	52973	74413	106074	141831	200791	278749	412208
10	1825	2426	3534	5043	7564	10391	14325	19874	26826	38735	53251	74834	107008	142601	201802	280064	414690
11.2	1814	2501	3520	5108	7598	10430	14401	20066	27202	39327	54060	75810	108441	144474	204649	283968	420512
12.5	1767	2472	3534	5050	7187	10219	14373	20055	27230	39335	65418	75768	108417	144468	204347	283767	420797
14	1789	2502	3551	5125	7250	10371	14500	20177	27426	39774	54530	76710	109664	146021	206671	286931	425554
16	1803	2450	3512	5207	7979	11075	14972	20826	28312	40834	56130	78742	112737	150136	212442	294741	437560
18	1808	2456	3548	5236	7572	10727	14411	20004	28105	40707	55834	78345	112025	149305	211601	293185	435276
20	1834	2426	3649	5368	8271	10811	14536	19177	28650	41352	56288	79074	112958	150470	211781	294484	437696





**GENERAL TECHNICAL**

**5. Lubrication**

5.1 In most cases gear units are lubricated by splash lubrication. In instances where gears unit are mounted at an incline angle, or working in a high ambient temperature with large power and high speed, then it become necessary for forced feed lubrication as it will helps to reduce the oil temperature so that the bearings and gears can performed to it maximum capacities.

In condition where the ambient temperature is extremely low, synthetic oil is to be considered and engineers should ensure that oil temperature in gear unit should be above 0° Deg C.

5.2 Following tables recommend the type of ISO VG against various speeds and powers and frequency of oil changes.

Input Speed n1 (rpm)	Input Power (kw)	Type Lubrication	Viscoity ISO VG at 40° C (cSt)	
			ratio 10:1	ratio 10/1
1000 ~ 1500	< 7.5	Forced or Splash	100	150
	≥7.5 ~ 37		150	220
	> 37		220	320
300 ~ 1000	< 15	Forced	100	150
		Splash	150	220
	≥15 ~ 55	Forced	150	220
		Splash	220	320
	> 55	Forced	220	320
		Splash	320	460
50 ~ 300	< 22	Forced	150	220
		Splash	220	320
	≥22 ~ 75	Forced	220	320
		Splash	320	460
	> 75	Forced	320	460
		Splash	460	680

- If ambient temperature < 0° C, decrease viscosity by one class
- If ambient temperature >40°C, increase viscosity by one class
- Permissible temperature for mineral oil is ( -10°C to 90°C )
- Permissible temperature for synthetic oil is (-20°C to 110°C )
- More details information is obtainable from manufacturer

**6. Oil level/Change**

6.1 Each unit is provided with an oil level sight glass and the depending on the mounting positions, the oil level sight glass will be placed at the correct level. The amount of oil is measured when the gear unit is stalled and the correct oil level is at the mid-point on the sight glass.

6.2 Oil level, oil temperature and if necessary oil temperature, should be checked periodically during the time of operation.

- ❖ New unit – 1<sup>st</sup> change after 14 working days.
- ❖ Every 3months for 24hours operation daily
- ❖ Every 6 months for under 10hours duty/day

**7. Putting into Operation :**

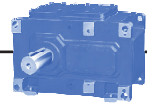
7.1 Before entering into service, run the unit with no load for about 2 hours and then proceed to run the gear unit with load under the following guidelines:

- ❖ Into 4 stages at 25% load for the 1<sup>st</sup> stage and then 50% load for the 2<sup>nd</sup> stage, 75% load for the 3<sup>rd</sup> stage and 100% for the final stage. Each stage takes about an hour.
- ❖ This will allow the oil temperature to stabilised after each stage and the maximum temperature of the oil should not be more than 80° C
- ❖ Check for excessive noise, vibrations etc

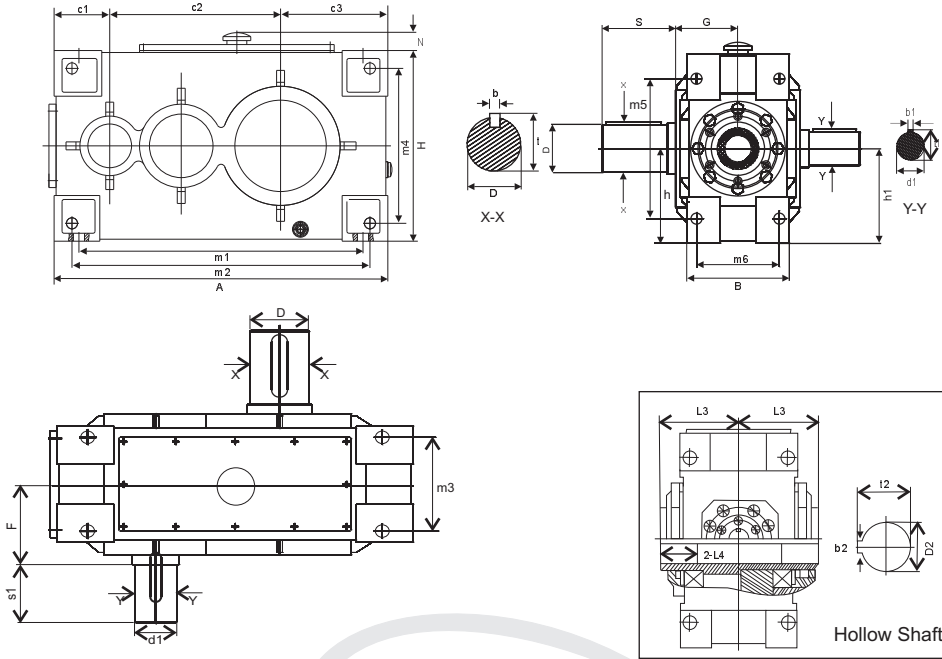
**8: Noise level:**

8.1 Noise level is measured in decibel (dBA) and the mean measurement is taken at 1m from the external of the gear unit. Based on an input speed of at 1500rpm nominal, the gear units should have a noise level of below 95 dBA with the larger units recording the higher noise level. In case of different speed, the noise level will be different. Generally on lower input speeds, the noise level will be lower and the reduction in noise level range from 2 to 4 dBa based on an input speed between 1000rpm to 500rpm.

8.2 In the case of artificial cooling by fan, the noise level will goes up by additional 2-3 dBA.



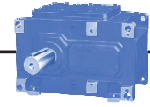
## 2SHH - DIMENSIONS



Gear	Dimensions																			
	A	m1	m2	m3	B	H	c1	c2	c3	N	m4	m5	m6	F	G	h1	D (m6)	b	t	S
04	430	360	385	115	140	210	90	192	148	40	165	140	115	95	100	112	56	16	60	82
05	475	400	430	125	150	230	96	215	164	40	185	155	125	100	105	125	65	18	69	105
06	515	435	465	140	165	250	102	240	173	40	200	170	140	110	115	140	70	20	74.5	105
07	580	490	525	145	180	290	108	272	200	40	235	200	145	125	130	160	75	20	79.5	105
08	635	540	580	160	195	320	115	305	215	40	265	225	160	130	140	180	85	22	90	130
09	700	590	630	170	210	360	120	340	240	40	290	250	170	140	150	200	95	25	100	130
10	755	645	685	190	230	430	126	384	245	40	360	320	190	155	165	224	110	28	116	165
11	840	715	750	210	260	480	140	430	270	50	390	355	210	170	180	250	120	32	127	165
12	920	790	830	240	300	530	160	480	280	50	440	405	240	185	195	280	130	32	137	200
13	1040	900	930	260	320	580	180	539	321	50	470	440	260	195	205	315	150	36	158	200
14	1150	1005	1040	290	350	630	200	605	345	50	520	490	290	225	235	355	170	40	179	240
15	1295	1135	1175	315	390	710	225	680	390	60	590	550	315	250	260	400	190	45	200	240
16	1480	1320	1360	395	470	800	255	765	460	70	680	640	395	285	300	450	220	50	231	280
17	1660	1480	1520	440	530	900	295	855	510	70	760	720	440	330	345	500	240	56	252	330
18	1880	1700	1740	510	600	1000	340	960	580	80	860	820	510	375	390	560	280	63	292	380
19	2110	1900	1950	570	670	1120	380	1080	650	80	960	910	570	415	435	630	300	70	314	380
20	2360	2150	2200	640	740	1260	420	1210	730	80	1100	1050	640	450	470	710	340	80	355	450

Ratio	Dimensions	Gear Size																	
		04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
i=6.3~10	d1 (m6)	Ø28	Ø32	Ø38	Ø42	Ø45	Ø50	Ø56	Ø65	Ø70	Ø80	Ø90	Ø100	Ø110	Ø125	Ø140	Ø150	Ø170	
	s1	42	58	58	82	82	82	82	105	105	130	130	165	165	165	200	200	240	
	b1	8	10	10	12	14	14	16	18	20	22	25	28	28	32	36	36	40	
	t1	31	35	41	45	48.5	53.5	60	69	74.5	85	95	106	116	132	148	158	179	
i=11.2~20	d1 (m6)	Ø24	Ø28	Ø32	Ø35	Ø40	Ø45	Ø50	Ø55	Ø60	Ø65	Ø75	Ø85	Ø110	Ø120	Ø130	Ø140		
	s1	36	42	58	58	58	82	82	82	105	105	105	130	130	165	165	200	200	
	b1	8	8	10	10	12	14	14	16	18	18	20	22	25	28	32	32	36	
	t1	27	31	35	38	43	48.5	53.5	59	64	69	79.5	90	100	116	127	137	148	

Hollow Output Shaft c/w Keywaying	Dimensions	Gear Size																	
		04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
	L3	100	105	115	130	140	150	165	180	195	205	235	260	300	345	390	435	470	
	L4	40	45	45	50	50	60	60	70	70	90	90	110	110	130	130	150	150	
	D2 (H7)	54	60	65	75	85	95	105	115	130	150	170	190	220	240	270	300	340	
	t2	58	64	69	79.5	90	100	111	122	137	158	179	200	231	252	282	314	355	
	b2	16	18	18	20	22	25	28	32	32	36	40	45	50	56	63	70	80	

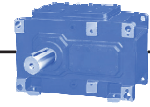


**POWER RATINGS**

**HELICAL GEAR UNIT - THREE STAGE 3SHH**

**Table 3 -- Power Ratings - Parallel Shaft Helical Gear Reducer - 3SHH**

Nominal			Size 3SHH													
Gear Ratio (iN)	Input Speed (n1)	Output Speed (n2)	Nominal Power Rating - kW Pn													
			07	08	09	10	11	12	13	14	15	16	17	18	19	20
22.4	1500	67	35.2	52.8	70.4	101.4	135.5	188.2	279.2	413.6	548.1	806.6	1101.3	1499.3	1928.5	
	1000	44	24.9	36.2	49.7	70.4	94.1	132.4	191.3	271	367.1	558.4	775.5	1059.9	1370.1	1969.8
	750	33	18.7	28	38.3	53.8	72.4	100.3	139.6	222.4	284.4	429.2	599.8	827.2	1065.1	1535.5
25	1500	60	33.1	47.6	65.2	99.3	119	162.4	248.2	377.5	486	729	1054.7	1452.8	2116.5	
	1000	40	22.8	32.1	44.5	68.3	82.8	111.7	168.6	258.5	325.8	480.9	729	1008.2	1370.1	1969.8
	750	30	16.6	24.9	34.2	52.8	62.1	86.9	126.2	201.7	248.2	361.9	558.4	775.5	1065.1	1535.5
28	1500	54	30	43.5	61.1	89	116.9	146.9	227.5	336.1	439.5	646.3	977.2	1302.9	1861.2	
	1000	36	20.7	30	42.4	62.1	77.6	101.4	153.1	222.4	289.6	434.3	672.1	899.6	1287.4	1819.9
	750	27	15.6	22.8	32.1	47.6	58	78.6	117.9	165.5	217.2	320.6	517	692.8	992.7	1401.1
31.5	1500	48	26.9	38.3	52.8	81.7	98.3	131.4	203.7	299.9	408.5	579.1	868.6	1178.8	1654.4	
	1000	32	17.6	26.9	36.2	56.9	65.2	89	136.5	201.7	279.2	382.6	604.9	816.9	1147.8	1618.3
	750	24	14.5	20.7	28	43.5	50.7	67.3	103.4	150	206.8	289.6	465.3	625.6	884.1	1240.8
35.5	1500	42	23.8	35.2	48.6	72.4	91	121	184.1	284.4	361.9	527.4	780.7	1059.9	1499.3	
	1000	28	15.6	23.8	33.1	49.7	61.1	82.8	122.1	186.2	243	351.6	537.7	734.2	1034	1458
	750	21	12.5	18.7	25.9	38.3	45.5	63.1	93.1	144.8	181	351.6	418.8	563.6	775.5	1127.1
40	1500	38	21.8	31.1	43.5	66.2	81.7	110.7	163.4	243	336.1	480.9	698	961.7	1344.2	
	1000	25	17.6	21.8	30	41.4	54.9	73.5	111.7	165.5	217.2	325.8	480.9	661.8	930.6	1359.8
	750	19	11.4	16.6	22.8	32.1	42.4	56.9	82.8	129.3	160.3	243	372.3	480.9	703.2	1049.6
45	1500	33	17.6	24.9	35.2	47.6	72.4	99.3	146.9	222.4	289.6	424	636	878.9	1168.5	
	1000	22	12.5	16.6	24.9	33.1	48.6	66.2	98.3	150	191.3	289.6	439.5	610.1	796.2	1189.1
	750	17	9.4	12.5	18.7	25.9	37.3	51.7	76.6	113.8	144.8	217.2	330.9	465.3	620.4	915.1
50	1500	30	15.6	22.8	33.1	47.6	65.2	87.9	132.4	201.7	253.4	372.3	558.4	775.5	1065.1	1540.7
	1000	20	11.4	15.6	22.8	32.1	44.5	61.1	87.9	134.5	170.7	248.2	382.6	537.7	734.2	1065.1
	750	15	8.3	12.5	17.6	24.9	33.1	44.5	67.3	98.3	129.3	186.2	299.9	413.6	568.7	822.1
56	1500	27	15.6	21.8	32.1	44.5	58	78.6	115.9	175.8	227.5	320.6	496.4	698	987.5	1385.6
	1000	18	1.1	15.6	22.8	31.1	39.3	53.8	79.7	119	150	217.2	341.3	486	682.5	961.7
	750	13.4	8.3	11.4	17.6	23.8	29	41.4	60	93.1	113.8	165.5	263.7	372.3	527.4	739.4
63	1500	24	12.5	17.6	23.8	38.3	46.6	63.1	105.5	150	201.7	289.6	439.5	625.6	889.3	1209.8
	1000	16	8.3	12.5	16.6	25.9	31.1	43.5	72.4	103.4	134.5	196.5	299.9	434.3	620.4	837.6
	750	12	6.3	9.4	12.5	20.7	23.8	33.1	53.8	77.6	103.4	144.8	232.7	336.1	475.7	641.1
71	1500	21	11.4	17.6	23.8	34.2	41.4	58	93.1	134.5	191.3	253.4	403.3	558.4	796.2	1080.6
	1000	14	8.3	11.4	15.6	23.8	28	39.3	62.1	93.1	119	175.8	279.2	382.6	558.4	749.7
	750	10.6	6.3	9.4	12.5	18.7	21.8	30	46.6	67.3	93.1	129.3	217.2	294.7	424	573.9
80	1500	18.8	9.4	13.5	18.7	26.9	37.3	52.8	82.8	119	160.3	232.7	319.6	486	698	992.7
	1000	12.5	6.3	9.4	12.5	18.7	24.9	35.2	55.9	82.8	103.4	155.1	248.2	341.3	486	687.7
	750	9.4	4.2	7.3	10.4	14.5	19.7	28	43.5	62.1	82.8	113.8	191.3	258.5	372.3	527.4
90	1500	16.7	8.3	12.5	18.7	25.9	34.2	47.6	76.6	108.6	144.8	206.8	315.4	408.5	610.1	791.1
	1000	11.1	6.3	8.3	12.5	17.6	22.8	33.1	50.7	72.4	98.3	134.5	206.8	287.5	418.8	548.1
	750	8.3	4.2	6.3	9.4	13.5	17.6	23.8	38.3	56.9	72.4	103.4	165.5	217.2	310.2	418.8
100	1500	15	8.3	11.4	16.6	24.9	31.1	44.5	62.1							
	1000	10	5.2	7.3	11.4	16.6	21.8	30	41.4							
	750	7.5	4.2	6.3	8.3	13.5	16.6	22.8	31.1							

