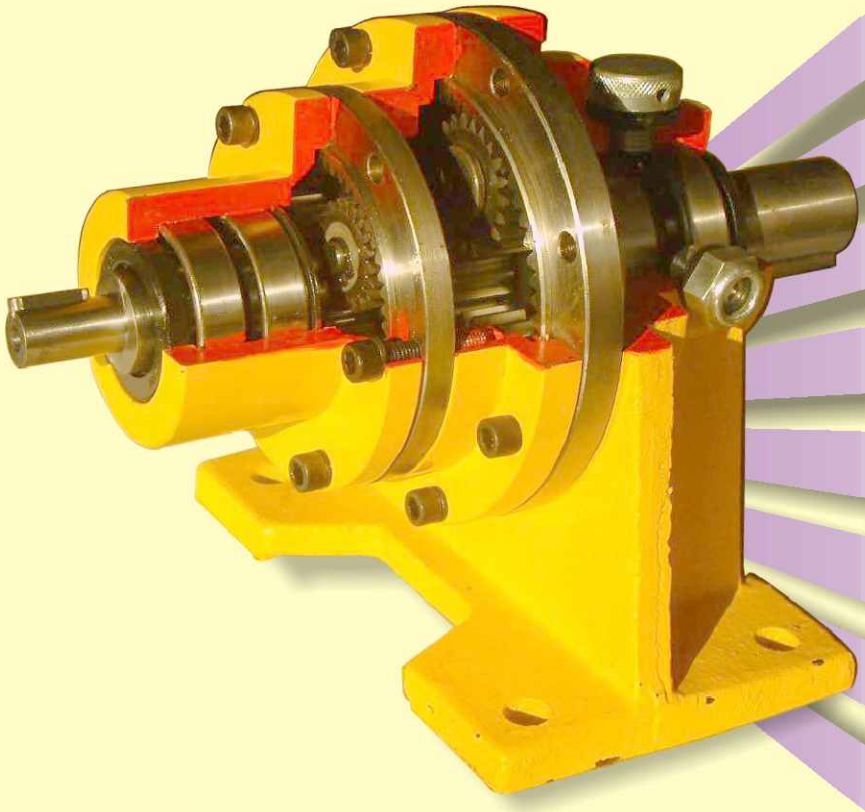
TRANSMATIX

PLANETARY GEAR BOXES

SAVE POWER, CUT COST

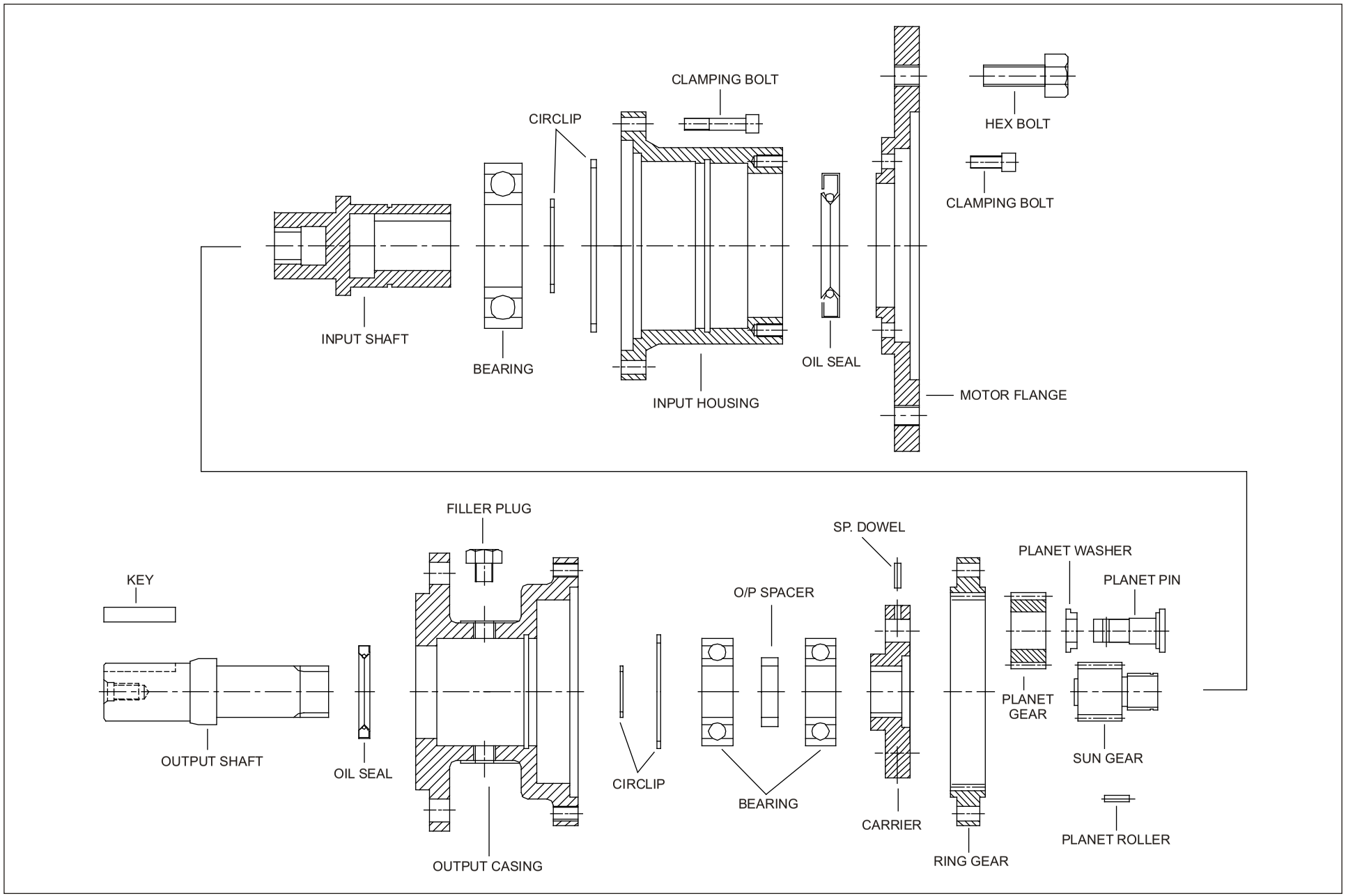


- MATERIAL HANDLING
- PROCESS EQUIPMENTS
- DRYERS, SCREW CONVEYORS
- CHAIN / BELT CONVEYORS
- AGITATORS, MIXERS
- FOOD / PHARMA MACHINERY
- CONSTRUCTION MACHINERY
- AND..... MANY MORE

SPECIAL FEATURES

- Compact Size, High efficiency
- No Oil Leakage
- Low noise
- Full complementary roller bearing for planets
- Gears made from best quality alloy steel, case carburised & ground
- All Shafts made of special alloy steel, hardened & tempered
- Only SKF / FAG bearings on all high speed shafts
- Long & troublefree performance

EXPLODED VIEW OF PLANTRY GEAR BOX



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1 GENERAL INFORMATION

1.1 INTRODUCTION

'TRANSMATIX' is a registered Partnership Firm having its registered office in Mumbai & Manufacturing facility at Satara. It is engaged in manufacturing and supplying high quality **Planetary Gear Boxes.** These are of modular construction and hence can be offered in single, double, triple or multiple stages as a standard product. These modular stages can also be combined with worm, bevel or helical gearing stages to give special gear boxes as per customer's requirement.

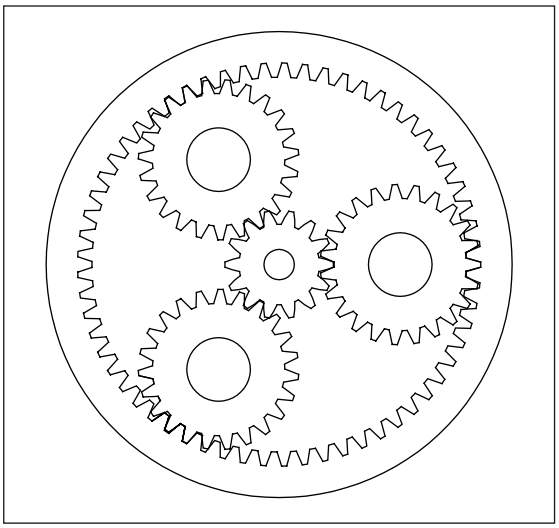
Our standard Planetary gear boxes are available in:
- Foot , Flange or Agitator mounting
- Free shaft input or Hollow shaft input to suit standard IEC frame sizes of Electric Motors. This particular provision eliminates the mounting of the motor, center height adjustments & misalignments between motor & gear box.

We also manufacture non-standard custom-built gear boxes, winches etc. as per requirement.

1.2 CONSTRUCTION

Planetary gear box works on planetary motion principle. Each stage of the planetary gear box consists of a central Sun Gear meshing with accurately positioned three Planet Gears around it which in turn mesh with the internal teeth of the outer Ring Gear (Fig.1). Normally, the Ring gear is stationary & forms the part of the housing, input is given to the sun gear & output is derived from the three planet gears through a planet carrier. However, out of these three members any one can be held stationary, second can be driven by input and the output can be derived from the third member. Due to this flexibility, planetary gear boxes have a large variety and innumerable applications like Winches, Track Drives, Wheel Hubs, Differential Planetary, Composite Planetary etc. As total load is shared by three planets, the torque handling capacity of this type of gear box is very high compared to all other types of gear boxes. Hence, in all high torque applications, planetary gear box is the only economical solution and is most preferred worldwide. It also gives the highest weight /volume ratio i.e. in a given space, this type of gear box can handle the highest torque.

Fig 1.