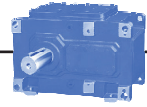


**TORQUE RATINGS**

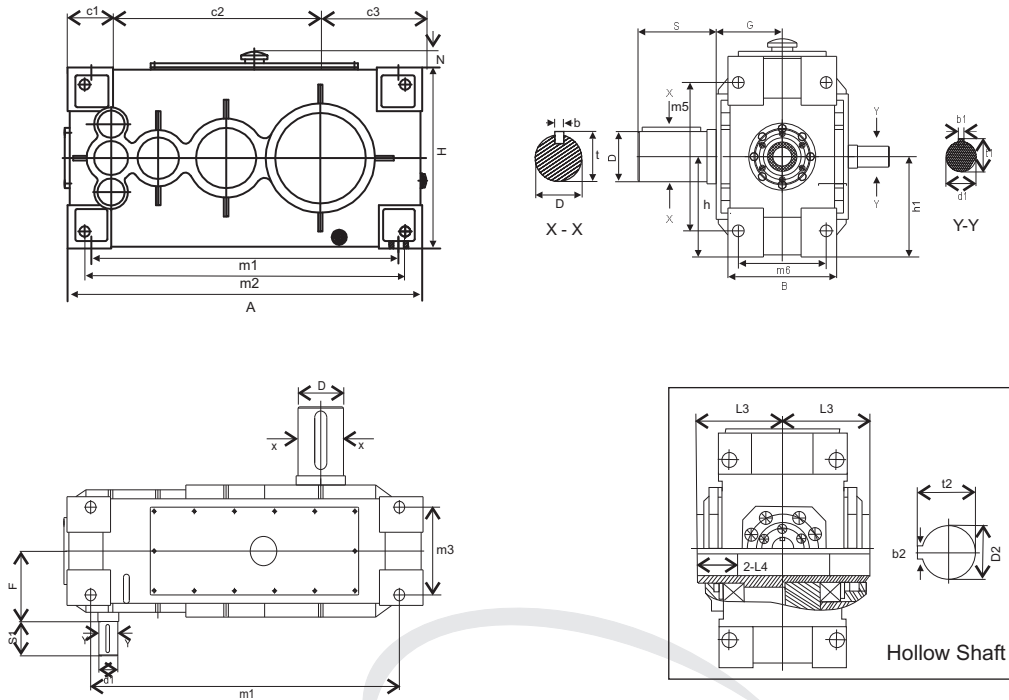
**HELICAL GEAR UNIT - THREE STAGE 3SHH**

**Table 3a -- Nominal Output Torque - Parallel Shaft Helical Gear Reducer - 3SHH**

Gear Ratio	Size 3SHH													
	Nominal Output Torque in Nm - $T_n$													
	07	08	09	10	11	12	13	14	15	16	17	18	19	20
(iN)														
22.4	5405	7858	10788	15280	20424	28737	41521	58820	79678	121199	168319	230047	297374	427537
25	5444	7664	10625	16307	19769	26669	40254	61717	77785	114815	174049	240708	327112	470290
28	5492	7959	11248	16474	20586	26900	40615	58998	76825	115211	178294	238644	341519	482780
31.5	5253	8028	10804	16982	19459	26561	40737	60195	83324	114183	180525	243794	342547	482962
35.5	5321	8118	11290	16952	20840	28241	41645	63508	82881	119921	183395	250415	352668	497283
40	6724	8328	11460	15815	20972	28077	42670	63221	82971	124456	183704	252808	355490	519444
45	5427	7206	10809	14369	21097	28737	42672	65114	83042	125713	190783	264839	345624	516178
50	5444	7449	10887	15328	21249	29176	41973	64224	81510	118516	182692	256752	350581	508586
56	584	8277	12097	16501	20851	28544	42286	63137	79584	115237	181079	257850	362105	510236
63	4955	7461	9909	15460	18563	25965	43214	61717	80280	117286	179003	259223	370302	499943
71	5662	7777	10642	16235	19100	26809	42362	63508	81175	119921	190455	260988	380909	511403
80	4814	7182	9550	14287	19024	26893	42708	63260	78998	118497	189625	260754	371304	525403
90	5421	7141	10755	15143	19617	28478	43621	62291	84574	115719	177923	247354	360319	471564
100	4966	6972	10887	15853	20819	28650	39537							



## 3SHH - DIMENSIONS



Gear Size	Dimensions																			
	A	m1	m2	m3	B	H	C1	C2	C3	N	m4	m5	m6	F	G	h1	D (m6)	b	t	S
07	640	550	585	145	180	290	35	352	198	40	235	200	145	120	130	160	75	20	79.5	105
08	705	610	650	160	195	320	41	395	214	40	265	225	160	125	140	180	85	22	90	130
09	780	670	710	170	210	360	32	440	238	40	290	250	170	135	150	200	95	25	100	130
10	850	740	780	190	230	430	58	496	226	40	360	320	190	150	165	224	110	28	116	165
11	940	815	850	210	260	480	25	555	270	50	390	355	210	165	180	250	120	32	127	165
12	1020	895	930	240	300	530	30	620	280	50	440	405	240	180	195	280	130	32	137	200
13	1145	1005	1035	260	320	580	16	699	320	50	470	440	260	190	205	315	150	36	158	200
14	1270	1125	1160	290	350	630	30	785	345	50	520	490	290	220	235	355	170	40	179	240
15	1430	1270	1310	315	390	710	40	880	390	60	590	550	315	245	260	400	190	45	200	240
16	1630	1470	1510	395	470	800	60	989	461	70	680	640	395	275	300	450	220	50	231	280
17	1815	1635	1675	440	530	900	60	1105	510	70	760	720	440	320	345	500	240	56	252	330
18	2045	1865	1905	510	600	1000	85	1240	580	80	860	820	510	365	390	560	280	63	292	380
19	2300	2090	2140	570	670	1120	95	1395	650	80	960	910	570	405	435	630	300	70	314	380
20	2590	280	2430	640	740	1260	135	1565	730	80	1100	1050	640	440	470	710	340	80	355	450

Ratio	Dimensions	Gear Size															
		07	08	09	10	11	12	13	14	15	16	17	18	19	20		
i=22.4~71	d1 (m6)	Ø28	Ø32	Ø38	Ø42	Ø45	Ø50	Ø56	Ø65	Ø70	Ø80	Ø90	Ø100	Ø110	Ø120		
	s1	42	58	58	58	8	82	82	105	105	105	130	130	165	165		
	d1	8	10	10	12	14	14	16	18	20	22	25	28	28	32		
	t1	31	35	41	45	48.5	53.5	60	69	74.5	85	95	106	116	127		
i=80~100	d1 (m6)	Ø19	Ø22	Ø24	Ø28	Ø32	Ø38	Ø42	Ø45	Ø50	Ø56	Ø65	Ø70	Ø80	Ø90		
	s1	28	36	36	42	58	58	58	82	82	82	105	105	105	130		
	d1	6	6	8	8	10	10	12	14	14	16	18	20	22	25		
	t1	21.5	24.5	27	31	35	41	45	48.5	53.5	60	69	74.5	85	95		

Hollow Output Shaft c/w Keywaying	Dimensions	Gear Size															
		07	08	09	10	11	12	13	14	15	16	17	18	19	20		
	L3	130	140	150	165	180	195	205	235	260	300	345	390	435	470		
	L4	50	50	60	60	70	70	90	90	110	110	130	130	150	150		
	D2 (H7)	75	85	95	105	115	130	150	170	190	220	240	270	300	340		
	i2	79.5	90	100	111	122	137	158	179	200	231	252	282	314	355		
b2	20	22	25	28	32	32	36	40	45	50	56	63	70	80			



**POWER RATINGS**

**HELICAL GEAR UNIT - FOUR STAGE 4SHH**

**Table 4 -- Power Ratings - Parallel Shaft Helical Gear Reducer - 4SHH**

Nominal			Size 4SHH												
Gear Ratio (iN)	Input Speed (n1)	Output Speed (n2)	Nominal Power Rating - kW Pn												
			08	09	10	11	12	13	14	15	16	17	18	19	20
112	1500	13.2			21.6	26.2	37.4	60.1	91.2	118.4	170.6	252.6	365		
	1000	8.8			14.3	18.2	25.9	40	62.8	78.3	114.8	178.6	255.8	329.6	502.8
	750	6.6			10.6	13.5	19.4	30.8	47.2	58.4	86.9	135.5	193.4	246.4	454.9
125	1500	12			19.4	23.8	34.3	55.4	81.7	106	155.1	237.2	343.1	440.4	666.3
	1000	8			13.1	16.3	23.4	37	56.5	70.7	105.5	157.1	224.6	292.6	443.2
	750	6			9.7	12.3	17.5	27.7	42.5	53.8	77.6	118.6	168.4	218.7	333.2
140	1500	10.6			17.5	21.2	30.6	49.3	73.8	95.3	139.6	212.5	308.8	397.3	603.5
	1000	7.1			12.8	14.5	20.9	37	50.3	69.2	102.4	143.2	205.9	264.9	402.3
	750	5.3			9	11.1	16.2	25.3	39.3	47.6	71.4	107.8	154.4	197.1	301.7
160	1500	9.4			15.6	19.8	28.1	44.7	67.5	84.5	124.1	191	274.6	354.2	540.5
	1000	6.2			10.3	13	18.7	29.3	45.5	55.3	82.2	140.1	199.7	258.7	392.8
	750	4.7			8.1	9.9	14.4	22.8	34.5	43	63.6	98.6	141.9	184.8	273.5
180	1500	8.3			13.8	17.6	25	40	61.3	75.4	111.7	169.4	243.3	317.2	484
	1000	5.6			9.7	11.7	16.8	26.8	40.8	50.7	74.5	112.4	162.3	209.4	318.3
	750	4.2			7.2	8.9	12.8	20	31.1	36.9	55.9	89.3	127.9	166.3	245.2
200	1500	7.5			12.2	15.2	22.6	34.3	53.1	68.4	97.8	155.4	217.6	288.2	425.2
	1000	5			8	9.9	15.1	22.4	35.9	44.8	64.8	114.1	158.2	210.5	309
	750	3.8			6.3	7.6	11.6	17.5	26.2	34.9	50.2	80.2	112.4	150.4	215.1
224	1500	6.7			10.7	13.5	20	30.8	48.2	60.9	88	137.8	192.8	285.2	380.7
	1000	4.5			7.6	9	13.5	20.6	32.1	41	58.6	91.4	128.6	170.4	252.1
	750	3.3			5.6	6.9	10.2	15.4	24.4	29.8	44	72.7	101.3	135.3	192.8
250	1500	6			9.4	11.9	17.3	27.1	42.2	55	77.8	118.6	179.2	227.3	342.7
	1000	4			6.6	7.9	11.7	18.2	28.5	37.1	51.9	78.8	119.5	150	226.9
	750	3			4.8	6.1	8.8	13.5	21.7	27	38.9	62.6	94.2	119.1	173.6
280	1500	5.4			8.3	11.2	16	24.4	37.8	47.5	67.5	102.1	150.6	199.1	298.4
	1000	3.6			5.8	7.6	10.8	16.4	25.5	32	45	67.8	100.4	131.5	197.7
	750	2.7			4.3	5.7	8.1	12.2	19.5	23.3	33.8	53.9	79.2	104.4	151.1
315	1500	4.8			7.3	9.9	13.6	21.5	34	41.8	59.6	89.8	139.9	175.2	268.6
	1000	3.2			5.1	6.6	9.2	14.4	23	28.2	39.8	59.6	93.3	115.7	177.9
	750	2.4			3.7	7.1	7	10.8	17.5	20.5	29.8	47.4	73.6	91.9	136.1
355	1500	4.2			6.6	9.1	12.4	20.7	30.3	37.7	54.3	81.7	124.1		
	1000	2.8			4.6	6.1	8.4	13.5	20.4	25.4	36.2	54.3	82.7		
	750	2.1			3.4	4.6	6.4	10.3	15.5	18.5	27.2	43.1	65.2		
400	1500	3.8			5.8	7.5	10.8	26.4	17	34.4	48.6				
	1000	2.5			4.2	5	7.3	17.8	11.3	23.2	32.5				
	750	1.9			3.1	3.9	5.5	13.5	8.5	16.9	24.4				
450	1500	3.3			5.2	6.6	9.6	15.1	23.4						
	1000	2.2			3.6	4.4	6.5	10.1	15.8						
	750	1.7			2.6	3.4	5	7.6	12						
500	1500	3			4.7	6.1	8.7								
	1000	2			3.4	4.1	5.9								
	750	1.5			2.4	3.1	4.4								



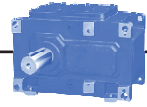
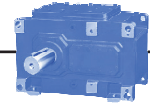


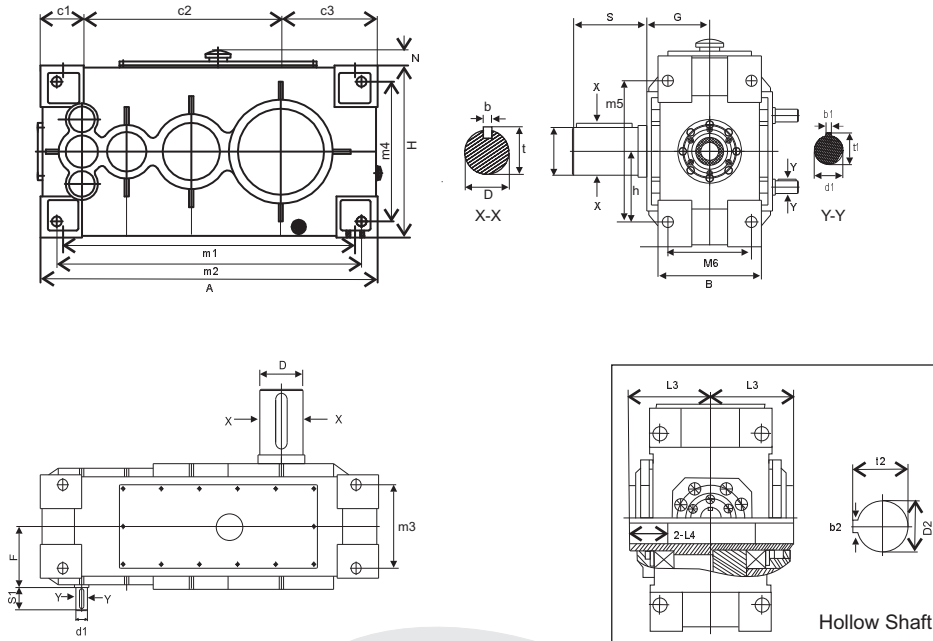
Table 4a -- Nominal Output Torque - Parallel Shaft Helical Gear Reducer - 4SHH

Gear Ratio (iN)	Size 4SHH												
	Nominal Output Torque in Nm - $T_n$												
	08	09	10	11	12	13	14	15	16	17	18	19	20
112			15519	19752	28108	43410	68153	84974	124585	193822	277602	357691	545653
125			15639	19459	27934	44169	67447	84399	125941	187539	268117	349292	529070
140			17217	19504	28112	49768	67658	93079	137736	192615	276950	356310	541122
160			15866	20025	28805	45132	70085	85180	126615	215800	307603	398482	605039
180			16542	19953	28650	45704	69579	86462	127050	191683	276780	357102	542816
200			15280	18909	28841	42784	68569	85568	123768	217931	302162	402055	590190
224			16129	19100	28650	43718	68124	87012	124363	193972	272918	361627	535013
250			15758	18862	27934	43453	68044	88577	123912	188135	285307	358125	541724
280			15387	20162	28650	43506	67646	84889	119375	179859	266339	348841	524455
315			15221	19697	27457	42975	68641	84160	118779	177869	278443	345293	530921
355			15690	20806	28650	46045	69579	86633	123468	185202	282067		
400			16044	19100	27886	67996	43166	88624	124150				
450			15628	19100	28216	43844	68587						
500			16235	19578	28173								





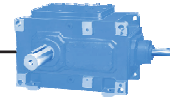
4SHH - DIMENSIONS



Gear Size	Dimensions																D (m6)	b	t	S
	A	m1	m2	m3	B	H	C1	C2	C3	N	M4	M5	M6	F	G	h1				
10	850	740	780	190	230	430	38	496	246	40	360	320	190	150	165	224	110	28	116	165
11	940	815	850	210	260	480	25	555	270.0	50	390	355	210	165	180	250	120	32	127	165
12	1020	895	930	240	300	530	30	620	280	50	440	405	240	180	195	280	130	32	137	200
13	1145	1005	1035	260	320	580	16	699	320	50	470	440	260	190	205	315	150	36	158	200
14	1270	1125	1160	290	350	630	30	785	345	50	520	490	290	220	235	355	170	40	179	240
15	1430	1270	1310	315	390	710	40	880	390	60	590	550	315	245	260	400	190	45	200	240
16	1630	1470	1510	395	470	800	60	989	461	70	680	640	395	275	300	450	220	50	231	280
17	1815	1635	1675	440	530	900	60	1105	510	70	760	720	440	320	345	500	240	56	252	330
18	2045	1865	1905	510	600	1000	85	1240	580	80	860	820	510	365	390	560	280	63	292	380
19	2300	2090	2140	570	670	1120	95	1395	650	80	960	910	570	405	435	630	300	70	314	380
20	2590	2380	2430	640	740	1260	135	1565	730	80	1100	1050	640	440	470	710	340	80	355	450

Ratio	Dimensions	Gear Size										
		10	11	12	13	14	15	16	17	18	19	20
i=22.4~71	d1 (m6)	Ø28	Ø32	Ø38	Ø42	Ø45	Ø50	Ø56	Ø65	Ø70	Ø80	Ø90
	s1	42	58	58	58	82	82	82	105	105	105	130
	b1	8	10	10	12	14	14	16	18	20	22	25
	t1	31	35	41	45	48.5	53.5	60	69	74.5	85	95
i=80~100	d1 (m6)	Ø19	Ø22	Ø24	Ø28	Ø32	Ø38	Ø42	Ø45	Ø50	Ø56	Ø65
	s1	28	36	36	42	58	58	58	82	82	82	105
	b1	6	6	8	8	10	10	12	14	14	16	18
	t1	21.5	24.5	27	31	35	41	45	48.5	53.5	60	69

Hollow Output Shaft c/w Keywaying	Dimensions	Gear Size										
		10	11	12	13	14	15	16	17	18	19	20
	L3	165	180	195	205	235	260	300	345	390	435	470
	L4	60	70	70	90	90	110	110	130	130	150	150
	D2 (H7)	105	115	130	150	170	190	220	240	270	300	340
	t2	111	122	137	158	179	200	231	252	282	314	355
b2	28	32	32	36	40	45	50	56	63	70	80	

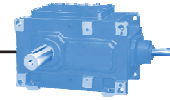


**POWER RATINGS**

**BEVEL HELICAL GEAR UNIT - TWO STAGE 2SBH**

**Table 5 -- Power Ratings - Bevel Helical Gear Reducer - 2SBH**

Nominal			Size 2SBH																	
Gear Ratio (iN)	Input Speed (n1)	Output Speed (n2)	Nominal Power Rating - kW Pn																	
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
8	1500	188	10	13.9	19.2	26.4	36.4	57.5	85.6	121.5	153.2	216.5	338	448.8	644.2	792	1140.5	1774.1	2217.6	
	1000	125	6.7	9.3	12.8	17.6	24.3	38.4	59.2	90.9	116.2	163.7	258.8	343.2	491.1	591.4	855.4	1330.6	1795.2	2323.2
	750	94	5	7	9.6	13.2	18.3	28.8	44.4	58.1	93	132	195.4	264	359.1	438.3	697	1003.2	1478.4	1900.8
10	1500	150	8	11.1	15.4	21.2	29.1	46	70.8	97.2	137.3	174.3	269.3	364.4	506.9	644.2	961	1446.8	2006.4	
	1000	100	5.3	7.4	10.2	14.2	19.4	30.7	46.5	72.9	99.3	132	206	274.6	380.2	491.1	654.8	1003.2	1341.2	1795.2
	750	75	4	5.6	7.7	10.6	14.6	23	36	48.6	77.1	110.9	163.7	221.8	311.6	401.3	538.6	749.8	1003.2	1372.8
11.2	1500	134	6.8	9.6	13.5	18.7	25.8	40.5	62.4	85.6	121.5	158.4	248.2	343.2	475.2	591.4	887.1	1267.2	1636.8	
	1000	89	4.6	6.4	9.1	12.5	17.2	27	42.3	64.5	88.8	137.3	184.8	258.8	359.1	454.1	665.3	855.4	1087.7	1457.3
	750	67	3.4	4.8	6.8	9.4	12.9	20.3	32.8	43.3	68.7	103.5	147.9	195.4	253.5	369.6	496.4	644.2	823.7	1098.3
12.5	1500	120	6.4	8.9	12.3	16.9	23.4	36.8	56	79.2	110.9	147.9	221.8	301	411.9	528	802.6	1034.9	1330.6	1636.8
	1000	80	4.3	5.9	8.2	11.3	15.6	24.5	38.1	59.2	78.2	110.9	153.2	227.1	279.9	401.3	506.9	697	897.6	1172.2
	750	60	3.3	4.5	6.2	8.5	11.7	18.5	28.6	38.1	59.2	80.3	116.2	158.4	200.7	285.2	385.5	528	675.9	887.1
14	1500	107	5.4	7.6	10.8	14.9	20.6	32.4	50.7	69.7	85.6	132	200.7	274.6	364.4	491.1	612.5	823.7	1056	1214.4
	1000	71	3.6	5.1	7.2	9.9	13.8	21.6	32.8	44.4	57.1	88.8	116.2	164.7	216.5	327.4	438.3	549.2	718.1	950.4
	750	53	2.7	3.9	5.4	7.5	10.3	16.2	24.3	32.8	40.2	63.4	84.5	121.5	153.2	248.2	327.4	422.4	538.6	728.7



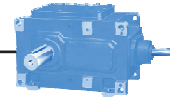
**TORQUE RATINGS**

**BEVEL HELICAL GEAR UNIT - TWO STAGE 2SBH**

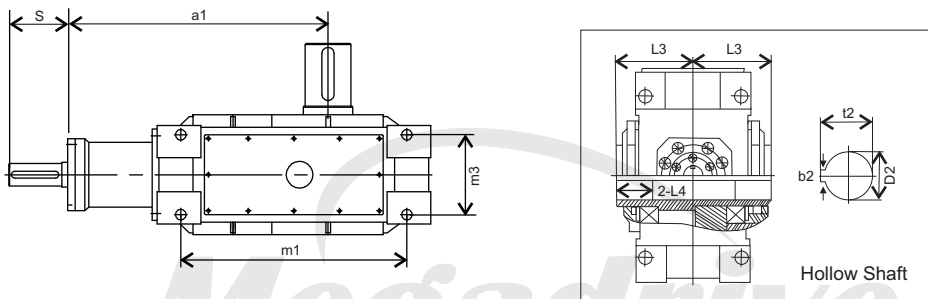
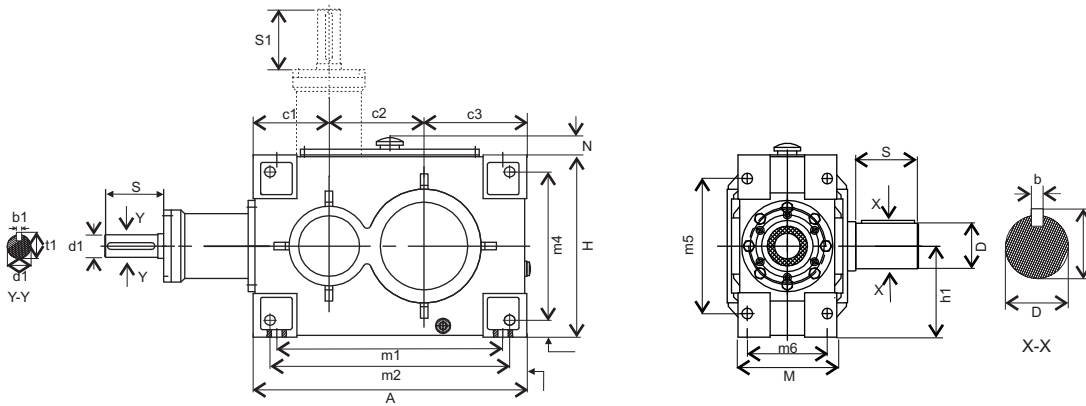
Table 5a -- Nominal Output Torque - Bevel Helical Gear Reducer - 2SBH

Gear Ratio (iN)	Size 2SBH																	
	Nominal Output Torque in Nm - Tn																	
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
<b>8</b>	507	705	976	1343	1856	2927	4518	6939	8875	12506	19767	26221	37516	45180	65350	101655	137154	177493
<b>10</b>	505	706	972	1348	1852	2925	4438	6959	9480	12606	19666	26221	36306	46895	62526	95806	128077	171442
<b>11.2</b>	485	680	969	1340	1844	2895	4533	6913	9519	14731	19830	27762	38527	48725	71387	91784	116712	156372
<b>12.5</b>	505	700	975	1341	1857	2923	4539	7060	9329	13237	18279	27103	33406	47903	60509	83200	107151	139927
<b>14</b>	478	685	969	1331	1847	2906	4404	5966	7671	11932	15625	22146	29119	44033	58947	73861	96587	127836





2SBH - DIMENSIONS



Gear Size	Dimensions																						
	A	m1	m2	m3	M	H	c1	c2	c3	N	m4	m5	m6	a1	h1	d1 (m6)	b1	t1	s1	D (m6)	b	t	S
01	290	230	255	88	110	150	102.5	80	107.5	30	115	90	88	270	75	18	6	20.5	40	40	12	43	58
02	315	255	280	98	120	170	108.5	90	116.5	30	135	110	98	290	85	20	6	22.5	50	45	14	48.5	82
03	345	275	300	105	130	190	114.5	100	130.5	30	145	120	105	315	95	22	6	24.5	50	50	14	53.5	82
04	370	300	325	115	140	210	120.5	112	137.5	40	165	140	115	332	105	25	8	28	60	56	16	60	82
05	400	325	355	125	150	230	130	125	145	40	185	155	125	365	115	30	8	33	80	65	18	69	105
06	435	335	385	140	165	250	135	140	160	40	200	170	140	400	125	35	10	38	80	70	20	74.5	105
07	485	395	430	145	180	290	143.5	160	181.5	40	235	200	145	445	145	40	12	43	80	75	20	79.5	105
08	535	440	480	160	195	320	160	180	195	40	265	225	160	495	160	45	14	48.5	110	85	22	90	130
09	600	490	530	170	210	360	180	200	220	40	290	250	170	560	180	50	14	53.5	110	95	25	100	130
10	650	540	580	190	230	430	200	224	226	40	360	320	190	629	215	55	16	59	110	110	28	116	165
11	720	595	630	210	260	480	217.5	250	252.5	50	390	355	210	700	240	60	18	64	140	120	32	127	165
12	785	660	695	240	300	530	242.5	280	262.5	50	440	405	240	785	265	65	18	69	140	130	32	137	200
13	890	750	780	260	320	580	270	315	305	50	470	440	260	885	290	75	20	79.5	140	150	36	158	200
14	995	855	885	290	350	630	310	355	330	50	520	490	290	995	315	90	25	95	170	170	40	179	240
15	1130	970	1010	315	390	710	360	400	370	60	590	550	315	1120	355	100	28	106	210	190	45	200	240
16	1290	1130	1170	395	470	800	400	450	440	70	680	640	395	1260	400	110	28	116	210	220	50	231	280
17	1430	1250	1290	440	530	900	440	500	490	70	760	720	440	1410	450	120	32	127	210	240	56	252	330
18	1620	1440	1480	510	600	1000	500	560	560	80	860	820	510	1600	500	130	32	137	250	280	63	292	380

Hollow Output Shaft c/w Keywaying	Dimensions	Gear Size																	
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
	L3	80	85	95	100	105	115	130	140	150	165	180	195	205	235	260	300	345	390
	L4	35	35	40	40	45	45	50	50	60	60	70	70	90	90	110	110	130	130
	D2 (H7)	38	42	48	54	60	65	75	85	95	105	115	130	150	170	190	220	240	270
	t2	41	45	51.5	58	64	69	79.5	90	100	111	122	137	158	179	200	231	252	282
	b2	10	12	14	16	18	18	20	22	25	28	32	32	36	40	45	50	56	63