1.3 SPECIAL FEATURES

Various Special features of our planetary gear boxes are as under:
1) All shafts are made of special alloy steel and are hardened and tempered.
2) Sun and Planet gears are made of case carburising alloy steel & are case carburised and ground.
3) The Ring Gear is made of forged alloy steel.
4) Full complimentary roller bearing for planets. (except for Model 019)
5) Accurate positioning of planets and hence, best load sharing.
6) Good quality bearings for input and output shafts.
7) High efficiency
8) Low noise level
9) No oil leakages
10) Taper roller bearings on output shafts for bigger models
11) Long and trouble free performance

1.4 NOMENCLATURE

Every gear box manufactured and supplied by us has got a specific code number and a unique serial number. This combination of code number and serial number helps us in exactly identifying the unit supplied. The code number of the gear box gives full information about the exact type of the gear box. The codification is done as under:

F	71	B3		2	038	24.48

Ratio - Overall ratio of the Gear Box

Model - Name of the Model e.g. 019, 028 etc

No. of stages - 1 - Single Stage
2 - Double Stage
3 - Triple Stage and so on

Out put - - Standard Shaft
H - Hollow output shaft
HSD - Hollow shaft with shrink disc

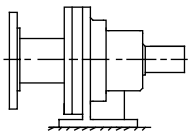
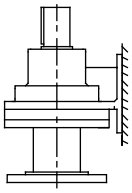
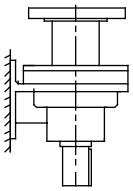
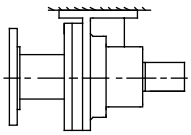
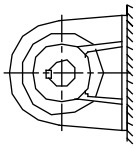
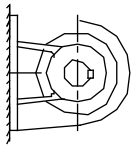
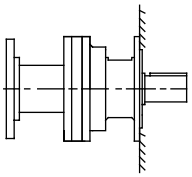
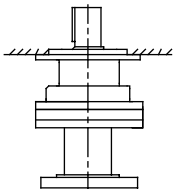
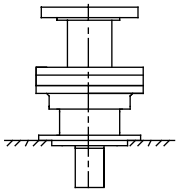
Mounting Position - B3 Designation to be selected from the Table 1 shown below

Input - F - Free Input
63 - IEC Frame Size Hollow Input
X - Non standard

Mounting - F - Foot Mounting
L - Flange Mounting
A - Agitator Mounting
S - Shaft Mounting

Example : F F B3 2060 31.10 - This is a Foot Mounted Gear Box , Model 2060 i.e. 2 stage Model 060, Ratio 31.10:1, with Free Solid Input Shaft, Mounted Horizontally..

TABLE 1 - ORIENTATION

FOOT TYPE	 B3	 V6	 V5
FOOT TYPE	 B8	 B7	 B6
FLANGE TYPE	 B5	 V3	 V1

2 TECHNICAL INFORMATION

2.1 RADIAL (OVERHANG) LOAD RATING

It is not necessary to check the radial load on the Gear Box Shaft if the shaft is connected by a coupling to another shaft, which is separately supported on bearings. It is also not necessary to check the same for Hollow Input of our Gear Box which is meant for mounting the motor directly on the Gear Box. However, many a times, Gear Box input or output shafts are fitted with Pulleys, Sprockets, Gears etc. It is very important in such cases, to see that the actual radial load on the shaft does not exceed the allowable radial load of that particular gear box. The actual radial load on the shaft can be calculated by the following formula :

$$F = (14052200 \times P \times Fc) / (D \times N)$$

Where F = Actual Radial Load in N
P = Power being Transmitted in HP.
Fc = Load Connection Factor (See Table 2) .
D = PCD of Pulley or Sprocket in mm
N = Speed of the Shaft in RPM.

Table 2

Load connection Factor Fc	
Type of Connection	Fc
Sprocket or Timing Belt	1.00
Pinion or Gear	1.25
V Belt	1.50
Flat Belt	2.50

This Calculated Radial Load should be less than the Allowable radial Load Fr.
The allowable radial load is directly related to the expected life in Working Hours. The recommended expected life values are given in Table 3.

Table 3

	Recommended Life Values	
Type of Operation	Example	Life in working Hours
Infrequent	Demo Units, Prototypes etc.	500
Brief Operation	Hand Tools, Lifting Tackle, Domestic & Agricultural Machines etc.	4000 - 8000
Intermittent Operation	Lifts, Cranes, Conveyors, Auxillary Machines etc.	8000 - 12000
One Shift Operation	Motors, Gear Boxes, Engg. Machinery etc.	12000 - 30000
Continuous Operation	Cont. Duty Conveyors, Separators, Compressors, Agitators	30000 - 60000
Continuous with high Production	Power Plant Machinery, Mine Pumps, Equipments with very high Downtime cost.	60000 - 100000

Based on this expected life and the speed of the shaft, find Life Factor K from Table 4 on the next page.

The Allowable Radial Load Fr is calculated by following formula :

$$Fr = Fo \times Lf \times K$$

Where Fr = Allowable Radial Load in N.
Fo = Radial Load capacity for the related model as per Table 5.
K = Life Factor as per Table 3.
Lf = Load Location factor (See Table 7). Depending on the Model & Position of the actual load, Dist. `x', (at which you desire to calculate the radial load), see Fig.2, select `Lf'.

Fig.2

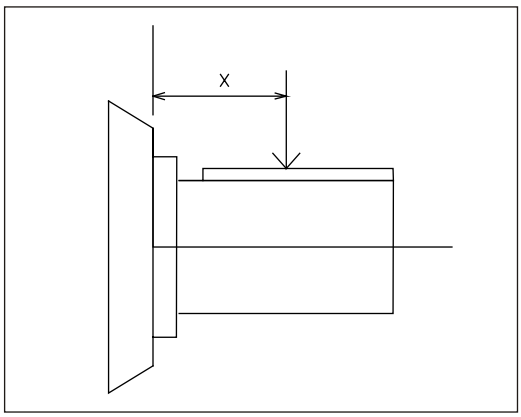


Table 4

Life Factor K								
Working Hours	1000	5000	10000	15000	20000	25000	50000	100000
Speed								
1400	0.415	0.243	0.193	0.168	0.153	0.142	0.113	0.089
1300	0.425	0.249	0.197	0.172	0.157	0.145	0.115	0.092
1200	0.437	0.255	0.203	0.177	0.161	0.149	0.119	0.094
1100	0.450	0.263	0.209	0.182	0.166	0.154	0.122	0.097
1000	0.464	0.271	0.215	0.188	0.171	0.159	0.126	0.100
800	0.500	0.292	0.232	0.203	0.184	0.171	0.136	0.108
600	0.550	0.322	0.255	0.223	0.203	0.188	0.149	0.119
400	0.630	0.368	0.292	0.255	0.232	0.215	0.171	0.136
300	0.693	0.405	0.322	0.281	0.255	0.237	0.188	0.149
250	0.737	0.431	0.342	0.299	0.271	0.252	0.200	0.159
200	0.794	0.464	0.368	0.322	0.292	0.271	0.215	0.171
150	0.874	0.511	0.405	0.354	0.322	0.299	0.237	0.188
100	1.000	0.585	0.464	0.405	0.368	0.342	0.271	0.215
80	1.077	0.630	0.500	0.437	0.397	0.368	0.292	0.232
60	1.186	0.693	0.550	0.481	0.437	0.405	0.322	0.255
40	1.357	0.794	0.630	0.550	0.500	0.464	0.368	0.292
20	1.710	1.000	0.794	0.693	0.630	0.585	0.464	0.368
15	1.882	1.101	0.874	0.763	0.693	0.644	0.511	0.405
10	2.154	1.260	1.000	0.874	0.794	0.737	0.585	0.464
5	2.174	1.587	1.260	1.101	1.000	0.928	0.737	0.585
2	3.684	2.154	1.710	1.494	1.357	1.260	1.000	0.794

Table 5

Radial Load Capacity 'Fo' at step of the shaft (Closet to the Gear Box) for life of 6 x 10^6 Cycles		
Model	Output Shaft Kg	Input Shaft Kg
019	358	316
028	373	405
038	889	514
050	1395	913
060	1725	784
070	2020	1595
080	3630	1640
095	4878	2006
110	6479	2006
120	8204	2497

Table 6

Axial Load Capacity 'Fa'		
Model	Output Shaft Kg	Input Shaft Kg
019	161	142
028	168	182
038	400	231
050	628	411
060	776	353
070	909	718
080	2178	738
095	2927	903
110	3887	903
120	4923	1124

Table 7

Load Location Factor 'Lf'																									
	Dist. x in mm	0	5	10	15	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	225	250	275	300
Model																										
019	Output	1.00	0.89	0.80	0.72	0.66	0.61	0.57	0.53	0.49	0.46	0.44	0.39	0.36	0.33	0.30	0.28	0.25	0.22	0.20	0.18	0.16	0.15	0.13	0.12	0.12
028	Output	1.00	0.90	0.83	0.76	0.70	0.66	0.61	0.58	0.54	0.51	0.49	0.44	0.40	0.37	0.35	0.32	0.28	0.25	0.23	0.21	0.19	0.17	0.16	0.15	0.14
038	Output	1.00	0.92	0.85	0.79	0.74	0.70	0.66	0.62	0.59	0.56	0.53	0.49	0.45	0.42	0.39	0.36	0.32	0.29	0.26	0.24	0.22	0.20	0.19	0.17	0.16
050	Output	1.00	0.93	0.88	0.82	0.78	0.74	0.70	0.67	0.64	0.61	0.59	0.54	0.50	0.47	0.44	0.41	0.37	0.33	0.31	0.28	0.26	0.24	0.22	0.20	0.19
060	Output	1.00	0.94	0.89	0.84	0.80	0.76	0.72	0.69	0.66	0.64	0.61	0.57	0.53	0.50	0.47	0.44	0.40	0.36	0.33	0.31	0.28	0.26	0.24	0.22	0.21
070	Output	1.00	0.95	0.90	0.86	0.82	0.78	0.75	0.72	0.69	0.66	0.64	0.60	0.56	0.53	0.50	0.47	0.43	0.39	0.36	0.33	0.31	0.28	0.26	0.24	0.23
080	Output	1.00	0.95	0.91	0.87	0.84	0.80	0.77	0.75	0.72	0.70	0.67	0.63	0.60	0.56	0.53	0.51	0.46	0.42	0.39	0.36	0.34	0.31	0.29	0.27	0.26
095	Output	1.00	0.96	0.92	0.89	0.86	0.83	0.80	0.77	0.75	0.73	0.70	0.66	0.63	0.60	0.57	0.54	0.50	0.46	0.43	0.40	0.37	0.35	0.32	0.30	0.28
110	Output	1.00	0.96	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.74	0.72	0.68	0.65	0.62	0.59	0.56	0.52	0.48	0.45	0.42	0.39	0.36	0.34	0.32	0.30
120	Output	1.00	0.97	0.93	0.90	0.88	0.85	0.82	0.80	0.78	0.76	0.74	0.70	0.67	0.64	0.61	0.59	0.54	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32
019	Input	1.00	0.87	0.78	0.70	0.64	0.58	0.54	0.50	0.47	0.44	0.41	0.37	0.33	0.30	0.28	0.26	0.23	0.20	0.18	0.16	0.15	0.13	0.12	0.11	0.10
028	Input	1.00	0.89	0.81	0.73	0.67	0.62	0.58	0.54	0.51	0.48	0.45	0.41	0.37	0.34	0.32	0.29	0.26	0.23	0.21	0.19	0.17	0.16	0.14	0.13	0.12
038	Input	1.00	0.91	0.84	0.77	0.72	0.67	0.63	0.59	0.56	0.53	0.50	0.46	0.42	0.39	0.36	0.34	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.16	0.15
050	Input	1.00	0.93	0.87	0.82	0.77	0.73	0.69	0.66	0.63	0.60	0.58	0.53	0.49	0.46	0.43	0.40	0.36	0.33	0.30	0.27	0.25	0.23	0.21	0.20	0.18
060	Input	1.00	0.93	0.88	0.83	0.78	0.74	0.70	0.67	0.64	0.61	0.59	0.54	0.50	0.47	0.44	0.42	0.37	0.34	0.31	0.28	0.26	0.24	0.22	0.21	0.19
070	Input	1.00	0.94	0.89	0.84	0.80	0.76	0.73	0.70	0.67	0.64	0.62	0.57	0.53	0.50	0.47	0.44	0.40	0.36	0.33	0.31	0.29	0.26	0.24	0.23	0.21
080	Input	1.00	0.95	0.90	0.86	0.82	0.78	0.75	0.72	0.69	0.67	0.64	0.60	0.56	0.53	0.50	0.47	0.43	0.39	0.36	0.33	0.31	0.29	0.26	0.25	0.23
095	Input	1.00	0.95	0.91	0.87	0.83	0.80	0.77	0.74	0.71	0.69	0.67	0.63	0.59	0.56	0.53	0.50	0.45	0.42	0.38	0.36	0.33	0.31	0.29	0.27	0.25
110	Input	1.00	0.95	0.91	0.87	0.83	0.80	0.77	0.74	0.71	0.69	0.67	0.63	0.59	0.56	0.53	0.50	0.45	0.42	0.38	0.36	0.33	0.31	0.29	0.27	0.25
120	Input	1.00	0.96	0.92	0.88	0.85	0.81	0.79	0.76	0.73	0.71	0.69	0.65	0.61	0.58	0.55	0.52	0.48	0.44	0.41	0.38	0.35	0.33	0.31	0.29	0.27