**POWER RATINGS**

**BEVEL HELICAL GEAR UNIT - THREE STAGE 3SBH**

**Table 6 -- Power Ratings - Bevel Helical Gear Reducer - 3SBH**

Nominal			Size 3SBH																
Gear Ratio (iN)	Input Speed (n1)	Output Speed (n2)	Nominal Power Rating in kW - Pn																
			04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
16	1500	94	15,8	22,4	31,6	46,6	63,1	82,8	124,1	165,5	237,9	315,4	455	620,4	858,3	1395,9	1912,9		
	1000	63	10,6	15	21,1	31,1	44,5	62,1	87,9	119	175,8	237,9	341,3	455	651,5	1044,4	1468,3	2274,8	2585
	750	47	7,9	11,2	15,8	24,9	36,2	46,6	72,4	87,9	144,8	191,3	279,2	372,3	527,4	858,3	1220,2	1654,4	2378,2
18	1500	83	14,1	19,9	28,2	43,5	60	77,6	113,8	155,1	217,2	299,9	455	579,1	806,6	1395,9	1912,9		
	1000	56	9,4	13,3	18,8	31,1	41,4	54,9	77,6	108,6	160,3	222,4	341,3	434,3	610,1	1034	1447,6	1923,3	2585
	750	42	7,1	10	14,1	23,8	33,1	43,5	67,3	82,8	124,1	181	268,9	356,8	496,4	816,9	1158,1	1509,7	2254,2
20	1500	75	12,6	17,9	25,3	40,4	54,9	70,4	103,4	139,6	201,7	279,2	444,7	56,9	806,6	1364,9	1861,2		
	1000	50	8,5	12	16,9	28	37,3	49,7	72,4	98,3	144,8	206,8	325,8	393	568,7	910	1282,2	1695,8	2481,6
	750	38	6,3	9	12,6	20,7	29	39,3	56,9	77,6	113,8	165,5	253,4	320,6	460,2	723,8	1034	1333,9	1985,3
22,4	1500	67	11,3	15,7	22,5	35,2	51,7	67,3	97,2	134,5	181	258,5	413,6	527,4	754,9	1209,8	1592,4		
	1000	45	7,6	10,6	15	23,8	35,2	49,7	67,3	93,1	134,5	191,3	299,9	372,3	537,7	806,6	1137,4	1499,3	2192,1
	750	33	5,7	7,9	11,3	17,6	25,9	37,3	50,7	72,4	98,3	144,8	227,5	284,4	413,6	641,1	910	1178,8	1768,2
25	1500	60	10,1	14,1	20,2	31,1	45,5	64,2	85,9	119	165,5	232,7	361,9	465,3	672,1	1065,1	1509,7		
	1000	40	6,7	9,4	13,5	20,7	31,1	43,5	59	82,8	113,8	170,7	263,7	325,8	475,7	754,9	1075,4	1395,9	2078,4
	750	30	5,1	7,1	10,1	15,6	23,8	33,1	44,5	62,1	87,9	129,3	201,7	248,2	361,9	568,7	806,6	1044,4	1561,4
28	1500	54	9,1	12,6	18	22,8	38,3	49,7	77,6	95,2	144,8	222,4	330,9	418,8	610,1	941	1333,9		
	1000	36	6,1	8,4	12,1	15,6	25,9	35,2	53,8	68,3	97,2	155,1	232,7	294,7	434,3	661,8	941	1230,5	1830,2
	750	27	4,6	6,3	9,1	12,5	19,7	26,9	40,4	51,7	73,5	119	175,8	222,4	325,8	506,7	713,5	920,3	1375,3
31,5	1500	48	8	11,2	16	20,7	34,2	45,5	71,4	87,9	124,1	201,7	299,9	398,1	568,7	847,9	1209,8		
	1000	32	5,4	7,5	10,7	14,5	22,8	32,1	47,6	61,1	85,9	134,5	206,8	263,7	382,6	599,8	847,9	1106,4	1654,4
	750	24	4,1	5,7	8	10,4	17,6	23,8	35,2	45,5	64,2	103,4	155,1	196,5	289,6	455	641,1	827,2	1240,8
35,5	1500	42	7,1	10	14,2	18,7	31,1	41,4	64,2	79,7	113,8	186,2	268,9	356,8	517	796,2	1137,4	1478,7	2192,1
	1000	28	4,7	6,6	9,4	12,5	20,7	29	43,5	54,9	77,6	124,1	186,2	237,9	351,6	527,4	744,5	982,3	1458
	750	21	3,6	5	7,1	9,4	15,6	21,8	32,1	41,4	58	93,1	139,6	181	258,5	398,1	558,4	734,2	1096,1
40	1500	38	6,3	8,9	12,6	17,6	28	37,3	58	71,4	101,4	165,5	243	320,6	465,3	713,5	1023,7	1333,9	1985,3
	1000	25	4,3	5,9	8,4	11,4	18,7	25,9	42,4	48,6	69,3	124,1	165,5	232,7	341,3	480,9	682,5	889,3	1323,6
	750	19	3,2	4,5	7,5	8,9	14,5	19,7	30	37,3	53,8	84,8	129,3	160,3	237,9	361,9	511,9	661,8	992,7
45	1500	33,5	5,7	7,8,1	11,2	15,6	26,0	34,2	51,7	66,2	93,1	150	222,4	284,4	413,6	641,1	910	1189,1	1778,5
	1000	22	3,8	5,3	7,5	10,4	16,6	22,8	34,2	43,5	62,1	98,3	150	186,2	274,1	470,5	661,8	868,6	1292,5
	750	16,6	2,9	4	5,7	7,9	12,5	17,6	26,9	33,1	47,6	76,6	113,8	144,8	212	330,9	470,5	620,4	899,6
50	1500	30	5,1	7,1	10,1	13,5	21,8	31,1	45,5	59	82,8	134,5	201,7	253,4	372,3	568,7	806,6	1065,1	1592,4
	1000	20	3,4	4,7	6,7	9,4	14,5	20,7	32,1	39,3	55,9	90	134,5	170,7	248,2	377,5	537,7	703,2	1054,7
	750	15	2,6	3,5	5,1	7,3	11,4	15,6	23,8	30	42,4	67,3	102,4	124,1	186,2	299,9	424	558,4	806,6



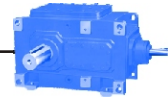
**TORQUE RATINGS**

**BEVEL HELICAL GEAR UNIT - THREE STAGE 3SBH**

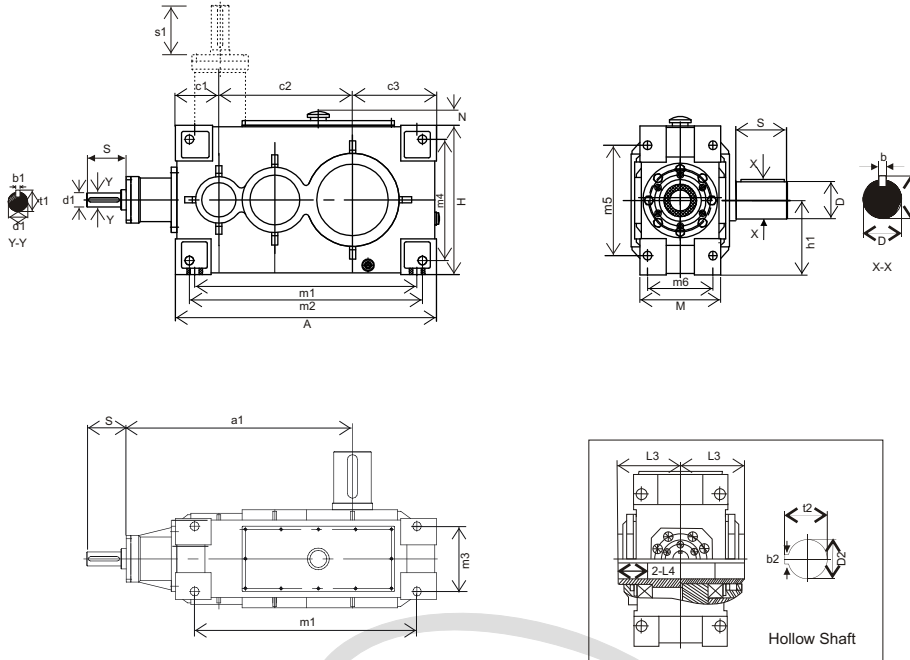
Table 6a -- Nominal Output Torque - Bevel Helical Gear Reducer - 3SBH

Gear Ratio (iN)	Size 3SBH																
	Nominal Output Torque in Nm - $T_n$																
	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
16	1597	2267	3193	4703	6742	9405	13324	18026	26647	36051	51725	68967	98747	158309	222573	344831	391854
18	1588	2262	3191	5291	7054	9348	13226	18516	27332	37912	58191	74061	104038	176334	246868	327982	440835
20	1616	2281	3215	5333	7111	9482	13825	18762	27650	39499	62211	75048	108622	173795	244893	323891	473986
22.4	1596	2235	3173	5049	7462	10535	14264	19750	28527	40596	63637	78998	114108	171162	241382	318185	465209
25	1595	2245	3212	4938	7407	10369	14072	19750	27156	40734	62952	77764	113560	180214	256743	333272	496204
28	1597	2221	3194	4115	6858	9328	14264	18106	25785	41145	61717	78175	115205	175551	249611	326414	485507
31.5	1600	2218	3173	4322	6790	9568	14197	18208	25615	40116	61717	78690	114177	178979	253040	330186	493735
35.5	1604	2245	3207	4233	7054	9878	14813	18695	26451	42321	63481	81114	119908	179861	253921	335035	497262
40	1616	2228	3198	4348	7113	9875	16197	18566	26465	47399	63199	88873	130347	183670	260693	339690	505585
45	1633	2288	3226	4489	7185	9876	14816	18853	26931	42641	65084	80793	118946	204227	287264	377034	561063
50	1619	2245	3190	4446	6915	9875	15309	18766	26664	42956	64186	81467	118497	180214	256743	335740	503610





3SBH - DIMENSIONS

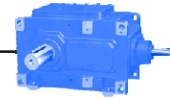


Megadrive

Gear Size	Dimensions																						
	A	m1	m2	m3	M	H	c1	c2	c3	N	m4	m5	m6	a1	h1	d1 (m6)	b1	t1	s1	D (m6)	b	t	S
04	430	360	385	115	140	210	102.5	192	135.5	40	165	140	115	382	105	18	6	20.5	40	56	16	60	82
05	475	400	430	125	150	230	111	215	149	40	185	155	125	415	115	20	6	22.5	50	65	18	69	105
06	515	435	465	140	165	250	117	240	158	40	200	170	140	455	125	22	6	24.5	50	70	20	74.5	105
07	580	490	525	145	180	290	125.5	272	182.5	40	235	200	145	492	145	25	8	28	60	75	20	79.5	105
08	635	540	580	160	195	320	135	305	195	40	265	225	160	545	160	30	8	33	80	85	22	90	130
09	700	590	630	170	210	360	140	340	220	40	290	250	170	600	180	35	10	38	80	95	25	100	130
10	755	645	685	190	230	430	146	384	225	40	360	320	190	669	215	40	12	43	80	110	28	116	165
11	840	715	750	210	260	480	157.5	430	252.5	50	390	355	210	745	240	45	14	48.5	110	120	32	127	165
12	920	790	830	240	300	530	180	480	260	50	440	405	240	840	265	50	14	53.5	110	130	32	137	200
13	1040	900	930	260	320	580	195	539	306	50	470	440	260	944	290	55	16	59	110	150	36	158	200
14	1150	1005	1040	290	350	630	217.5	605	327.5	50	520	490	290	1055	315	60	18	64	140	170	40	179	240
15	1295	1135	1175	315	390	710	245	680	370	60	590	550	315	1185	355	65	18	69	140	190	45	200	240
16	1480	1320	1360	395	470	800	275	765	440	70	680	640	395	1335	400	75	20	79.5	140	220	50	231	280
17	1660	1480	1520	440	530	900	315	855	490	70	760	720	440	1495	450	90	25	95	170	240	56	252	330
18	1880	1700	1740	510	600	1000	360	960	560	80	860	820	510	1680	500	100	28	106	210	280	63	292	380
19	2110	1900	1950	570	670	1120	405	1080	625	80	960	910	570	1890	560	110	28	116	210	300	70	314	380
20	2360	2150	2200	640	740	1260	445	1210	705	80	1100	1050	640	2120	630	120	32	127	210	340	80	355	450

Hollow Output Shaft c/w Keywaying	Dimensions	Gear Size																		
		04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20		
	L3	100	105	115	130	140	150	165	180	195	205	235	260	300	345	390	435	470		
	L4	40	45	45	50	50	60	60	70	70	90	90	110	110	130	130	150	150		
	D2 (H7)	54	60	65	75	85	95	105	115	130	150	170	190	220	240	270	300	340		
	t2	58	64	69	79.5	90	100	111	122	137	158	179	200	231	252	282	314	355		
b2	16	18	18	20	22	25	28	32	32	36	40	45	50	56	63	70	80			





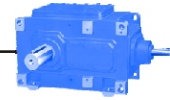
**POWER RATINGS**

**BEVEL HELICAL GEAR UNIT - FOUR STAGE 4SBH**

Table 7 -- Power Ratings - Bevel Helical Gear Reducer - 4SBH

Nominal			Size 4SBH													
Gear Ratio	Input Speed (iN)	Output Speed (n2)	Nominal Power in Kw - Pn													
			07	08	09	10	11	12	13	14	15	16	17	18	19	20
56	1500	27	12.98	18.17	24.65	34.41	41.5	65.97	86.02	127.24	169.65	<i>236.9</i>	<i>341.05</i>	<i>530.94</i>		
	1000	18	8.65	12.11	16.44	24.38	28.34	48.76	59.71	95.41	124.39	179.86	236.81	407.56	<i>451.36</i>	<i>635.54</i>
	750	13.4	6.49	9.09	12.32	20.15	22.27	40.21	46.56	78.02		145.55	183.18	338.66	350.16	493.86
63	1500	24	11.53	16.14	21.91	31.56	41.5	60.36	82.16	127.24	158.43	222.64	<i>341.05</i>	<i>530.94</i>		
	1000	16	7.7	10.77	14.61	21.53	28.34	44.53	59.71	95.41	118.78	168.36	236.81	401.77	<i>451.36</i>	<i>635.54</i>
	750	12	5.77	8.07	10.96	18.59	22.27	34.41	46.56	75.17		136.99	183.18	321.45	350.16	493.86
71	1500	21	10.24	14.33	19.44	28.71	38.28	55.94	76.55	124.39	155.58	222.64	<i>341.05</i>	<i>516.68</i>		
	1000	14	6.82	9.55	12.97	20.15	26.96	40.21	56.68	91.08	107.46	156.96	236.81	355.86	<i>451.36</i>	<i>635.54</i>
	750	10.6	5.12	7.16	9.72	15.83	21.26	31.56	45.36	70.84	87.68	127.06	183.18	287.04	350.16	493.86
80	1500	19	9.09	12.72	17.25	27.05	36.8	50.24	70.84	115.65	144.26	208.38	<i>331.57</i>	<i>441.97</i>		
	1000	12.5	6.06	8.48	11.5	18.59	25.49	37.17	52.44	83.91	101.85	148.49	220.99	315.66	410.88	<i>613</i>
	750	9.4	4.54	6.36	8.63	14.08	19.88	27.24	39.66	63.02	77.74	114.18	175.72	252.64	323.02	493.86
90	1500	16.7	7.16	11.25	15.34	23.83	32.57	45.91	63.76	101.2	127.24	185.48	291.83	418.97		
	1000	11.1	4.78	7.5	10.23	16.38	22.64	31.56	46.74	73.79		131.29	206.82	298.45	382.54	<i>584.3</i>
	750	8.3	3.58	5.63	7.67	12.33	17.02	24.38	35.42	56.4	67.9	99.92	155.85	223.84	286.22	436.54
100	1500	15	6.44	10.12	13.8	21.53	26.13	40.21	60.91	92.46	114.54	168.36	257.88	370.21		
	1000	10	4.3	6.75	9.2	14.91	18.77	27.05	42.51	65.05	80.6	119.97	181.34	261.19	337.18	<i>511.8</i>
	750	7.5	3.22	5.06	6.9	11.23	14.17	20.34	32.57	49.22	60.82	89.89	138.83	198.08	252.18	384.56
112	1500	13.2	5.75	9.04	12.32	19.88	24.11	34.41	46.1	83.91	108.93	156.96	232.4	335.8		
	1000	8.8	3.84	6.03	8.22	13.16	16.75	23.83	36.8	57.78	72.04	105.62	164.32	235.34	303.24	462.58
	750	6.6	2.88	4.52	6.17	9.76	12.42	17.85	28.34	43.43	53.73	79.95	124.66	177.93	226.69	328.81
125	1500	12	5.16	8.1	11.04	17.85	21.9	31.56	50.97	75.17	97.52	142.7	218.23	315.66	405.17	<i>613</i>
	1000	8	3.44	5.41	7.36	12.06	15	21.53	34.04	51.98	65.05	97.06	144.54	206.64	269.2	407.75
	750	6	2.58	4.05	5.52	8.93	11.32	16.1	25.49	39.1	49.5	71.4	109.12	154.93	201.21	306.55
140	1500	10.6	4.6	7.24	9.86	16.1	19.51	28.16	45.36	67.9	87.68	128.44	195.5	284.1	365.52	555.22
	1000	7.1	3.07	4.83	6.57	11.78	13.34	19.23	34.04	46.28	63.67	94.21	131.75	189.43	243.71	370.12
	750	5.3	2.3	3.62	4.94	8.28	10.22	14.91	23.28	36.16	43.8	65.69	99.18	142.05	181.34	277.57
160	1500	9.4	4.03	6.33	8.63	14.36	18.22	25.86	41.13	62.1	77.74	114.18	175.72	252.64	325.87	497.26
	1000	6.2	2.69	4.22	5.75	9.48	11.96	17.21	26.96	41.86	50.88	75.63	128.9	183.73	238.01	361.38
	750	4.7	2.02	3.17	4.3	7.46	9.11	13.25	20.98	31.74	39.56	58.52	90.72	130.55	170.02	251.62
180	1500	8.3	3.58	5.63	7.67	12.7	16.2	23	36.8	56.4	69.37	102.77	155.85	223.84	291.83	445.28
	1000	5.6	2.39	3.75	5.12	8.93	10.77	15.46	24.66	37.54	46.65	77.74	103.41	149.32	192.65	292.84
	750	4.2	1.79	2.82	3.84	6.63	8.19	11.78	18.4	28.62	33.95	51.43	82.16	117.67	153	225.59
200	1500	7.5	3.22	5.06	6.9	11.23	13.99	20.8	31.56	48.86	62.93	89.98	142.97	200.2	265.15	391.19
	1000	5	2.15	3.38	4.6	7.36	9.11	13.9	20.61	33.03	41.22	59.62	104.98	145.55	193.66	284.28
	750	3.8	1.61	2.53	3.45	5.8	7	10.68	16.1	25.03	32.11	46.19	73.79	103.41	138.37	197.9
224	1500	6.7	2.88	4.52	6.17	9.85	12.42	18.4	28.34	44.35	56.03	80.96	126.78	177.38	237.55	350.25
	1000	4.5	1.92	3.01	4.11	7	8.28	12.42	18.96	29.54	37.72	53.92	84.09	118.32	156.77	231.94
	750	3.3	1.44	2.27	3.09	5.16	6.26	9.39	14.17	22.27	27.42	40.48	66.89	93.2	124.48	177.38
250	1500	6	2.51	3.37	5.38	8.65	10.95	15.92	24.94	38.83	50.6	71.58	109.12	164.87	209.12	315.29
	1000	4	1.67	2.25	3.58	6.08	7.27	10.77	16.75	26.22	34.14	47.75	72.5	109.94	138	208.75
	750	3	1.26	1.69	2.69	4.42	5.62	8.1	12.42	19.97	24.84	35.79	57.6	86.67	109.58	159.72
280	1500	5.4	2.24	3.01	4.8	7.64	10.31	14.72	22.45	34.78	43.7	62.1	93.94	138.56	183.18	274.53
	1000	3.6	1.5	2.01	3.21	5.34	7	9.94	15.09	23.46	29.44	41.4	62.38	92.37	120.98	181.89
	750	2.7	1.12	1.51	2.41	3.96	5.25	7.46	11.23	17.94	21.44	31.1	49.59		96.05	139.02
315	1500	4.8	1.99	2.68	4.26	6.72	9.11	12.52	19.78	31.28	38.46	54.84	82.62	128.71	161.19	247.12
	1000	3.2	1.33	1.79	2.85	4.7	6.08	8.47	13.25	21.16	25.95	36.62	54.84	85.84	106.45	163.67
	750	2.4	1	1.34	2.14	3.41	4.7	6.44	9.94	16.1	18.86	27.42	43.61	67.72	84.55	125.22
355	1500	4.2	1.77	2.38	3.79	6.08	8.38	11.41	19.05	27.88	34.69	49.96	75.17	114.18	142.97	219.33
	1000	2.8	1.18	1.59	2.53	4.24	5.62	7.73	12.42	18.77	23.37	33.31	49.96	76.09	94.4	145.27
	750	2.1	0.89	1.19	1.9	3.13	4.24	5.89	9.48	14.26	17.02	25.03	39.66	59.99	74.98	111.14

*kw* ratings in italic --- forced feed lubrication required



**TORQUE RATINGS**

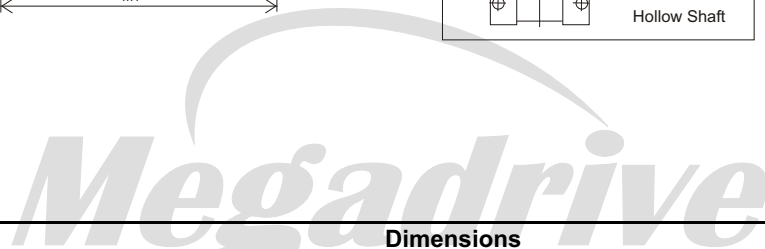
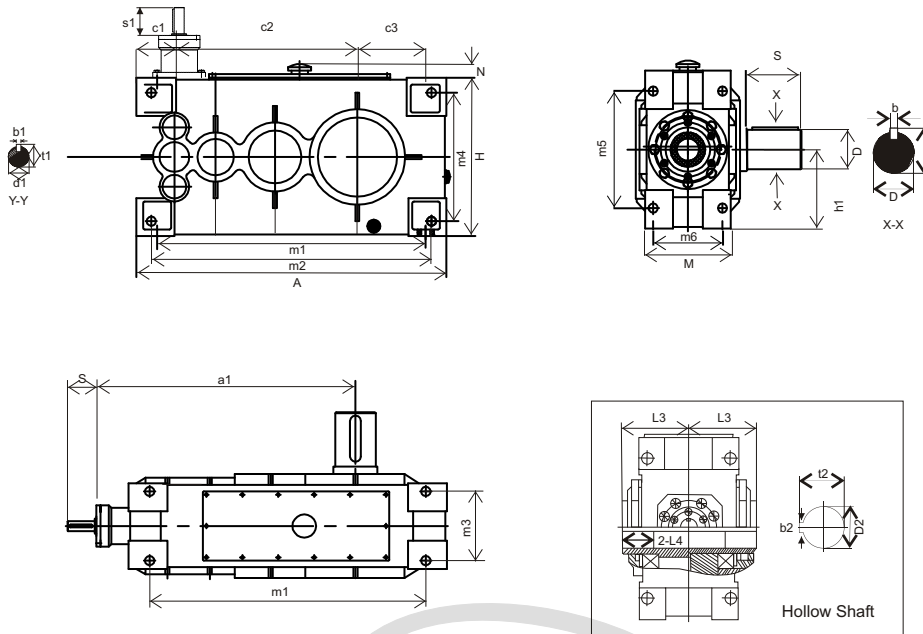
**BEVEL HELICAL GEAR UNIT - FOUR STAGE 4SBH**

Table 7a -- Nominal Output Torque - Bevel Helical Gear Reducer - 4SBH

Gear Ratio (iN)	Size 4SBH													
	Nominal Output Torque in Nm - Tn													
	07	08	09	10	11	12	13	14	15	16	17	18	19	20
56	4589	6424	8718	12935	15034	25870	31679	50618	65993	95426	125640	216234	239468	337188
63	4591	6425	8715	12850	16914	26578	35639	56945	70893	100490	141345	239803	269401	379336
71	4651	6515	8843	13744	18388	27425	38659	62130	73301	107064	161537	242745	307887	433527
80	4625	6474	8786	14199	19470	28397	40065	64103	77809	113445	168832	241159	313907	468329
90	4109	6451	8794	14090	19472	27150	40210	63481	72740	112952	177937	256773	329119	502702
100	4104	6441	8786	14234	17924	25831	40592	62118	76966	114570	173173	249435	322007	488766
112	4164	6540	8916	14278	18172	25859	39937	62701	78176	114618	178316	255394	329076	502001
125	4097	6447	8786	14388	17902	25700	40636	62052	77647	115866	172536	246667	321348	486745
140	4121	6485	8836	15840	17944	25864	45787	62245	85633	126717	177205	254794	327805	497833
160	4138	6491	8857	14597	18423	26500	41521	64478	78366	116486	198536	282995	366603	556636
180	4064	6386	8724	15219	18357	26358	42048	64013	79545	132575	176348	254638	328534	499390
200	4095	6449	8786	14058	17397	26534	39362	63084	78723	113867	200497	277990	369891	542975
224	4062	6385	8708	14839	17572	26358	40221	62674	80051	114414	178454	251085	332697	492212
250	3976	5360	8545	14497	17353	25700	39977	62601	81491	113999	173085	262482	329475	498386
280	3954	5321	8494	14156	18549	26358	40026	62235	78098	109825	165470	245032	320934	482498
315	3954	5327	8484	14003	18122	25260	39537	63150	77427	109276	163640	256167	317669	488447
355	4017	5398	8598	14435	19141	26358	42362	64013	79702	113591	170386	259501	321945	495468



4SBH - DIMENSIONS



Gear Size	Dimensions																						
	A	m1	m2	m3	M	H	c1	c2	c3	N	m4	m5	m6	a1	h1	d1 (m6)	b1	t1	s1	D (m6)	b	t	S
07	640	550	585	145	180	290	90	352	153	40	235	200	145	542	145	18	6	20.5	40	75	20	79.5	105
08	705	610	650	160	195	320	96	395	166.5	40	265	225	160	595	160	20	6	22.5	50	85	22	90	130
09	780	670	710	170	210	360	102	440	183	40	290	250	170	655	180	22	6	24.5	50	95	25	100	130
10	850	740	780	190	230	430	108	496	191	40	360	320	190	716	215	25	8	28	60	110	28	116	165
11	940	815	850	210	260	480	115	555	207.5	50	252	355	210	795	240	30	8	33	80	120	32	127	165
12	1020	895	930	240	300	530	120	620	217.5	50	440	405	240	880	265	35	10	38	80	130	32	137	200
13	1145		1035	260	320	580		699	250	50	470	440	260		290	40	12	43	80	150	36	158	200
14	1270	1125	1160	290	350	630	140	785	272.5	50	520	490	290	1100	315	45	14	48.5	110	170	40	179	240
15	1430	1270	1310	315	390	710	160	880	310	60	590	550	315	1240	355	50	14	53.5	110	190	45	200	240
16	1630	1470	1510	395	470	800	180	989	381	70	680	640	395	1394	400	55	16	59	110	220	50	231	280
17	1815	1635	1675	440	530	900	200	1105	420	70	760	720	440	1555	450	60	18	64	140	240	56	252	330
18	2045	1865	1905	510	600	1000	225	1240	490	80	860	820	510	1745	500	65	18	69	140	280	63	292	380
19	2300	2090	2140	570	670	1120	255	1395	545	80	960	910	570	1965	560	75	20	79.5	140	300	70	314	380
20	2590	2380	2430	640	740	1260	295	1565	625	80	1100	1050	640	2205	630	90	25	95	170	340	80	355	450

Hollow Output Shaft c/w Keywaying	Dimensions	Gear Size													
		07	08	09	10	11	12	13	14	15	16	17	18	19	20
	L3	130	140	150	165	180	195	205	235	260	300	345	390	435	470
	L4	50	50	60	60	90	70		90	110	110	130	130	200	150
	D2 (H7)	75	85	95	105	115	130	150	170	190	220	240	270	300	340
	t2	79.5	90	100	111	122	137	158	179	200	231	252	282	314	355
	b2	20	22	25	28	32	32	36	40	45	50	56	63	70	80



**THERMAL RATINGS**

**HELICAL GEAR UNIT - SINGLE STAGE 1SHH**

Table 8 -- Thermal Power for Gear Reducer Size 1SHH

Cooling Conditions & Heat Dissipation			Gear Size 1SHH																				
PG 1	No Cooling System	Ventilation Conditions	Ambient Airflow Rate	PG 1 (Kw)																			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		In small workshop	> 0.5	13	16	20	25	31	38	48	61	77	94	115	145	182	228	286	365	440	542		
		In large open space	> 1.4	18	23	29	35	43	54	68	86	110	132	160	210	270	320	415	515	620	770		
	Outdoor	> 3.7	24	30	38	47	58	73	92	115	145	178	220	275	360	425	550	690	840	1020			
PG 2	Forced Feed Cooling System	Ventilation Conditions	Ambient Airflow Rate	PG 2 (Kw)																			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		In small workshop	> 0.5				76	90	127	180	232	300	353	415	490	610	695	870	1010	1190	1300		
		In large open space	> 1.4				87	100	140	200	257	330	391	465	550	695	790	1000	1160	1380	1530		
		Outdoor	> 3.7				104	120	162	220	283	365	435	520	625	790	900	1140	1340	1600	1780		
	Water Pipe Diameter					0.08	0.08	0.12	0.12	0.12	0.12	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2				



**THERMAL RATINGS**

**HELICAL & BEVEL HELICAL UNIT - TWO STAGE 2SHH & 2SBH**

Table 9 -- Thermal Power for Gear Reducer Size 2SHH and 2SBH

Cooling Conditions & Heat Dissipation			Gear Size 2SHH & 2SBH																				
PG 1	No Cooling System	Ventilation Conditions	PG 1 (Kw)																				
		Ambient Airflow Rate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
		In small workshop	> 0.5	8	10	13	16	20	24	30	38	48	60	74	92	115	145	181	226	276	345	430	540
		In large open space	> 1.4	10	12	16	20	28	35	43	54	67	87	105	130	165	210	225	320	405	485	620	760
	Outdoor	> 3.7	13	17	22	30	38	47	57	73	88	115	140	175	220	275	345	420	530	650	810	1000	
PG 2	Forced Feed Cooling System	Ventilation Conditions	PG 2 (Kw)																				
		Ambient Airflow Rate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
		In small workshop	> 0.5				34	41	98	104	150	170	200	225	266	280	305	365	415	490	550	680	800
		In large open space	> 1.4				38	50	109	116	170	190	225	260	305	330	370	440	510	620	690	870	1010
	Outdoor	> 3.7				48	60	120	130	200	210	250	290	350	385	435	530	610	750	860	1060	1250	
	Water Pipe Diameter				0.08	0.08	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	



**THERMAL RATINGS**

**HELICAL & BEVEL HELICAL UNIT - THREE STAGE 3SHH & 3SBH**

**Table 10 -- Thermal Power for Gear Reducer Size 3SHH and 3SBH**

Cooling Conditions & Heat Dissipation			Gear Size 3SHH & 3SBH																				
PG 1	No Cooling System	Ventilation Conditions	PG 1 (Kw)																				
		Ambient Airflow Rate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
		In small workshop	> 0.5				12	15	19	24	30	37	45	56	69	86	110	135	165	208	258	322	400
		In large open space	> 1.4				18	22	27	34	42	52	64	80	98	116	155	190	235	300	365	450	570
	Outdoor	> 3.7				24	30	37	46	57	69	87	108	132	162	205	250	310	400	475	600	760	
PG 2	Forced Feed Cooling System	Ventilation Conditions	PG 2 (Kw)																				
		Ambient Airflow Rate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
		In small workshop	> 0.5				46	53	61	70	77	92	106	150	160	180	210	350	370	430	480	700	770
		In large open space	> 1.4				53	61	71	80	89	107	125	175	190	210	255	400	440	520	590	820	940
		Outdoor	> 3.7				60	69	79	90	105	124	148	200	225	255	310	460	510	620	700	970	1150
	Water Pipe Diameter				0.08	0.08	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	