2.2 AXIAL LOAD CAPACITY

In some of the applications, there is an axial load on the Gear Box shaft. Some typical applications are Screw Conveyors, Agitators etc. In such cases it is necessary to check whether the axial load on the gear box is within the safe limits. Table 6 on the previous page gives the Maximum Axial Load Capacity `Fa' of all the models of our Planetary Gear Boxes. Before selecting the gear box, ensure that the actual axial load to which gear box is subjected to, is less than `Fa'. In many of the agitators or screw conveyors, there is a separate bearing housing provided in the equipment itself to take the axial thrust developed in the process, so that it is not passed on to the gear box shaft. In such cases, it is not necessary to check the axial thrust. Values of `Fa' given in table 6 above are applicable only when there is purely axial load on the gear box shaft. However, if both axial and radial loads exist simultaneously, the axial load capacities of the gear box reduces substantially. In such case, contact us for correct selection.

2.3 THERMAL RATING

Planetary Gear Boxes, being very small in size & volume compared to other types of equivalent gear boxes, have a limitation on the heat dissipation capacity. Hence, in some cases, even though a particular size of gear box is mechanically / torque wise safe, it may so happen that thermally, it is not suitable for the Power being transmitted. Hence, it is necessary that while selecting the gear box, particularly for a continuous duty application, the thermal rating of the gear box should be checked for the suitability. The thermal rating of the gear box should be equal or more than the power being transmitted through it. The thermal ratings of different gear boxes are given in Table 9. In case the input power to the gear box is more than the thermal rating (but well within the torque rating), it is necessary to provide a separate cooling arrangement for the gear box. It is not necessary to check the thermal rating of the gear box if it is sparingly used or used for in frequent duty.

2.4 EFFICIENCY

The average efficiency of TRX Make Planetary Gear Box is 96 % per stage. Thus for two stage gear box the efficiency would be 0.96 X 0.96 i.e. 92 % & likewise for three or four stage units. Thus Efficiencies for 3 stage & 4 stage units are 88% and 85% respectively.

2.5 SERVICE FACTOR

For any application, it is necessary to consider a certain Service Factor while selecting the Gear Box. This is mainly because for any application, in practice, there are many factors which are acting and which we do not consider in theoretical calculations of gear box capacity or required torque etc. The Service Factors are based on the actual experience of years of many. In fact, for various applications, different service factors are recommended. However as a general guideline, select a suitable service factor as per the Table 8 given below. The Service Factor should normally be applied to the actual torque requirement to calculate the minimum required rated torque. The Service Factor should not be applied for selecting the motor power.

Table 8

Duty	Type of Load	Daily Working Hours			
		< 0.5 Hr	0.5 to 3 Hr	3 to 8 Hr	8 to 24 Hr
Continuous Or Intermittent Service With Less than 10 starts/hr	Uniform	0.8	0.9	1	1.25
	Moderate Shock	0.9	1	1.25	1.5
	Heavy Shock	1	1.25	1.5	1.75
Intermittent Service with 10 or more starts/hr	Uniform	0.9	1	1.25	1.5
	light overloads	1	1.25	1.5	1.75
	Heavy Overloads	1.25	1.5	1.75	2

2.6 MOUNTING

We can offer three different types of Mountings as under :

1. Foot Mounting
2. Flange Mounting
3. Agitator Mounting.

The above gear boxes can be mounted in any mounting position as shown in Table 1. In Agitator Mounting, we provide special bearings on the output shaft which can take axial thrust. This type of mounting is required for the Agitator Drives, only when the Agitator shaft is hanging on the output shaft of the gear box. Normally, for most of the agitator vessels, there is a separate bearing housing with taper roller or axial thrust bearings. In such cases, it is not necessary to use agitator mounting and a standard flange mounted gear box can be used for such applications.

Table For Thermal Ratings & Possible Hollow Input Frame Sizes

Thermal Rating given below is for input speed of 1500 RPM. For input speeds other than 1500 RPM, contact us. Frame Sizes other than those given in the following table can also be given by making special combinations of stages. For such requirements, contact us.

Table 9

Model	Thermal Rating (KW)	Possible Hollow Input Frame Sizes									
		63	71	80	90	100	112	132	160	180	200
1019	0.75	■	■	■							
1028	1.5	■	■	■	■						
1038	3.7		■	■	■	■	■				
1050	5.5			■	■	■	■	■			
1060	11					■	■	■	■		
1070	15					■	■	■	■		
1080	22.5					■	■	■	■	■	
1095	30							■	■	■	■
1110	37							■	■	■	■
1120	55							■	■	■	■
2019	0.85	■	■	■							
2028	1.1	■	■	■							
2029	1.5	■	■	■	■						
2038	2.2	■	■	■	■						
2039	4		■	■	■	■	■				
2050	5.5		■	■	■	■	■				
2060	7.5			■	■	■	■	■			
2070	11			■	■	■	■	■			
2080	15					■	■	■	■		
2095	22					■	■	■	■		
2110	30					■	■	■	■	■	
2120	40							■	■	■	■
3019	1.1	■	■	■							
3028	1.1	■	■	■							
3029	1.5	■	■	■	■						
3038	1.5	■	■	■							
3039	2	■	■	■	■						
3050	2.2	■	■	■	■						
3060	5.5		■	■	■	■	■				
3070	7.5		■	■	■	■	■				
3080	11			■	■	■	■	■			
3095	15			■	■	■	■	■			
3110	18.5					■	■	■	■		
3120	22.5					■	■	■	■		

■ Available Not Available

2.7 INPUT

On the input side of the gear box, we can offer three different options.

1. Free Solid Input Shaft with Keyway.
2. Hollow Input Shaft to suit Standard B5 Flange Mounted Electric Motors with IEC Frames
3. Hollow Input to suit Hydraulic Motors or non-standard custom built hollow input .

The standard available Hollow Input Frame Sizes for various models are given in Table 9. However, it is also possible to give Hollow Input to suit certain Frame Sizes, which does not appear in the table, by changing the combination of different stages. Thus for any such requirements, please contact us and we can offer you the right solution.

2.8 OUTPUT

The standard output shaft is a free solid shaft with keyway. However, depending on customers requirement, we can offer a blind hollow output shaft with keyway or blind hollow output shaft with Shrink Disc. We can also offer splines instead of keyway for Free as well as Hollow shaft.

3. SELECTION PROCEDURE

In any engineering application, it is necessary to select the gear box properly for its long and trouble-free operation. The gear box selection can be done in different ways depending on the available data.

The basic relation between Horse Power and Torque is as under:

$$P = \frac{2 \times \pi \times N \times T}{4500 \times \eta}$$

where P = Power in HP
N = Speed in RPM
T = Torque in Kg-m at above speed.
1 H.P. = 0.746 KW
η = Efficiency.

Before going to Selection Procedure, we must collect the following details for correctly selecting the gear box model :

1.The Application and the Duty Cycle / Working Hours per day. Based on this data, the correct Service Factor can be selected using Table 8.

2.Input Speed

3.Output Speed or Ratio required. Ratio = Input Speed / Output Speed.

4.Input Power or the Required Output Torque. If you know either of these, you can calculate the other using the above formula. If you know both of these, please check that the Torque calculated based on the input HP, matches with the required torque.

5.Mounting Position of the Gear Box & Mounting Type eg, Foot / Flange / Agitator etc.

6.Ambient Temperature. The thermal rating of all the Models are given in Table 9. If the ambient temperature is above 45^{o} C, and if the input power is on the higher side of the allowable limit, please consult us for checking the suitability.

7.Type of Input We can provide a free solid input shaft or a hollow input shaft to suit standard IEC frame size B5 Flange motors which can be mounted directly on the gear box.

8.Based on the application, decide on the expected working life of the unit using Table 3. This will be required in case of checking the overhang load.

9.Type of connection for Input as well as Output Shaft. If the connection is by means of Sprocket, Belt or Pinion, it is necessary to check that the actual overhang load is less than the allowable overhang load.

Now, after knowing the above, the gear box selection can be done as under :

3.1 SELECTION WHEN INPUT HP AND OUTPUT RPM IS KNOWN.

A) Depending on the duty cycle, select the correct service factor (S.F.) from the table 8.
B) From our **'Selection Table Based on HP' (Table 10)**, go to the selection chart of that particular H.P. & check the nearest output RPM. Select a model with service factor equal to or higher than above service factor.
C) If the input shaft required is hollow to suit a particular Frame Size, check the availability of hollow input for that particular model from Table 9. If it is not available, select an alternate higher model or contact us.
D) Check that the Thermal Rating of the selected unit (See Table 9) is more than or equal to the HP to be connected. If the Thermal Rating of the unit is less than the connected HP and if the duty of the unit is continuous, select a higher model or arrange for a separate cooing arrangement for the gear box or contact us.
E) Finally, check that the actual overhang load on the input and output shaft is less than the allowable overhang load as described in section 2.1 above. Also check that the axial load on the gear box shaft is also within limit as described in section 2.2 above.