**THERMAL RATINGS**

**HELICAL & BEVEL HELICAL UNIT - FOUR STAGE 4SHH & 4SBH**

Table 11 -- Thermal Power for Gear Reducer Size 4SHH and 4SBH

Cooling Conditions & Heat Dissipation			Gear Size 4SHH & 4SBH																			
PG 1	No Cooling System	Ventilation Conditions	PG 1 (Kw)																			
		Ambient Airflow Rate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		In small workshop > 0.5							19.2	23.7	28.5	33.8	42.4	51.8	64.3	83	101	120	157	193	241	296
		In large open space > 1.4							26.9	32.7	40.4	47.1	61	73.9	81.6	114	160	173	222	275	327	428
	Outdoor > 3.7							37.1	44.5	54.1	65.8	83.3	99.6	119	153	181	229	302	347	444	578	
PG 2	Forced Feed Cooling System	Ventilation Conditions	PG 2 (Kw)																			
		Ambient Airflow Rate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		In small workshop > 0.5							47.1	39.5	49.8	56.2	100	96.2	116	145	336	330	377	419	721	741
		In large open space > 1.4							55.2	46.6	60.3	69.4	118	118	134	176	364	380	436	504	773	875
	Outdoor > 3.7							62.3	55.1	73.2	87.6	138	145	169	221	399	426	513	570	888	1058	
	Water Pipe Diameter							0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	

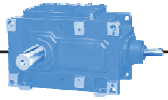


Table 12 -- Moment of Inertia

Gear Size	Ratio (IN)															
	1.25	1.4	1.6	1.8	2	2.24	2.5	2.8	3.15	3.55	4	4.5	5	5.6	8	
01	0.001963	0.001731	0.001503	0.001319	0.001178	0.001037	0.000899	0.000794	0.000664	0.000537	0.000442	0.000377	0.000329	0.000277	0.00063	
02	0.00363	0.003196	0.00274	0.002393	0.002133	0.001884	0.001574	0.001376	0.001143	0.000963	0.000846	0.000698	0.000606	0.000519	0.001008	
03	0.005916	0.005208	0.00452	0.003957	0.003528	0.00309	0.002668	0.002301	0.001906	0.001632	0.001398	0.0012	0.001002	0.000826	0.001613	
04	0.010534	0.009285	0.00797	0.006975	0.006217	0.005461	0.00485	0.00406	0.003399	0.002927	0.002522	0.002075	0.001782	0.001488	0.002581	
05	0.018119	0.01597	0.013876	0.012142	0.010815	0.009448	0.008209	0.007148	0.006119	0.005175	0.004446	0.003833	0.003106	0.002653	0.004129	
06	0.031961	0.028479	0.024425	0.021378	0.019056	0.016259	0.014287	0.012477	0.010532	0.008879	0.007469	0.006372	0.00547	0.00457	0.006606	
07	0.059019	0.052159	0.045355	0.039828	0.035603	0.0304	0.026817	0.023525	0.019742	0.017068	0.014678	0.012282	0.0102	0.008537	0.01057	
08	0.110773	0.09793	0.085498	0.075063	0.0671	0.056534	0.049795	0.043607	0.03662	0.031407	0.026773	0.023021	0.019087	0.016284	0.01831	
09	0.182398	0.161082	0.140322	0.123172	0.110074	0.094586	0.083493	0.073287	0.060333	0.051797	0.044467	0.038019	0.031827	0.026605	0.03079	
10	0.324735	0.289681	0.247647	0.216264	0.191968	0.168286	0.147602	0.129222	0.108899	0.093943	0.080131	0.067339	0.056777	0.047427	0.04635	
11	0.554181	0.489566	0.426483	0.373881	0.333552	0.28747	0.253863	0.223037	0.185202	0.159058	0.136603	0.114475	0.095497	0.081481	0.09714	
12	0.99163	0.879323	0.757092	0.664729	0.594106	0.508906	0.448208	0.392289	0.324496	0.279146	0.234085	0.20082	0.177395	0.146629	0.15846	
13	1.758998	1.55849	1.342089	1.174208	1.05695	0.929497	0.803784	0.694512	0.577994	0.498017	0.41945	0.350897	0.301892	0.255446	0.25936	
14	3.205687	2.838488	2.442138	2.148946	1.918717	1.674421	1.451984	1.25131	1.054498	0.908781	0.760229	0.651757	0.552089	0.472941	0.49831	
15	5.580507	4.988915	4.269471	3.729914	3.310959	2.931744	2.584519	2.264434	1.898435	1.624044	1.392784	1.164287	0.973502	0.833924	0.92597	
16	10.00525	8.944358	7.675375	6.708564	5.958153	5.222525	4.567066	3.992644	3.415104	2.946523	2.513238	2.094508	1.796099	1.541743	1.5886	
17	17.06125	15.11057	12.99168	11.37444	10.12244	8.896579	7.818861	6.862855	5.874914	4.916906	4.215343	3.522685	3.000628	2.577495	2.81946	
18	30.68604	27.24094	23.46621	20.60447	18.41177	16.13585	13.90812	12.22177	10.32568	8.700316	7.414315	6.228243	5.398551	4.615335	4.5384	
19																
20																

MOMENT OF INERTIA

RATIOS 1.25 TO 8



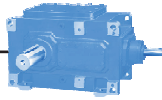
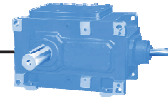


Table 12(a) -- Moment of Inertia

Gear Size	Ratio (IN)														
	10	11.2	12.5	14	16	18	20	22.4	25	28	31.5	35.5	40	45	50
01	0.000592	0.000571	0.00042	0.000407											
02	0.000948	0.000914	0.000672	0.000651											
03	0.001517	0.001462	0.001076	0.001042											
04	0.002427	0.002339	0.001721	0.001667	0.00086	0.000791	0.00073	0.000717	0.000693	0.000501	0.000486	0.000352	0.000341	0.000261	0.000255
05	0.003883	0.003742	0.002754	0.002668	0.001433	0.001318	0.001217	0.001195	0.001156	0.000835	0.00081	0.000587	0.000569	0.000436	0.000425
06	0.006213	0.005988	0.004406	0.004269	0.002388	0.002196	0.002028	0.001992	0.001926	0.001392	0.00135	0.000978	0.000948	0.000726	0.000708
07	0.00994	0.00958	0.00705	0.00683	0.00398	0.00366	0.00338	0.00332	0.00321	0.00232	0.00225	0.00163	0.00158	0.00121	0.00118
08	0.01677	0.01612	0.01143	0.01103	0.00741	0.00696	0.00651	0.0064	0.00603	0.00463	0.00439	0.00304	0.00288	0.00227	0.00217
09	0.02838	0.02793	0.02274	0.02245	0.01246	0.01202	0.01133	0.01114	0.01055	0.00757	0.0072	0.00576	0.00552	0.00404	0.00389
10	0.04173	0.04173	0.04064	0.03494	0.02341	0.02173	0.02101	0.02063	0.01952	0.01499	0.01427	0.0106	0.01013	0.00746	0.00717
11	0.08983	0.08983	0.08848	0.06207	0.03848	0.03583	0.03337	0.03281	0.03079	0.02432	0.02301	0.01786	0.017	0.01209	0.01157
12	0.14536	0.14536	0.14067	0.09863	0.0702	0.06548	0.06126	0.06026	0.05859	0.04871	0.04762	0.03006	0.02938	0.02382	0.02339
13	0.23334	0.23334	0.22929	0.1642	0.11248	0.10293	0.09498	0.0929	0.08921	0.06974	0.06735	0.0448	0.04331	0.03762	0.03665
14	0.45614	0.45614	0.43219	0.34379	0.22435	0.20942	0.19608	0.1926	0.18733	0.15535	0.15172	0.09577	0.09361	0.06683	0.06542
15	0.83713	0.83713	0.81261	0.61721	0.36909	0.34061	0.31933	0.313	0.29676	0.25302	0.24113	0.15672	0.14965	0.10909	0.10498
16	1.44287	1.44287	1.4088	1.01517	0.65306	0.60007	0.55775	0.54	0.53135	0.42348	0.41269	0.25179	0.24537	0.17886	0.17468
17	2.591	2.591	2.47706	1.57234	1.2603	1.16649	1.10488	1.09875	1.03113	0.78718	0.74056	0.49213	0.46443	0.3809	0.36285
18	4.19434	4.19434	4.07979	2.76643	2.58408	2.40918	2.24261	2.22933	2.14037	1.63366	1.57647	0.89878	0.86463	0.6738	0.65137
19					4.15133	3.8453	3.59063	3.52724	3.40849	2.70359	2.62297	1.53826	1.49011	1.10017	1.06856
20					7.19955	6.918	6.3243	6.19212	5.84199	4.36953	4.13182	2.77957	2.6315	1.76279	1.66957

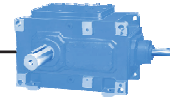


**MOMENT OF INERTIA**

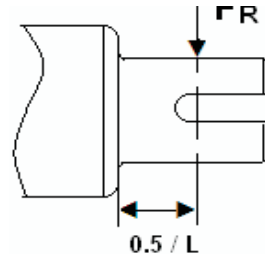
**RATIOS 56 TO 250**

Table 12(b) -- Moment of Inertia

Gear Size	Ratio (IN)															
	56	63	71	80	90	100	112	125	140	160	180	200	224	250		
01																
02																
03																
04																
05																
06																
07	0.00091	0.00083	0.000761	0.000742	0.000748	0.000718	0.000521	0.000502	0.000365	0.000351	0.000269	0.000201	0.000195	0.000196		
08	0.001499	0.00137	0.001258	0.001228	0.001236	0.001188	0.000861	0.000831	0.000604	0.000582	0.000446	0.000333	0.000324	0.000325		
09	0.002466	0.002258	0.002077	0.00203	0.002039	0.001964	0.001423	0.001375	0.000998	0.000963	0.000738	0.000551	0.000536	0.000538		
10	0.004256	0.003878	0.003552	0.003455	0.00344	0.003307	0.002397	0.002312	0.00168	0.001618	0.00124	0.000927	0.0009	0.000898		
11	0.007887	0.007337	0.006806	0.006634	0.006606	0.006197	0.004763	0.004497	0.003125	0.002945	0.002322	0.001736	0.001653	0.001649		
12	0.013294	0.012679	0.011849	0.011549	0.0115	0.10842	0.007803	0.007387	0.005909	0.005634	0.00413	0.003088	0.002961	0.002954		
13	0.024919	0.022923	0.021949	0.02137	0.021285	0.02005	0.015413	0.014609	0.1087	0.010337	0.007624	0.0057	0.005456	0.005443		
14	0.04121	0.037987	0.035068	0.034148	0.033996	0.031751	0.025086	0.023625	0.01835	0.017375	0.012387	0.009263	0.008826	0.0088		
15	0.075117	0.069365	0.064319	0.06267	0.06241	0.060331	0.050098	0.048734	0.030948	0.03006	0.024357	0.018211	0.017802	0.017765		
16	0.121369	0.109954	0.10051	0.097256	0.096778	0.092351	0.072244	0.06936	0.046403	0.044537	0.03859	0.02886	0.027977	0.027909		
17	0.23999	0.221778	0.20581	0.200264	0.199169	0.192651	0.159592	0.155125	0.098485	0.095688	0.068472	0.051203	0.049881	0.048766		
18	0.396912	0.362593	0.336638	0.326633	0.324587	0.305146	0.260502	0.247137	0.161509	0.153316	0.111987	0.083757	0.080214	0.08		
19	0.700375	0.637455	0.587185	0.563185	0.560612	0.548046	0.43679	0.423375	0.260308	0.251892	0.184013	0.137652	0.133686	0.133354		
20	1.347019	1.235009	1.158828	1.141242	1.13857	1.061765	0.811602	0.760166	0.50776	0.476397	0.390355	0.291912	0.276889	0.276061		



**RADIAL LOAD**



Radial load at mid point of the output shaft extension

**Table 13 -- Radial Load - Fr KN**

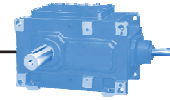
Gear Size	r/min (rpm)											
	12	13	15	17	19	21	24	27	30	33	38	42
04	18.197	17.56	16.945	16.352	15.78	15.227	14.694	14.234	13.414	12.902	12.237	11.93
05	22.746	21.95	21.181	20.44	19.725	19.034	18.368	17.792	16.768	16.128	15.296	14.912
06	28.432	27.437	26.477	25.55	24.656	23.793	22.96	22.24	20.96	20.16	19.12	18.64
07	35.54	34.296	33.096	31.937	30.82	29.741	28.7	27.8	26.2	25.2	23.9	23.3
08	42.599	41.108	39.669	38.28	36.941	35.648	34.4	32.8	31.5	29.9	28.7	27.5
09	51.514	49.711	47.972	46.293	44.672	43.109	41.6	40.1	37.5	36.1	34.7	33.3
10	62.04	59.869	57.773	55.751	53.8	51.917	50.1	48.4	45.8	43.6	41.7	40
11	78.882	76.121	73.456	70.886	68.405	66.01	63.7	61.4	57.6	55	53.2	51
12	90.398	87.234	84.181	81.235	78.391	75.648	73	69.7	66.1	63.4	61	58.6
13	107.98	104.2	100.56	97.036	93.64	90.363	87.2	84.1	78.4	75.1	72.5	67.2
14	128.54	124.04	119.7	115.51	111.47	107.56	103.8	100.1	93.1	90.1	86.2	81.6
15	137.22	133.1	129.11	125.24	121.48	117.84	114.3	111.3	103.9	99.7	91.3	86
16	173.24	168.04	163	158.11	153.36	148.76	144.3	139.4	138.5	132.5	130.9	126.3
17	227.02	220.21	213.6	207.19	200.98	194.95	189.1	171.4	163.9	157.5	153.9	145.6
18	237.85	233.1	228.43	223.87	219.39	215	210.7	207.7	195.6	189.7	174.8	169.9
19	282.56	276.9	271.37	265.94	260.62	255.41	250.3	245.3	244.7	236	219.2	203.3
20	294.07	288.19	282.43	276.78	271.24	265.82	260.5	258.5	251.9	243.2	240.3	230

**Table 13 -- Radial Load - Fr KN**

Gear Size	r/min (rpm)											
	48	54	60	67	75	83	94	107	120	134	150	180
04	11.469	11.059	10.035	9.5744	8.8576	8.704	8.448	8.448	8.0896	7.7824	7.3728	6.0416
05	14.336	13.824	12.544	11.968	11.072	10.88	10.56	10.56	10.112	9.728	9.216	7.552
06	17.92	17.28	15.68	14.96	13.84	13.6	13.2	13.2	12.64	12.16	11.52	9.44
07	22.4	21.6	19.6	18.7	17.3	17	16.5	16.5	15.8	15.2	14.4	11.8
08	26.6	25.4	23.9	22.7	22	21.2	20.6	20	18.9	18.4	17.4	14.9
09	32.2	31	28.4	27.8	26.9	25.9	25.2	25.2	22.8	22.4	20.4	19.2
10	38.5	37.1	35.7	33.9	32.7	31.2	30.2	30.2	28.9	28.7	27.2	22.5
11	49.2	47.5	44	41.7	41	39.5	38.2	36.8	33.6	33.8	29.8	23.5
12	56.3	53.3	50.5	48.7	41.7	46	39.1	39.1	39.1	83.3	34.9	23.8
13	65.9	64.7	62.3	57.8	57	56.9	55.5	53.5	47.7	48.5	41.4	36.3
14	78.8	73.2	69.6	61.1	57.8	61.2	65.2	64	62.8	59.5	57.9	49.3
15	84.7	81.8	73.6	69.5	67.2	66.9	65.9	64.1	64	60.1	59.8	51.7
16	118.8	112.9	107	99.5	93.3	85	80.3	70.3	70.3	65.2	62.8	61.5
17	135.9	124	110.3	120.3	111.7	101.5	92.4	78.5	77.3	76	74.9	72.9
18	165.2	160.7	152.5	142.2	122.9	105.3	95.8	85.4	84.6	83.8	83.6	81
19	203.7	188.6	170.5	162.7	149.2	140.6	115.6					
20	227.5	220.1	215	195.1	158.2	144.4	119.7					

Application of force outside the centre of shaft end  
 $FR = FR * K$

K = depends on distance and vary from 1.25 to 0.55  
 Please refer us with application details for us.



**LOAD CLASSIFICATION FACTORS**

**Table 14 - Load factor f1 - (for load classification, please refer to Appendix A)**

Prime Mover	Hours/Day	Load Classification					
		Small Impact Load		Medium Impact Load		Heavy Impact Load	
Motor, Water Engine, Steam Turbine	-3	0.8	( 1.05 )	1	( 1.25 )	1.25	( 1.50 )
	>3 / 10	1	( 1.25 )	1.25	( 1.50 )	1.5	( 1.75 )
	>10	1.25	( 1.50 )	1.5	( 1.75 )	1.75	( 2 )
4-6 Cylinder Piston Engine	-3	1	( 1.25 )	1.25	( 1.50 )	1.5	( 1.75 )
	>3 / 10	1.25	( 1.50 )	1.5	( 1.75 )	1.75	( 2 )
	>10	1.5	( 1.75 )	1.75	( 2 )	2	( 2.25 )
1-3 Cylinder Piston Engine	-3	1.25	( 1.50 )	1.5	( 1.75 )	1.75	( 2 )
	>3 / 10	1.5	( 1.75 )	1.75	( 2 )	2	( 2.25 )
	>10	1.75	( 2 )	2	( 2.25 )	2.25	( 2.5 )

Notes: For stop/start of more than 10 times per hour, please use factor listed in bracket

**Table 15 -- Safety coefficient f2**

Safety Co-efficient	General purpose equipment. Replacement to only a single unit and replacement of parts are available	Important installation. Failure will cause production line to shut down	High risk installation where safety is important and out of service unit can result in personal injury.
factor f2	1.1 / 1.3	1.3 / 1.5	1.5 / 1.7

**Table 16 -- Ambient temperature factor f3**

Type of Cooling Method	Ambient Temperature °C			
	10	20	30	50
	factor f3			
Without Any Cooling	0.9	1	1.35	1.65
Forced Feed Lubrication	0.9	1	1.2	0.56

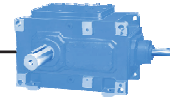
**Table 17 -- Load rate factor f4**

Hourly Rate x 100%	100	80	60	40	20
factor f4	1	0.94	0.86	0.74	0.56

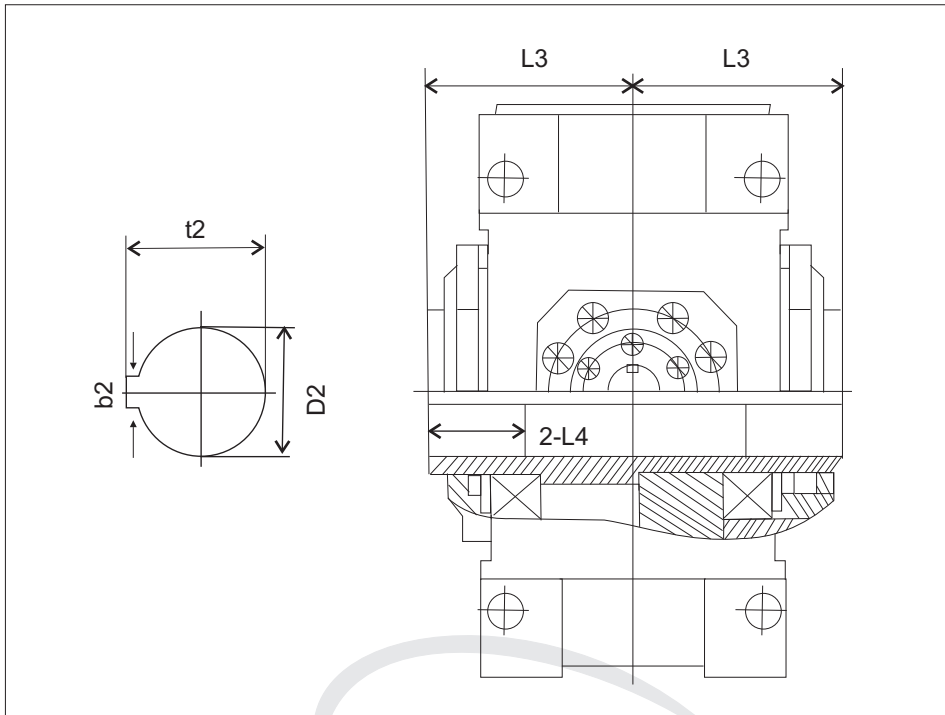
**Table 18 -- Duty rate factor for nominal power f5**

P1/Pn x 100%	30%	40%	50%	60%	70%	80 ? 100%
factor f5	1.5	1.25	1.15	1.1	1.05	1

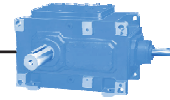
Notes: P1 = absorbed power  
Pn = nominal power of gear as in table 1, 2, 3, 4, 5, 6 & 7



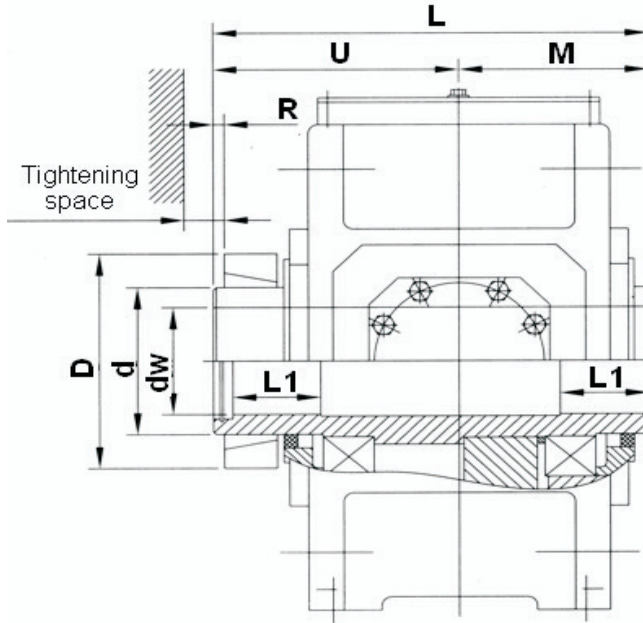
**DIMENSIONS OF HOLLOW SHAFT GEAR UNIT**



Gear Size	Dimensions				
	b2	t2	D2	L3	L4
01	10	41	38H7	80	35
02	12	45	42H7	85	35
03	14	51.5	48H7	95	40
04	16	58	54H7	100	40
05	18	64	60H7	105	45
06	18	69	65H7	115	45
07	20	79.5	75H7	130	50
08	22	90	85H7	140	50
09	25	100	95H7	150	60
10	28	111	105H7	165	60
11	32	122	115H7	180	70
12	32	137	130H7	195	70
13	36	158	150H7	205	90
14	40	179	170H7	235	90
15	45	200	190H7	260	110
16	50	231	220H7	300	110
17	56	252	240H7	345	130
18	63	282	270H7	390	130
19	70	315	300H7	435	150
20	80	355	340H7	470	150

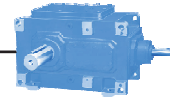


**HOLLOW SHAFT DESIGN WITH SHRINK DISC**

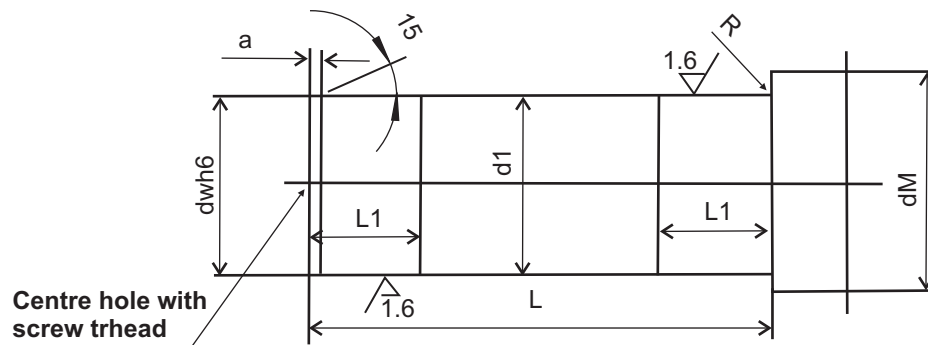


**Shrink Disc**

Gear Size	Hollow Shaft Dimensions						Shrink Disc Dimensions							
	dw	L	L1	M	R	U	Model	D	d	M Nm	Screw		Wt (kgs)	
											B	M2 (Nm)		
01	38	205	35	80	19	125	110 90 - 50	90	50	940	8 - 6 x 22	12	0.8	
02	42	215	35	85	16	130	110 100- 55	100	55	1160	8 - 6 x 22	12	1.1	
03	48	235	40	95	16	140	110 110- 62	110	62	1750	10 - 6 x 25	12	1.3	
04	54	250	40	100	21	150	110 115- 68	115	68	2500	12 - 6 x 25	12	1.4	
05	60	260	45	105	19	155	110 145- 80	145	80	3200	8 - 8 x 30	29	1.9	
06	65	290	45	115	22	175	110 155- 90	155	90	4750	10 - 8 x 30	29	3.3	
07	75	325	50	130	22	195	110 170- 100	170	100	7500	12 - 8 x 35	29	4.7	
08	85	355	50	140	26	215	110 185- 110	185	110	10800	10 - 10 x 4	58	5.9	
09	95	380	60	150	27	230	110 215- 125	215	125	15000	10 - 10 x 4	58	8.3	
10	105	415	70	165	27	250	110 230- 140	230	140	20100	10 - 12 x 5	100	10	
11	115	450	70	180	28	270	110 263- 155	263	155	28000	12 - 12 x 5	100	15	
12	130	485	90	195	27	290	110 300- 175	300	175	44000	8 - 16 x 55	240	22	
13	150	525	90	205	30	320	110 330- 185	330	185	76000	10 - 16 x 6	240	41	
14	170	610	110	235	37	375	110 370- 220	370	220	116000	15 - 16 x 7	240	54	
15	190	665	110	260	38	405	110 405- 240	405	240	156000	12 - 20 x 8	470	67	
16	220	765	130	300	33	465	110 460- 280	460	280	245000	15 - 20 x 9	470	102	
17	240	865	130	345	35	520	110 485- 300	485	300	293000	16 - 20 x 1	470	118	
18	270	970	150	390	35	580	110 570- 350	570	350	500000	24 - 20 x 1	470	204	
19	300	1075	150	435	42	640	110 645- 380	645	380	640000	18 - 24 x 1	820	239	
20	340	1165	150	470	41	695	110 690- 420	690	420	840000	20 - 24 x 1	820	316	



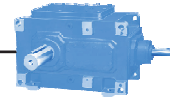
**DIMENSIONS OF MACHINE SHAFT - SHRINK DISC**



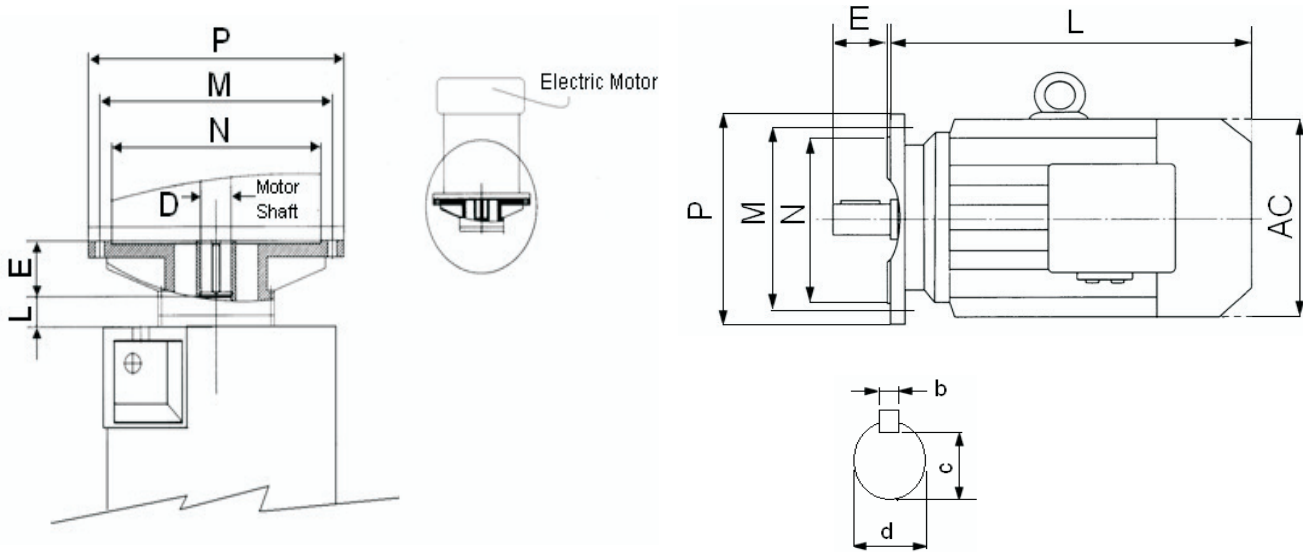
Note : When dw is greater or equal to 160, g6 tolerance to be used

**Output Shaft**

Gear Size	dimensions						
	a	dM<	dw	d1	L<	L1	R
01	3	50	38	36	193	35	1
02	3	54	42	40	203	35	1
03	3	60	48	46	223	40	1
04	4	69	54	52	235	40	1.2
05	4	75	60	58	245	45	1.2
06	4	80	65	63	275	45	1.2
07	5	95	75	73	310	50	1.6
08	5	105	85	83	340	50	1.6
09	5	120	95	93	360	60	1.6
10	5	130	105	103	395	60	1.6
11	6	160	115	113	430	70	2.5
12	6	180	130	128	465	70	2.5
13	6	200	150	148	500	90	2.5
14	6	230	170	168	585	90	2.5
15	8	260	190	188	640	110	4
16	8	280	220	218	735	110	4
17	10	300	240	238	835	130	4
18	10	340	270	268	940	130	4
19	12	380	300	298	1040	150	6
20	12	430	340	338	1130	150	6



MOTOR FLANGE FOR BEVEL HELICAL UNIT

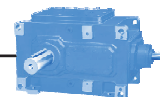


Assembly distance between Bevel Helical unit and Flange mounting motor - Distance L

Dimension	Gear Size																			
	01	02	03	04	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
L						30	30	35	35	45	45	45	45	50	50	50	50	55	55	