3.2 SELECTION WHEN ACTUAL TORQUE REQUIRED FOR THE APPLICATION AND OUTPUT SPEED IS KNOWN.

Ideally, it is most appropriate to select the gear box based on the torque requirement of the actual application. For selection of the gear box, follow steps given below:

A) Based on the input RPM, and required output RPM (N2), calculate ratio as described above.
B) Let the actual torque required for the application is T Kgm.
C) Depending on the duty cycle select the correct service factor (S.F.) from the table 8 given above. Multiply T by S.F. to get the design torque T1.
D) Stating from the lowest model, check the rated torque of the gearbox for the nearest ratio from our **'Selection Table Based on Torque' (Table 11).** If the design torque is more than the rated torque, go to the upper model, till the calculated design torque is less than or equal to the rated torque. This is the Selected Model and selected ratio.
E) Using T & N2 and substituting the same in the above equation the Power required for the application can be found out.
F) Now, check the suitability of the selected model for Thermal Rating, Hollow Input Frame Size and the Overhang and Axial Load as described in Procedure 3.1 above

3.3 EXAMPLE FOR SELECTION OF GEAR BOX.

1. A 5 HP, 4 Pole (1440 RPM) B5 Flange Mounted Motor is to be connected to the gear box with Hollow Input. Motor Frame Size is 112M. The output speed of the gear box should be 60 RPM. The Output shaft of the gear box is fitted with a 8 inch sprocket. This is used to drive a conveyor which works for 8 Hrs a day. Type of loading is uniform.

a. The Service Factor from Table 8 for uniform load & 8 hours duty is 1
b. Ratio required = 1440/60 = 24
c. The power is related to torque as $P = (2 \times \pi \times N \times T) / (4500 \times \eta)$
   Hence T = (4500 x 0.9 x 5)/ (2 x π x 60) = 53.71 Kgm. This is the maximum torque that a 5 HP motor can generate if it isconsumed fully, assuming the gear box efficiency as 90%
d. We assume that the ambient temp is 40^{o}C.(Normal)

Selection based on Input HP & Output RPM

a. Refer Table 10. Check for 5 HP & S.F.1.4 The nearest RPM is 64 & Model is 2039

b. Now from Table 9, the thermal rating of Model 2039 is 4KW (= 5.36 HP). This is more than the connected power of 5 HP. Hence O.K.

c. Refer Table 9 for checking motor frame size. The motor which is to be connected to the gear box directly is 112M Frame Size. Now Hollow Frame size of 112 is available for Model 2039. Hence the selection is O.K.

d. Finally, we have to check the radial load. It is given by formula given in 2.1

$$F = (14052200 \times P \times Fc) / (D \times N) = (14052200*5*1)/(200*60) = 5855\ N$$

The radial Load Capacity of output shaft of Model 039 is 889 Kg = 8890 N
The allowable radial load Fr is calculated as given in 2.1

$$Fr = Fo \times L_f \times K$$

Assuming Sprocket position at a dist of 20 mm from the gear box face, L_f = 0.74 from Table 7
For the output speed of 30 RPM & for a Life of 10000 working hours K = 0.71 from Table 4

Hence Fr = 8890 * 0.74 * 0.71 = 4670 N

This is less than actual radial load of 5855 N. Hence either increase the sprocket diameter or give support on the other end of the shaft or go to higher model & check.
Checking for higher model, let us select one size higher model 2050
The radial Load Capacity of output shaft of Model 050 is 1395 Kg = 13950 N
The allowable radial load Fr is calculated as given in 2.1

$$Fr = Fo \times L_f \times K$$

Assuming Sprocket position at a dist of 20 mm from the gear box face, L_f = 0.74 from Table 7
For the output speed of 30 RPM & for a Life of 10000 working hours K = 0.71 from Table 4
Hence Fa = 13950 * 0.74 * 0.71 = 7329 N
This is higher than actual radial load of 5855 N. Hence selection is O.K.
Thus the final Model selected is 2050.

Selection Based on Output Torque and Output Speed.

a. Input = 5 HP, 1440 RPM, Output Speed Reqd. = 60 RPM

b. Reduction Ratio Required = 1440/60 = 24. Hence it will be a Two Stage gear Box.

c. Torque generated, as calculated above is 53.71 Kgm.

d. Service Factor as selected above is 1. Hence design torque = 53.71 * 1 = 53.71 Kgm.

e. Starting from the lowest model, referring Table 11, Model 2038 & Ratio 23.41 has got a torque rating of 70 Kgm which is higher than 53.71. Hence O.K.

f. Checking Input Frame Size from Table 10, we find that 112 Frame Size is not available in Model 2038. Hence we go to higher model 2039 Ratio 25.36. Input Frame Size of 112 is available. Hence O.K.

g. Checking the overhang load capacity, we find that Model 2039 output shaft fails in this test. Hence, we have to go for Model 2050 as shown above.

TABLE 10 - SELECTION TABLE BASED ON HP

Notes - 1. The Output Speeds in the following tables are based on input speed of 1440 RPM (4 Pole Motors)
2. The Ratios given in the following Tables are nominal ratios. For exact ratios, refer 'Selection Table Based on Torque
3. The exact output speeds can be worked out based on the actual input speed and the exact ratio. However, these will not vary by more than 5 %.
4. Many more ratios and combinations other than those listed in the following tables are available. For such requirements, please contact us.

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
0.25 HP, 1440 RPM					
441	0.39	3.27	1019	1019	1019
400	0.43	3.60	1019	1019	1019
354	0.48	4.07	1019	1019	1019
305	0.56	4.72	1019	1019	1019
251	0.68	5.74	1019	1019	1019
135	1.19	10.67	2019	2019	2019
122	1.32	11.80	2019	2019	2019
108	1.48	13.33	2019	2019	2019
98	1.64	14.69	2019	2019	2019
87	1.85	16.55	2019	2019	2019
84	1.90	17.14	2019	2019	2019
75	2.15	19.20	2019	2019	2019
69	2.31	20.87	2019	2019	2019
91	2.61	15.82	2019	2019	2019
53	3.03	27.17	2019	2019	2019
43	3.68	33.49	2019	2019	2019
34	4.08	42.35	3019	3019	3019
30	5.08	47.65	3019	3019	3019
26	5.90	55.34	3019	3019	3028
23	6.51	62.61	3019	3019	3028
20.9	7.34	68.88	3019	3028	3028
18.5	8.28	77.67	3019	3028	3028
16.3	9.41	88.26	3028	3028	3028
14.6	10.51	98.59	3028	3028	3028
13.2	11.65	109.34	3028	3028	3028
12.0	12.77	119.78	3028	3028	3028
10.8	14.16	132.83	3028	3028	3028
9.6	16.04	150.48	3028	3028	3038
8.2	18.73	175.70	3028	3038	3038
7.8	19.74	185.20	3038	3038	3038
6.6	23.11	216.88	3038	3038	3038
5.4	28.33	265.79	3038	3038	3050
4.8	31.96	299.88	3050	3050	3050
3.8	40.06	375.93	3050	3050	3060
3.1	49.58	465.24	3060	3060	3060

0.5 HP, 1440 RPM					
441	0.77	3.27	1019	1019	1019
400	0.85	3.60	1019	1019	1019
354	0.96	4.07	1019	1019	1019
305	1.11	4.72	1019	1019	1019
251	1.35	5.74	1019	1019	1019
135	2.39	10.67	2019	2019	2019
122	2.63	11.80	2019	2019	2019
108	2.97	13.33	2019	2019	2019
98	3.28	14.69	2019	2019	2019
87	3.70	16.55	2019	2019	2019
84	3.81	17.14	2019	2019	2019
75	4.29	19.20	2019	2019	2019
69	4.63	20.87	2019	2019	2019
62	5.20	23.23	2019	2019	2028
54	6.00	26.67	2019	2028	2028
46	6.88	31.30	2028	2028	2028

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
0.5 HP, 1440 RPM					
38	8.41	37.89	2028	2028	2028
33	9.61	43.64	2029	2029	2029
30.3	10.13	47.55	3028	3028	3028
26.9	11.43	53.61	3028	3028	3028
23.2	13.21	61.98	3028	3028	3028
21.6	14.22	66.73	3028	3028	3028
19.1	16.05	75.29	3028	3028	3038
17.2	17.80	83.50	3028	3028	3038
15.3	20.07	94.15	3028	3028	3038
13.2	23.31	109.34	3028	3038	3038
12.0	25.53	119.78	3028	3038	3038
10.8	28.31	132.83	3028	3038	3038
9.8	31.26	146.67	3038	3038	3038
8.8	34.76	163.05	3038	3038	3050
8.1	37.84	177.51	3038	3050	3050
7.8	39.48	185.20	3038	3050	3050
6.6	46.23	216.88	3038	3050	3050
5.9	52.16	244.69	3050	3050	3060
4.8	63.92	299.88	3050	3060	3060
3.9	79.11	369.23	3060	3060	3060
3.1	99.17	464.52	3060	3070	3070

0.75 HP, 1440 RPM					
441	1.16	3.27	1019	1019	1019
400	1.28	3.60	1019	1019	1019
354	1.44	4.07	1019	1019	1019
305	1.67	4.72	1019	1019	1019
251	2.03	5.74	1019	1019	1019
135	3.58	10.67	2019	2019	2019
122	3.95	11.80	2019	2019	2019
108	4.45	13.33	2019	2019	2019
98	4.92	14.69	2019	2019	2019
87	5.53	16.55	2019	2019	2028
84	5.75	17.14	2019	2019	2028
75	6.43	19.20	2019	2019	2028
69	6.94	20.87	2019	2019	2028
62	7.81	23.23	2019	2028	2028
54	8.84	26.67	2028	2028	2028
46	10.33	31.30	2028	2028	2028
38	12.62	37.89	2028	2028	3028
33	13.77	43.64	3028	3028	3028
30.3	15.20	47.55	3028	3028	3038
26.9	17.14	53.61	3028	3028	3038
23.2	19.82	61.98	3028	3028	3038
21.1	21.33	68.25	3028	3038	3038
19.1	23.92	75.29	3028	3038	3038
17.2	26.70	83.50	3028	3038	3038
15.3	30.05	93.99	3038	3038	3038
13.1	35.09	109.74	3038	3038	3038
12.0	38.38	120.05	3038	3038	—
10.7	42.87	134.08	3038	3038	3050
9.8	46.90	146.67	3038	3050	3050
8.8	52.13	163.05	3038	3050	3050