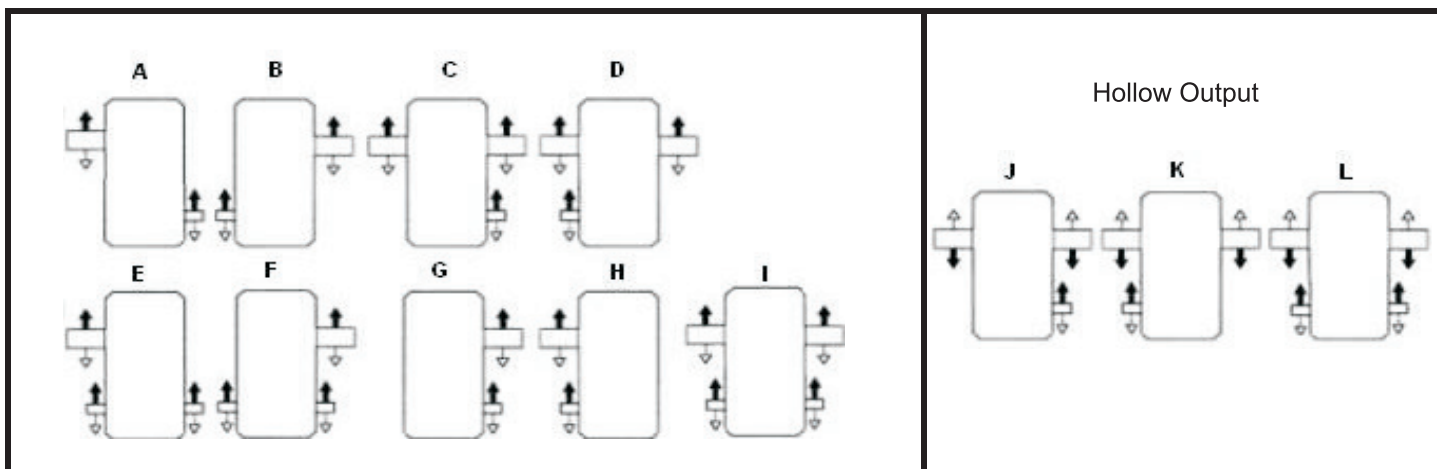
Motor Frame Size	Dimensions ( mm )													Motor Power							
	M	N	P	n	d		E		b		c		AC	L		motor poles /n1 (rpm)					
					2P	4P	2P	4P	2P	4P	2P	4P		2P	4P	2P	4P	2P	4P	6P	8P
						6P		8P		6P		8P			6P						
80	165	130j6	200	4 x ø12	19j6		40		6		15.5		175	255	0.75	0.55	0.37	0.08			
90 S	165	130j6	200	4 x ø12	24j6		50		8		20		195	270	1.5	1.1	0.75	0.37			
90 L	165	130j6	200	4 x ø12	24j6		50		8		20		195	295	2.2	1.5	1.1	0.55			
100 M	215	180j6	250	4 x ø15	28j6		60		8		24		215	325	3	2.2	1.5	0.75			
112 M	215	180j6	250	4 x ø15	28j6		60		8		24		240	340	4	4	2.2	1.5			
132 S	265	230j6	300	4 x ø15	38k6		80		10		33		275	395	5.5	5.5	3	2.2			
132 M	265	230j6	300	4 x ø15	38k6		80		10		33		275	435	7.5	7.5	4	3			
160 M	300	250j6	350	4 x ø19	42k6		110		12		37		330	495	11	11	7.5	4			
160 L	300	250j6	350	4 x ø19	42k6		110		12		37		330	560	15	15	11	7.5			
180 M	300	250j6	350	4 x ø19	48k6		110		14		42.5		380	590	18.5	18.5	11	7.5			
180 L	300	250j6	350	4 x ø19	48k6		110		14		42.5		380	630	22	22	15	15			
200 L	350	300j6	400	4 x ø19	55m6		110		16		49		420	665	30	30	18.5	15			
225 S	400	350j6	450	8 x ø19	-	60m6	-	140	-	18	-	53	470	680	37	37	30	18.5			
225 M	400	350j6	450	8 x ø19	55m6	60m6	110	140	18	18	49	53	470	705	45	45	30	22			
250 M	500	450j6	550	8 x ø19	60m6	65m6	140	140	18	18	53	58	510	795	55	55	37	30			
280 S	500	450j6	550	8 x ø19	65m6	75m6	140	140	18	20	58	67.5	580	860	75	75	45	37			
280 M	500	450j6	550	8 x ø19	65m6	75m6	140	140	18	20	58	67.5	580	920	90	90	55	45			
315 S	600	550j6	660	8 x ø24	65m6	80m6	140	170	18	22	58	71	645	1010	110	110	75	75			
315 M	600	550j6	660	8 x ø24	65m6	80m6	140	170	18	22	58	71	645	1180	132	132	90	90			
315 L	600	550j6	660	8 x ø24	65m6	80m6	140	170	18	22	58	71	645	1200	160	160	110	110			



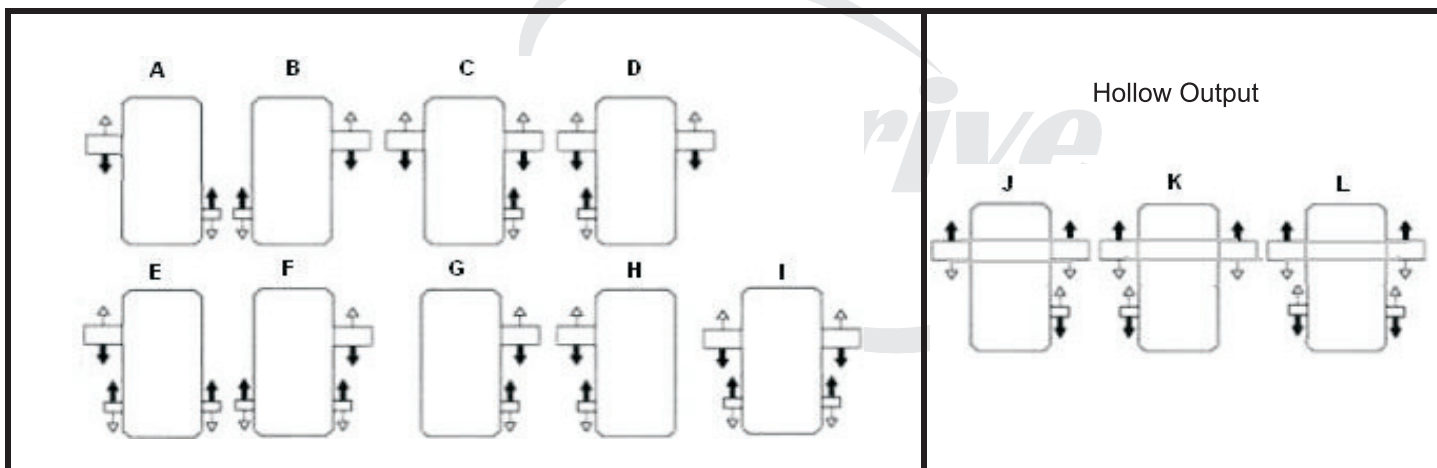


Shaft Position

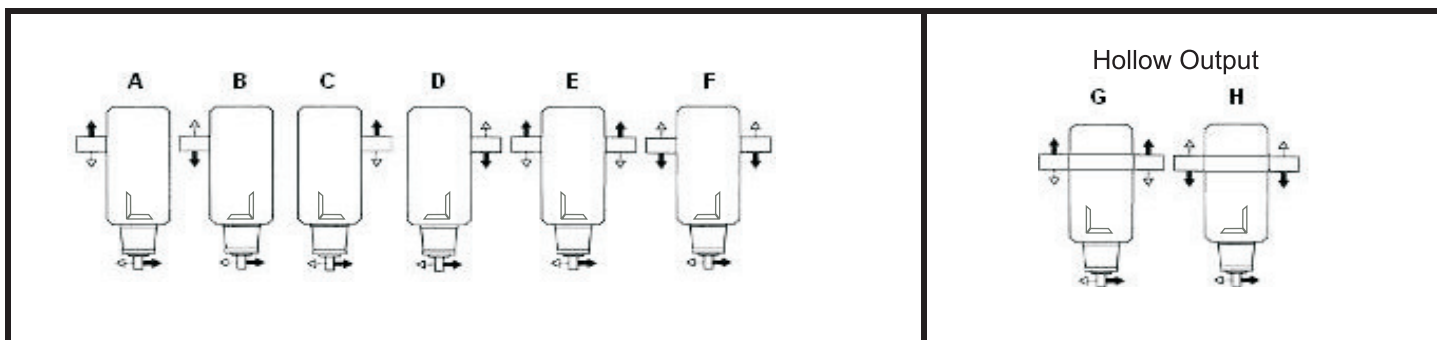
1 SHH / 3 SHH

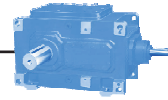


2 SHH / 4 SHH



2 SBH / 3 SBH / 4 SBH



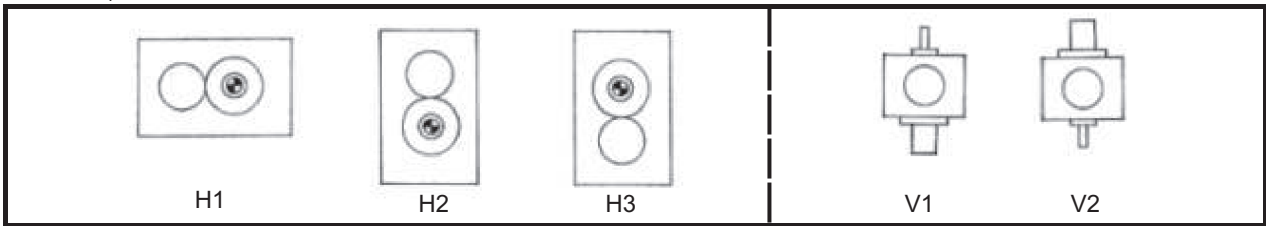


**Mounting Position**

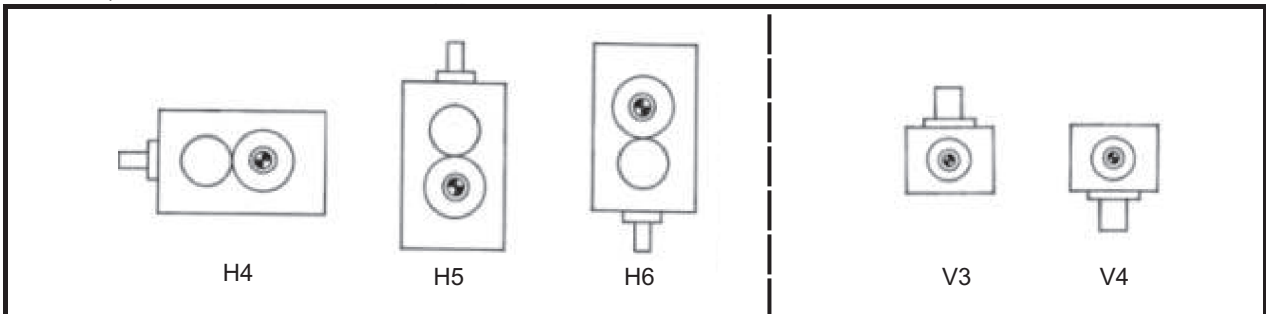
1 SHH / 2 SHH / 3 SHH / 4 SHH - Solid Input Shaft  
 Solid Output Shaft  
 Hollow Output Shaft

Horizontal

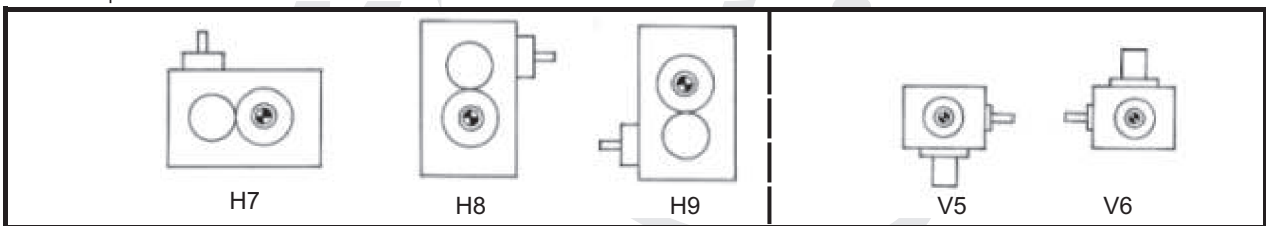
Vertical



2 SBH / 3 SBH / 4 SBH - Solid Input Shaft  
 Solid Output Shaft  
 Hollow Output Shaft

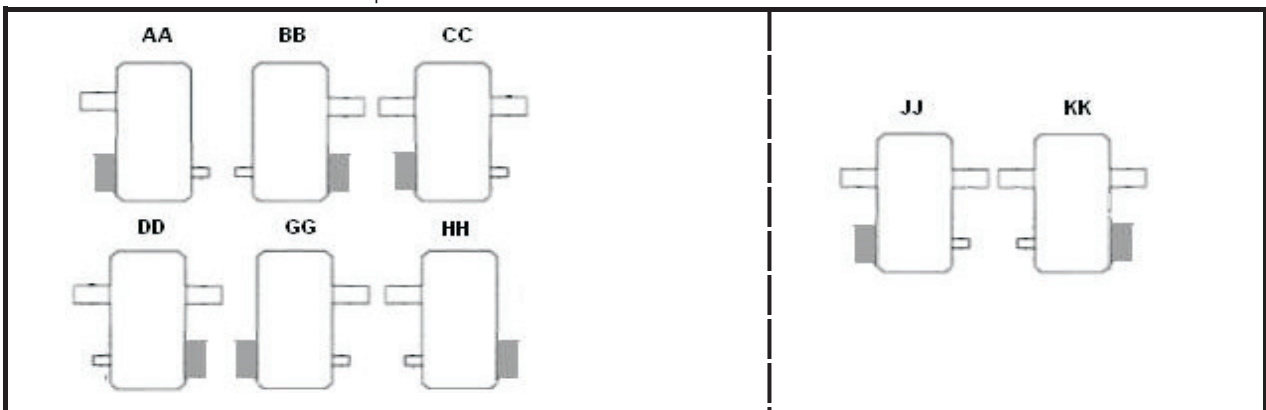


2 SBH / 3 SBH / 4 SBH - Vertical Input  
 Solid Output Shaft  
 Hollow Output Shaft

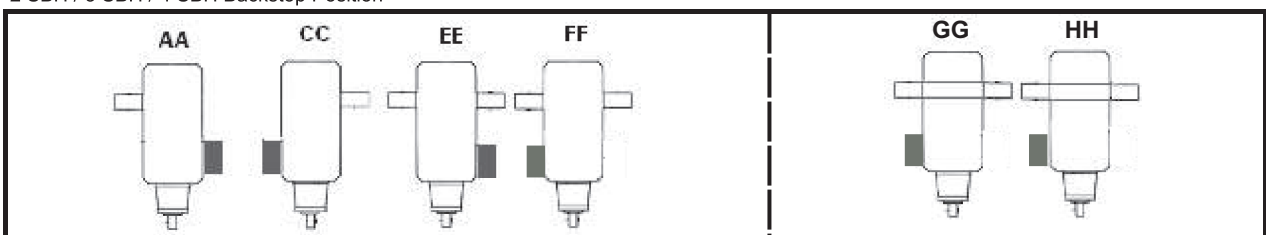


**Backstop Position**

1 SHH / 2 SHH / 3 SHH / 4 SHH Backstop Position



2 SBH / 3 SBH / 4 SBH Backstop Position





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