TABLE - SELECTION TABLE BASED ON HP

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
0.75 HP, 1440 RPM					
8.1	56.98	178.22	3050	3050	3050
7.3	62.72	196.18	3050	3050	3050
6.6	70.29	219.85	3050	3050	3060
5.9	78.24	244.69	3050	3060	3060
5.3	86.99	272.08	3060	3060	3060
4.6	99.87	312.34	3060	3060	3070
3.9	118.66	371.13	3060	3060	3070
3.1	148.75	464.52	3070	3070	—
1HP, 1440 RPM					
441	1.54	3.27	1019	1019	1019
400	1.70	3.60	1019	1019	1019
354	1.92	4.07	1019	1019	1019
305	2.23	4.72	1019	1019	1019
251	2.71	5.74	1019	1019	1019
135	4.77	10.67	2019	2019	—
122	5.27	11.80	2019	2019	2028
108	5.93	13.33	2019	2019	2028
98	6.55	14.69	2019	2019	2028
87	7.38	16.55	2019	2019	2028
84	7.62	17.14	2019	2028	2028
75	8.56	19.20	2019	2028	2028
68	9.39	21.18	2028	2028	2028
62	1041	23.23	2028	2028	2028
54	11.79	26.67	2028	2028	2029
46	13.77	31.30	2028	2028	2038
38	16.82	37.89	2028	3028	2038
30	20.27	48.00	3028	3028	2038
27	22.23	53.33	3028	3038	3038
24	25.07	60.00	3028	3038	3038
21.1	29.11	68.29	3038	3038	3038
19.2	31.89	74.81	3038	3038	3038
17.4	35.37	82.97	3038	3038	3038
15.3	40.07	93.99	3038	3038	—
13.1	46.78	109.74	3038	3038	3050
12.0	51.18	120.05	3038	3050	3050
10.7	57.16	134.08	3038	3050	3050
9.8	62.53	146.67	3038	3050	3050
9.0	68.24	160.07	3050	3050	3060
8.1	75.97	178.22	3050	3050	3060
7.3	83.63	196.18	3050	3050	3060
6.6	93.72	219.85	3050	3060	3060
5.9	103.50	242.79	3060	3060	3060
5.3	115.99	272.08	3060	3060	3070
4.6	133.15	312.34	3060	3070	3070
3.9	158.21	371.13	3060	3070	3080
3.4	180.73	423.53	3080	3080	—
1.5 HP, 1440 RPM					
394	2.59	3.65	1028	1028	1028
355	2.87	4.06	1028	1028	1028
313	3.25	4.60	1028	1028	1028
268	3.80	5.37	1028	1028	1028
220	4.64	6.55	1028	1028	1028
120	8.02	12.00	2028	2028	2028
109	8.89	13.21	2028	2028	2028
98	9.81	14.69	2028	2028	2028
87	11.07	16.55	2028	2028	2028
83	11.59	17.35	2028	2028	2028

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
1.5 HP, 1440 RPM					
75	12.85	19.20	2028	2028	2028
68	14.08	21.18	2028	2028	2038
62	15.61	23.23	2028	2028	2038
55	17.24	26.18	2028	2038	2038
46	2065	31.30	2028	2038	2038
38	25.16	37.89	2038	2038	2050
31	31.24	46.45	2038	3038	3038
27.6	33.35	52.15	3038	3038	3038
23.7	38.91	60.85	3038	3038	3050
21.0	43.67	68.57	3038	3038	3050
19.2	47.84	74.81	3038	3038	3050
17.9	51.47	80.45	3038	3050	3050
16.3	56.66	88.61	3038	3050	3050
14.6	62.89	98.34	3050	3050	3050
12.6	73.12	114.35	3050	3050	3060
11.6	79.41	124.18	3050	3050	3060
10.5	87.41	136.70	3050	3050	3060
9.9	92.99	145.42	3050	3060	3060
9.0	102.36	160.07	3050	3060	3060
8.2	112.51	175.94	3050	3060	3060
7.1	129.87	203.10	3060	3060	3070
6.5	141.04	220.56	3060	3060	3070
5.9	155.25	242.79	3060	3060	3070
5.3	173.98	272.08	3060	3070	3080
4.6	199.73	312.34	3070	3070	-
3.9	237.32	371.13	3070	3095	3095
3.4	271.09	423.53	3080	3095	3095
2.7	339.83	533.33	3095	3095	3095
2 HP, 1440 RPM					
394	3.45	3.65	1028	1028	1028
355	3.83	4.06	1028	1028	1028
313	4.33	4.60	1028	1028	1028
268	5.06	5.37	1028	1028	1028
220	6.18	6.55	1028	1028	1028
107	11.97	13.46	2029	2029	2029
97	13.27	14.85	2029	2029	2029
87	14.72	16.55	2029	2029	2038
76	16.68	18.95	2029	2029	2038
67	18.81	21.49	2029	2029	2038
61	21.01	23.61	2029	2038	2038
56	22.99	25.71	2038	2038	2038
50	25.55	28.80	2038	2038	2038
44	29.02	32.73	2038	2038	2050
38	33.99	37.89	2038	2038	2050
31	41.12	46.45	2038	3039	2050
27	46.97	53.33	3039	3039	3050
24.5	50.14	58.80	3038	3038	3050
21.1	58.23	68.29	3038	3050	3050
19.2	63.20	74.81	3038	3050	3050
17.9	68.63	80.49	3050	3050	3060
16.3	75.55	88.61	3050	3050	3060
14.6	82.09	98.34	3050	3050	3060
12.6	97.50	114.35	3050	3060	3060
11.6	105.88	124.18	3050	3060	3060
10.5	116.55	136.70	3050	3060	3060
9.1	134.74	158.03	3060	3060	3070
8.2	150.01	175.94	3060	3060	3070
7.1	173.16	203.10	3060	3070	3080
6.5	188.05	220.56	3060	3070	3080

TABLE - SELECTION TABLE BASED ON HP

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
2 HP, 1440 RPM					
5.9	207.00	242.79	3060	3070	3080
5.3	231.98	272.08	3070	3080	3095
4.6	266.31	312.34	3070	3080	3095
4.0	304.20	356.79	3080	3095	3095
3.4	361.46	423.94	3095	3095	3095
2.7	453.11	531.44	3095	3095	3110
3 HP, 1440 RPM					
403	5.07	3.58	1038	1038	1038
368	5.55	3.91	1038	1038	1038
331	6.16	4.35	1038	1038	1038
291	7.00	4.94	1038	1038	1038
249	8.20	5.79	1038	1038	1038
203	10.05	7.09	1038	1038	1038
110	17.59	13.09	2038	2038	2038
99	19.50	14.55	2038	2038	2038
90	21.33	16.00	2038	2038	2038
80	24.17	18.00	2038	2038	2038
75	25.80	19.20	2038	2038	2038
68	28.22	21.18	2038	2038	2038
61	31.52	23.61	2038	2038	2038
56	34.48	25.71	2038	2038	2050
50	38.33	28.80	2038	2038	2050
44	43.54	32.73	2038	2050	2050
37	51.65	38.92	2050	2050	2060
31	61.68	46.45	2050	3050	3050
28	64.15	51.43	3050	3050	3050
25.9	71.15	55.63	3050	3050	—
23.7	77.83	60.85	3050	3050	3060
20.9	88.17	68.94	3050	3050	3060
18.0	102.57	80.20	3050	3060	3060
16.3	113.32	88.61	3050	3060	3060
13.6	135.55	105.99	3060	3060	3070
12.5	147.20	115.10	3060	3060	3070
11.4	162.04	126.70	3060	3060	3070
10.6	174.38	136.35	3060	3070	3080
9.1	199.20	158.03	3060	3070	3080
7.9	233.61	182.66	3070	3070	3080
6.6	277.58	217.04	3070	3080	3080
5.8	318.66	249.16	3070	3080	3095
5.1	364.00	284.61	3080	3095	3095
4.6	397.47	310.79	3095	3095	3095
4.0	456.31	356.79	3095	3095	3095
3.4	542.18	423.94	3095	3095	3110
2.7	679.67	531.44	3095	3110	3120
5 HP, 1440 RPM					
403	8.45	3.58	1038	1038	1038
368	9.24	3.91	1038	1038	1038
331	10.27	4.35	1038	1038	1038
291	11.67	4.94	1038	1038	1038
249	13.67	5.79	1038	1038	1038
203	16.75	7.09	1038	1038	1038
113	28.70	12.79	2039	2039	2039
103	31.41	14.00	2039	2039	2039
93	34.91	15.56	2039	2039	2039
81	39.65	17.67	2039	2039	2039
70	46.44	20.70	2039	2039	2039
64	50.80	22.64	2039	2039	2039

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
5 HP, 1440 RPM					
57	56.90	25.36	2039	2039	2039
52	62.26	27.75	2039	2039	2050
48	67.25	30.00	2039	2039	2050
42	76.82	34.29	2050	2050	2050
37	86.52	38.92	—	2050	2050
31	98.83	46.45	2050	2050	2060
27	117.43	53.33	2060	2060	2060
24.6	124.67	58.49	3060	3060	3070
19.5	157.42	73.85	3060	3060	3070
18.0	170.95	80.20	3060	3060	3070
16.7	184.34	86.48	3060	3070	3070
15.0	205.23	96.28	3060	3070	3070
13.9	220.36	103.38	3070	3070	—
11.4	258.06	126.70	3070	3070	3080
10.6	290.64	136.35	3070	3080	3080
8.8	347.43	163.00	3070	3080	3095
7.7	394.48	187.01	3080	3080	3095
6.5	471.57	221.23	3080	3095	3095
5.8	528.47	247.93	3095	3095	3095
4.6	662.46	310.79	3095	3095	3110
4.0	760.51	356.79	3095	3110	3110
3.4	903.64	423.94	3095	3110	3120
2.7	1,132.78	533.33	3120	3120	—
7.5 HP, 1440 RPM					
407	12.53	3.54	1050	1050	1050
375	13.60	3.84	1050	1050	1050
341	14.98	4.22	1050	1050	1050
304	16.78	4.74	1050	1050	1050
265	19.27	5.43	1050	1050	1050
223	22.89	6.46	1050	1050	1050
178	28.70	8.09	1050	1050	1050
113	42.57	12.74	2050	2050	2050
104	46.57	13.85	2050	2050	2050
93	51.77	15.48	2050	2050	2050
86	56.22	16.74	2050	2050	2050
82	58.80	17.56	2050	2050	2050
75	63.86	19.20	2050	2050	2050
68	70.29	21.18	2050	2050	
58	82.31	24.83	2050	2050	
52	91.64	27.69	2050	2060	2060
46	104.68	31.30	2060	2060	2060
37	129.14	38.92	2060	2060	
32	148.25	45.00	2060	2070	2070
27	176.15	53.33	2070	2070	3070
21	220.82	68.57	3070	3070	3080
19.5	236.12	73.85	3060	3070	3080
18.0	256.43	80.20	3070	3070	3080
16.7	276.51	86.48	3070	3070	
15.0	300.28	96.00	3070	3080	3095
13.9	330.54	103.38	3070	3080	3095
12.5	368.00	115.10	3070	3080	3095
11.4	405.09	126.70	3070	3080	3095
10.6	433.79	135.68	3080	3095	3095
9.8	472.02	147.63	3080	3095	3095
8.9	518.57	162.19	3095	3095	3095
7.7	595.30	186.19	3095	3095	3095
6.9	667.12	208.65	3095	3095	3110
5.8	792.71	247.93	3095	3110	3110
4.6	993.69	310.79	3095	3110	3120

TABLE - SELECTION TABLE BASED ON HP

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
7.5 HP, 1440 RPM					
4.0	1,140.76	356.79	3110	3120	3120
3.4	1,355.46	423.94	3110	3120	3120
2.7	1,699.17	531.44	3120	—	—
10 HP, 1440 RPM					
407	16.70	3.54	1050	1050	1050
375	18.14	3.84	1050	1050	1050
341	19.97	4.23	1050	1050	1050
304	22.38	4.74	1050	1050	1050
265	25.69	5.44	1050	1050	1050
223	30.52	6.46	1050	1050	1050
178	38.26	8.10	1050	1050	1060
115	56.11	12.50	2060	2060	2060
106	60.93	13.58	2060	2060	2060
96	67.07	14.95	2060	2060	2060
86	75.16	16.75	2060	2060	2060
79	81.63	18.19	2060	2060	2060
72	89.85	20.02	2060	2060	2060
63	103.15	22.99	2060	2060	2060
56	115.60	25.76	2060	2060	2070
53	122.56	27.31	2060	2060	2070
46	139.58	31.10	2060	2060	2070
42	153.64	34.24	2060	2060	2080
38	172.18	38.37	2060	2070	2080
33	197.66	43.64	2070	2070	3070
29	208.57	49.66	2070	3070	3070
22	294.42	65.45	2080	3070	3080
19.0	314.83	75.79	3070	3080	3095
18.0	341.90	80.20	3070	3080	3095
17.7	346.50	81.28	3080	3080	3095
15.8	388.31	91.09	3080	3080	—
14.9	411.72	96.58	3080	3080	3095
13.1	468.87	109.98	3080	3095	3095
10.6	578.39	135.68	3080	3095	3095
9.7	633.19	148.53	3095	3095	3095
8.9	691.43	162.19	3095	3095	3110
7.7	793.74	186.19	3095	3095	3110
6.5	943.12	221.23	3095	3110	3120
5.8	1,056.94	247.93	3095	3110	3120
4.6	1,324.92	310.79	3110	3120	—
4.0	1,521.02	356.79	3110	3120	—
3.4	1,807.28	423.53	3120	—	—
12.5 HP, 1440 RPM					
407	20.88	3.54	1060	1060	1060
375	22.67	3.84	1060	1060	1060
341	24.96	4.23	1060	1060	1060
304	27.97	4.74	1060	1060	1060
265	32.11	5.44	1060	1060	1060
223	38.15	6.46	1060	1060	1060
178	47.83	8.10	1060	1060	1060
115	70.13	12.50	2060	2060	2060
106	76.16	13.58	2060	2060	2060
96	83.84	14.95	2060	2060	2060
86	93.96	16.75	2060	2060	2060
79	102.03	18.19	2060	2060	2060
72	112.32	20.02	2060	2060	2060
63	128.94	22.99	2060	2060	2070
56	144.49	25.76	2060	2070	2070

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
12.5 HP, 1440 RPM					
53	153.21	27.31	2060	2060	2070
46	174.47	31.10	2060	2070	2070
42	192.05	34.24	2060	2070	2080
38	215.23	37.89	2070	2070	2080
33	247.08	43.64	2070	2080	3080
28	293.58	51.43	2080	2080	3080
22	368.03	65.45	2095	3080	3080
20.3	377.29	70.80	3080	3080	3095
19.1	402.46	75.53	3080	3080	3095
17.7	433.13	81.28	3080	3095	3095
16.0	470.38	90.00	3080	3095	3095
14.9	514.65	96.58	3080	3095	3095
13.1	586.08	109.98	3080	3095	3095
12.5	615.21	115.45	3095	3095	3095
11.1	689.44	129.38	3095	3095	3110
10.7	719.02	134.93	3095	3095	
9.7	791.49	148.53	3095	3095	3110
8.9	864.28	162.19	3095	3095	3110
7.7	992.17	186.19	3095	3110	3120
6.5	1,178.90	221.23	3095	3110	3120
5.8	1,321.18	247.93	3110	3120	3120
5.1	1,516.64	284.61	3110	3120	3120
4.6	1,656.15	310.79	3120	3120	—
4.0	1,901.27	356.79	3120	—	—
3.4	2,259.10	423.94	3120	—	—
15 HP, 1440 RPM					
407	25.05	3.54	1060	1060	1060
375	27.21	3.84	1060	1060	1060
341	29.95	4.23	1060	1060	1060
304	33.56	4.74	1060	1060	1060
265	38.53	5.44	1060	1060	1060
223	45.78	6.46	1060	1060	1060
178	57.39	8.10	1060	1060	1060
115	84.16	12.50	2070	2070	2070
106	91.40	13.58	2070	2070	2070
96	100.61	14.95	2070	2070	2070
89	109.26	16.23	2070	2070	2070
79	122.44	18.19	2070	2070	2070
72	134.78	20.02	2070	2070	2070
63	154.72	22.99	2070	2070	2070
56	173.39	25.76	2070	2070	2080
53	183.85	27.31	2070	2070	2080
47	206.03	3.061	2070	2070	2080
42	230.47	34.24	2070	2080	2080
38	258.27	38.37	2070	2080	2095
33	296.49	44.05	2080	2080	3080
28	352.30	51.43	2080	3080	2095
22	441.63	65.45	2095	3080	2110
20.3	452.75	70.80	3080	3095	3095
17.7	519.75	81.28	3080	3095	3095
16.3	564.45	88.27	3095	3095	3095
14.8	621.30	97.16	3095	3095	3095
13.2	696.31	108.89	3095	3095	3110
12.5	738.26	115.45	3095	3095	3110
11.1	827.33	129.38	3095	3095	3110
9.7	949.79	148.53	3095	3095	3110
8.9	1,037.14	162.19	3095	3110	3120
7.7	1,190.61	186.19	3095	3110	3120
7.2	1,285.18	200.98	3110	3120	3120

TABLE - SELECTION TABLE BASED ON HP

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
15 HP, 1440 RPM					
6.5	1,414.67	221.23	3110	3120	3120
6.0	1,531.70	239.53	3110	3120	—
5.2	1,773.41	277.33	3120	3120	—
4.6	1,987.37	310.79	3120	—	—
4.0	2,281.53	356.79	3120	—	—
20 HP, 1440 RPM					
407	33.41	3.54	1070	1070	1070
375	36.28	3.84	1070	1070	1070
341	39.93	4.23	1070	1070	1070
304	44.75	4.74	1070	1070	1070
265	51.37	5.44	1070	1070	1070
223	61.04	6.46	1070	1070	1070
178	76.52	8.10	1070	1070	1070
115	112.22	12.50	2080	2080	2080
106	121.86	13.58	2080	2080	2080
96	134.14	14.95	2080	2080	2080
89	145.68	16.23	2080	2080	2080
75	172.58	19.23	2080	2080	2080
72	179.71	20.02	2080	2080	2080
63	205.06	22.85	2080	2080	2080
56	231.19	25.76	2080	2080	2080
53	245.13	27.31	2080	2080	2080
47	274.70	30.61	2080	2080	2095
42	307.29	34.24	2080	2080	2095
38	344.36	38.37	2080	2080	2095
33	395.32	44.05	2080	2095	2095
28	469.74	52.34	2095	2095	2095
22	588.84	65.45	2095	3095	3095
20.3	603.65	70.80	3095	3095	3095
18.7	655.57	76.89	3095	3095	3095
17.7	693.00	81.28	3095	3095	3095
16.3	748.08	88.27	3095	3095	3110
14.8	823.45	97.16	3095	3095	3110
13.2	922.78	108.89	3095	3095	3110
12.5	984.34	115.45	3095	3110	3110
11.1	1,103.11	129.38	3095	3110	3120
10.7	1,150.43	134.93	3095	3110	3120
9.7	1,266.38	148.53	3095	3110	3120
8.9	1,382.85	162.19	3110	3110	3120
8.2	1,504.69	176.48	3110	3120	3120
7.7	1,587.48	186.19	3110	3120	3120
7.2	1,713.58	200.98	3120	3120	—
6.5	1,886.23	221.23	3120	3120	—
6.0	2,042.26	239.53	3120	—	—
5.7	2,148.07	251.94	3120	—	—
5.2	2,364.55	277.33	3120	—	—
25 HP, 1440 RPM					
407	41.76	3.54	1080	1080	1080
375	45.35	3.84	1080	1080	1080
341	49.92	4.23	1080	1080	1080
304	55.94	4.74	1080	1080	1080
265	64.22	5.44	1080	1080	1080
223	76.30	6.46	1080	1080	1080
178	95.65	8.10	1080	1080	1080
115	140.23	12.50	2095	2095	2095
106	152.35	13.58	2095	2095	2095
96	167.72	14.95	2095	2095	2095

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
25 HP, 1440 RPM					
89	182.08	16.23	2095	2095	2095
81	200.48	17.87	2095	2095	2095
72	224.60	20.02	2095	2095	2095
64	251.74	22.44	2095	2095	2095
58	278.33	24.81	2095	2095	2095
53	306.38	27.31	2095	2095	2095
47	343.40	30.61	2095	2095	2095
41	394.22	35.14	2095	2095	2095
38	430.46	38.37	2095	2095	2095
33	494.18	44.05	2095	2095	2095
28	587.18	52.34	2095	2095	2110
22	736.05	65.61	2095	2110	3110
19.5	786.96	73.84	3110	3110	3110
17.8	861.03	80.79	3110	3110	3110
16.4	935.10	87.74	3110	3110	3110
14.9	1,029.32	96.58	3110	3110	3110
13.3	1,153.48	108.23	3110	3110	3120
12.5	1,230.43	115.45	3110	3110	3120
11.1	1,378.89	129.38	3110	3110	3120
9.9	1,542.48	144.73	3110	3120	3120
8.9	1,728.56	162.19	3110	3120	3120
8.2	1,880.86	176.48	3120	3120	—
7.8	1,972.41	185.07	3120	3120	—
7.2	2,141.97	200.98	3120	3120	—
6.5	2,357.79	221.23	3120	—	—
5.7	2,685.09	251.94	3120	—	—
5.2	2,955.69	277.33	3120	—	—
30 HP, 1440 RPM					
407	50.11	3.54	1080	1080	1080
375	54.42	3.84	1080	1080	1080
341	59.90	4.23	1080	1080	1080
304	67.13	4.74	1080	1080	1080
265	77.06	5.44	1080	1080	1080
223	91.56	6.46	1080	1080	1080
178	114.78	8.10	1080	1080	1080
115	168.28	12.50	2095	2095	2095
106	182.82	13.58	2095	2095	2095
96	201.26	14.95	2095	2095	2095
89	218.49	16.23	2095	2095	2095
81	240.57	17.87	2095	2095	2095
72	269.52	20.02	2095	2095	2095
64	302.09	22.44	2095	2095	2095
58	334.00	24.81	2095	2095	2095
53	367.66	27.31	2095	2095	2095
47	412.08	30.61	2095	2095	2095
41	473.06	35.14	2095	2095	2095
38	516.55	38.37	2095	2095	2110
33	593.01	44.05	2095	2095	2110
28	704.62	52.34	2095	2110	2110
22	883.26	65.45	2120	2120	2120
20.3	905.47	70.80	3120	3120	3120
18.1	1,014.69	79.34	3120	3120	3120
16.4	1,122.12	87.74	3120	3120	3120
14.9	1,235.18	96.58	3120	3120	3120
13.3	1,384.17	108.23	3120	3120	3120
11.6	1,589.06	124.25	3120	3120	3120
10.6	1,735.24	135.68	3120	3120	—
9.8	1,888.07	147.63	3120	3120	—
8.9	2,074.28	162.19	3120	3120	—

TABLE - SELECTION TABLE BASED ON HP

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
30 HP, 1440 RPM					
8.2	2,257.03	176.48	3120	—	—
7.8	2,366.89	185.07	3120	—	—
7.2	2,570.37	200.98	3120	—	—
6.5	2,829.35	221.23	3120	—	—

40 HP, 1440 RPM					
407	66.81	3.54	1095	1095	1095
375	72.55	3.84	1095	1095	1095
341	79.87	4.23	1095	1095	1095
304	89.50	4.74	1095	1095	1095
265	102.75	5.44	1095	1095	1095
223	122.09	6.46	1095	1095	1095
178	153.05	8.10	1095	1095	1095
115	224.37	12.50	2110	2110	2110
106	243.76	13.58	2110	2110	2110
96	268.35	14.95	2110	2110	2110
89	291.32	16.23	2110	2110	2110
81	320.76	17.87	2110	2110	2110
72	359.35	20.02	2110	2110	2110
63	412.66	22.99	2110	2110	2110
58	445.33	24.81	2110	2110	2110
53	490.21	27.31	2110	2110	2110
47	549.44	30.61	2110	2110	2110
41	630.93	35.15	2110	2110	2110
38	688.73	38.37	2110	2110	2110
33	790.69	44.05	2110	2110	2110

Output Speed	Output Torque	Ratio	Model suitable for minimum Service Factor		
RPM	Kgm		1	1.4	2
40 HP, 1440 RPM					
28	939.49	52.34	2110	2110	2120
22	1,177.68	65.45	2120	2120	

50 HP, 1440 RPM					
407	83.51	3.54	1110	1110	1110
375	90.69	3.84	1110	1110	1110
341	99.83	4.23	1110	1110	1110
304	111.89	4.74	1110	1110	1110
265	128.43	5.44	1110	1110	1110
223	152.61	6.46	1110	1110	1110
178	191.31	8.10	1110	1110	1110
115	280.46	12.50	2120	2120	2120
106	304.70	13.58	2120	2120	2120
96	335.44	14.95	2120	2120	2120
86	375.82	16.75	2120	2120	2120
75	431.47	19.23	2120	2120	2120
63	512.69	22.85	2120	2120	2120
58	556.67	24.81	2120	2120	2120
53	612.76	27.31	2120	2120	2120
47	686.80	30.61	2120	2120	2120
41	788.44	35.14	2120	2120	2120
38	860.91	38.37	2120	2120	2120
33	988.36	44.05	2120	2120	2120
28	1,174.36	52.34	2120	2120	—
22	1,472.10	65.61	2120	—	—

Notes- 1. The Output Speeds in the following tables are based on input speed of 1440 RPM (4 Pole Motors)

2. The Ratios given in the following Tables are nominal ratios. For exact ratios, refer 'Selection Table Based on Torque'
3. The exact output speeds can be worked out based on the actual input speed and the exact ratio. However, these will not vary by more than 5%
4. Many more ratios and combinations other than those listed in the following tables are available. For such requirements, please contact us.
5. For speed requirements of less than those listed in the tables above, please contact us.

TABLE 11- SELECTION TABLE BASED ON TORQUE

MODEL	1-MODEL		2-MODEL				3-MODEL					
	SINGLE STAGE		DOUBLE STAGE				TRIPPLE STAGE					
	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm
019	5.73	8	10.63	9	19.13	10	34.68	9	66.87	10	106.96	9
	4.71	8	11.74	10	20.62	10	38.28	10	68.88	10	109.58	10
	4.06	10	13.24	10	23.25	10	43.16	10	74.22	10	118.07	10
	3.60	10	14.61	10	27.00	8	47.65	10	77.67	10	127.26	8
	3.26	9	16.48	10	32.80	8	52.60	10	83.69	10	133.13	10
			16.97	10			55.34	9	88.04	9	154.61	8
							59.31	10	94.36	10	187.84	8
							61.09	10	97.19	10		
028	6.55	21	11.91	28	20.92	28	38.84	28	69.88	28	109.34	29
	5.36	23	13.21	29	23.19	29	43.07	29	75.29	28	119.78	28
	4.59	23	14.58	29	26.28	23	47.55	29	77.49	29	132.83	29
	4.05	29	16.44	29	30.68	23	53.61	29	83.50	29	144.62	23
	3.65	28	17.22	28	37.48	21	59.18	29	88.26	23	150.48	23
			19.09	29			61.98	28	94.15	29	175.70	23
							66.73	29	98.59	28	214.67	21
029			13.34	28	23.90	28	48.71	28	96.80	29	156.44	28
			14.79	29	26.51	29	54.02	29	104.80	28	160.86	23
			16.40	29	28.70	23	59.90	29	109.66	28	173.49	29
			18.58	29	30.03	23	66.43	29	116.22	29	187.82	23
			19.56	28	35.06	23	71.45	28	121.62	29	196.54	23
			21.70	29	42.84	21	75.25	29	128.04	28	229.48	23
							79.23	29	137.77	23	280.37	21
							87.87	29	142.00	29		
038	7.09	43	13.06	70	23.41	70	42.60	70	82.97	70	163.05	64
	5.79	50	14.49	70	25.61	64	47.24	70	93.99	70	177.51	50
	4.94	50	15.85	64	28.47	64	52.15	70	100.90	64	185.20	50
	4.35	64	16.41	70	31.00	50	58.80	70	109.74	70	216.88	50
	3.91	64	17.95	64	32.34	50	61.58	70	120.05	64	265.79	43
	3.58	70	19.16	70	37.87	50	68.29	70	134.08	70		
			20.96	64	46.41	43	74.81	70	146.67	64		
039			12.79	70	30.85	64	47.71	70	94.82	70	167.62	64
			14.00	70	33.48	50	52.91	70	102.65	70	186.34	64
			15.56	70	35.04	50	58.67	70	107.41	70	202.87	50
			17.67	70	41.03	50	66.47	70	115.31	64	211.66	50
			20.70	70	50.28	43	69.98	70	125.42	70	247.86	50
			22.64	64			77.61	70	130.62	64	303.76	43
			25.36	70			80.83	64	137.20	64		
			27.75	64			85.50	70	153.23	70		
050	8.10	65	12.65	125	25.07	125	46.19	125	98.34	125	178.22	125
	6.46	85	13.84	125	27.23	125	50.16	125	108.26	125	196.18	125
	5.44	95	15.38	125	29.97	125	55.63	125	114.35	125	219.85	105
	4.74	105	16.70	125	33.59	105	60.85	125	120.35	125	244.69	85
	4.23	125	17.47	125	37.39	85	63.48	125	124.18	125	252.38	95
	3.84	125	18.97	125	38.56	95	68.94	125	131.02	125	299.88	85
	3.54	125	20.89	125	45.82	85	74.12	125	136.70	125	375.93	65
			22.22	125	57.44	65	80.49	125	145.42	125		
			24.46	125			88.61	125	160.07	125		

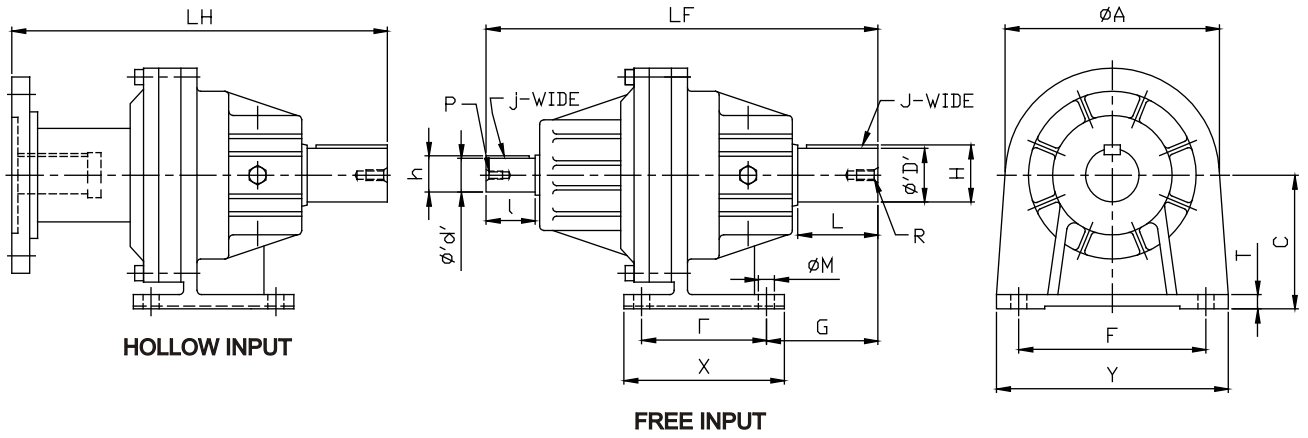
Note : 1. For ratios other than mentioned above, please contact us.

2. For Higher Models /Torques, please contact us.

TABLE 11- SELECTION TABLE BASED ON TORQUE

MODEL	1-MODEL		2-MODEL				3-MODEL					
	SINGLE STAGE		DOUBLE STAGE				TRIPPLE STAGE					
	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm	Ratio	Torque in Kgm
060	8.10	125	12.50	240	25.76	195	44.72	240	88.66	240	193.67	240
	6.46	170	13.58	240	27.31	240	48.93	240	96.28	240	203.10	230
	5.44	180	14.95	240	31.10	240	53.13	240	105.99	240	220.56	240
	4.74	195	16.75	240	34.24	240	58.49	240	115.10	240	242.79	240
	4.23	240	17.87	240	38.37	195	61.78	240	126.70	240	272.08	195
	3.84	240	18.19	240	41.75	170	65.02	240	136.35	240	312.34	180
	3.54	240	20.02	240	44.05	180	70.61	240	148.07	240	371.13	170
			22.99	240	52.34	170	73.85	240	158.03	240	465.24	125
							80.20	240	175.94	240		
070	8.10	210	12.50	420	27.31	360	44.72	420	93.92	410	217.04	340
	6.46	290	13.58	420	30.61	340	48.93	420	103.38	410	241.57	290
	5.44	320	14.95	420	34.24	275	54.39	420	115.10	410	249.16	320
	4.74	340	16.23	410	35.14	320	59.07	420	126.70	410	272.08	310
	4.23	410	18.19	410	38.37	310	64.14	410	136.35	340	296.06	290
	3.84	410	20.02	410	41.75	290	67.09	420	141.99	410	312.34	320
	3.54	420	22.99	410	44.05	320	73.85	420	163.00	405	371.13	290
			24.81	330	52.34	290	80.20	410	182.66	340	465.24	210
			25.76	340	65.61	210	86.48	420	203.31	320		
080	8.10	310	12.50	600	27.31	580	44.21	600	96.58	600	221.23	580
	6.46	420	13.58	600	30.61	480	48.01	600	109.98	600	247.93	480
	5.44	440	14.95	600	34.24	530	52.85	600	121.07	600	269.77	420
	4.74	480	16.23	580	35.14	440	59.23	600	135.68	600	284.61	440
	4.23	580	19.23	600	38.37	480	64.32	600	147.63	600	338.18	420
	3.84	570	20.02	580	41.75	420	70.80	600	155.75	600	356.79	310
	3.54	600	22.85	600	44.05	440	75.53	580	169.14	570	423.94	310
			24.81	570	52.34	420	81.28	600	185.07	600		
			25.76	480	65.61	310	91.09	600	200.98	570		
095	8.10	750	12.50	1400	25.76	1100	44.21	1400	97.16	1350	221.23	1225
	6.46	1000	13.58	1400	27.31	1220	48.01	1400	108.89	1350	247.93	1100
	5.44	1050	14.95	1400	30.61	1100	52.85	1400	115.45	1350	269.77	1000
	4.74	1100	16.23	1350	35.14	1050	57.40	1400	129.38	1350	284.61	1050
	4.23	1350	17.87	1350	38.37	1000	64.32	1400	134.93	1230	310.79	1000
	3.84	1300	18.19	1300	41.75	1000	70.80	1400	148.53	1350	338.18	1000
	3.54	1400	20.02	1350	44.05	1050	76.89	1350	162.19	1310	356.79	1050
			22.44	1100	52.34	1000	81.28	1400	186.19	1350	423.94	1000
			24.81	1100	65.61	750	88.27	1300	208.65	1100	531.44	750
110	8.10	1100	12.50	2100	27.31	1780	44.21	2100	108.89	2000	239.53	1600
	6.46	1500	13.58	2000	30.61	1700	48.01	2100	115.45	2000	247.93	1700
	5.44	1600	14.95	2050	34.24	1310	52.85	2100	129.38	2000	269.77	1500
	4.74	1700	16.23	2000	35.14	1600	57.40	2050	144.73	2000	284.61	1600
	4.23	2000	17.87	2000	38.37	1470	67.99	2100	162.19	2000	310.79	1470
	3.84	2000	20.02	2000	41.75	1500	73.84	2000	176.48	1775	338.18	1500
	3.54	2100	22.99	1860	44.05	1600	80.79	2100	186.19	1860	356.79	1600
			24.81	1600	52.34	1500	87.74	2015	200.98	1610	423.94	1500
			25.76	1700	65.61	1100	96.58	2050	221.23	1775	531.44	1100
120	8.10	1700	12.50	3200	27.31	3100	44.21	3200	108.23	3200	221.23	3100
	6.46	2300	13.58	3200	30.61	2600	48.01	3200	117.54	3050	239.53	2450
	5.44	2450	14.95	3200	34.24	3100	52.85	3200	124.25	3200	251.94	2880
	4.74	2600	16.75	3200	35.14	2450	57.40	3200	135.68	3200	277.33	3100
	4.23	3100	19.23	3200	38.37	2600	64.32	3200	147.63	3200	310.79	2600
	3.84	3050	20.02	3100	41.75	2300	70.80	3200	162.19	3100	338.18	2300
	3.54	3200	22.85	3200	44.05	2450	79.34	3200	176.48	3100	356.79	2450
			24.81	3050	52.34	2300	87.74	3200	185.07	3200	423.94	2300
			25.76	2600	65.61	1700	96.58	3200	200.98	3050	531.44	1700

DIMENSIONS OF FOOT MOUNTED UNITS
(MODEL 019-070)



HOLLOW INPUT

FREE INPUT

Model	Output Shaft					Input Shaft					Foot Mounting								Overall		
	D j6	H	J p9	R	L	d j6	h	j p9	p	l	C	X	Y	E	F	T	G	M	A	LF	LH

SINGLE STAGE

1019	19	21.5	6	M6	30	14	16	5	-	25	85	85	140	60	120	8	49	9	100	185	181
1028	28	31	8	M8	42	19	21.5	6	M6	30	102	110	170	80	140	12	62	14	130	226	227
1038	38	41	10	M10	55	28	31	8	M8	40	105	120	180	90	140	12	85	14	162	292	280
1050	50	53.5	14	M12	75	38	41	10	M10	55	125	150	215	115	180	15	105	14	195	373	356
1060	60	64	18	M12	90	38	41	10	M10	55	150	180	260	140	210	16	125	18	240	440	434
1070	70	74.5	20	M16	100	50	53.5	14	M12	75	165	205	300	150	250	18	140	18	280	509	462

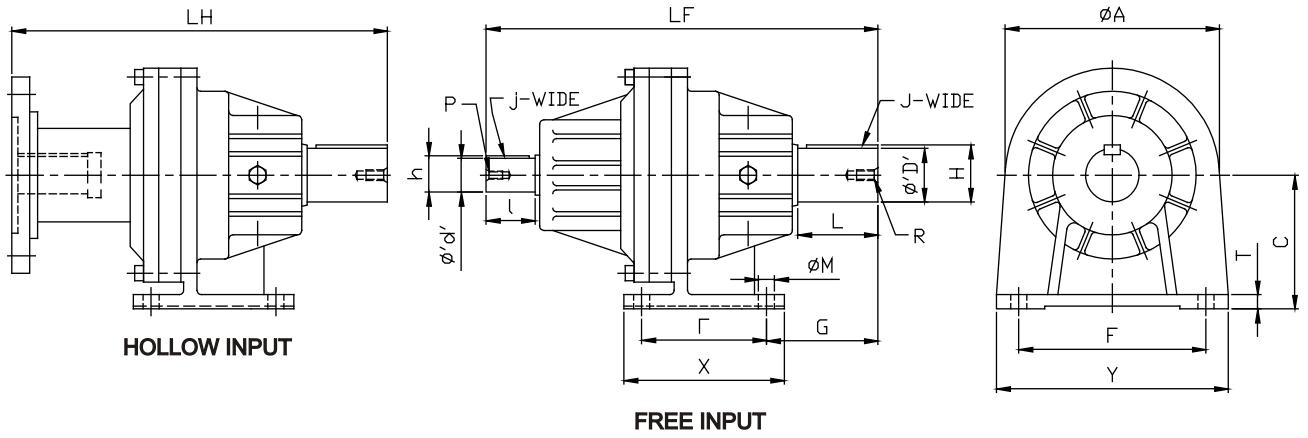
DOUBLE STAGE

2019	19	21.5	6	M6	30	14	16	5	-	25	85	85	140	60	120	8	49	9	100	214	210
2028	28	31	8	M8	42	14	16	5	-	25	102	110	170	80	140	12	62	14	130	248	244
2029	28	31	8	M8	42	19	21.5	6	M6	30	102	110	170	80	140	12	62	14	130	267	268
2038	38	41	10	M10	55	19	21.5	6	M6	30	105	120	180	90	140	12	85	14	162	312	313
2039	38	41	10	M10	55	28	31	8	M8	40	105	120	180	90	140	12	85	14	162	344	332
2050	50	53.5	14	M12	75	28	31	8	M8	40	125	150	215	115	180	15	105	14	195	393	381
2060	60	64	18	M12	90	38	41	10	M10	55	150	180	260	140	210	16	125	18	240	476	459
2070	70	74.5	20	M16	100	38	41	10	M10	55	165	205	300	150	250	18	140	18	280	512	494

TRIPPLE STAGE

3019	19	21.5	6	M6	30	14	16	5	-	25	85	85	140	60	120	8	49	9	100	244	240
3028	28	31	8	M8	42	14	16	5	-	25	102	110	170	80	140	12	62	14	130	277	273
3029	28	31	8	M8	42	19	21.5	6	M6	30	102	110	170	80	140	12	62	14	130	307	308
3038	38	41	10	M10	55	14	16	5	-	25	105	120	180	90	140	12	85	14	162	333	329
3039	38	41	10	M10	55	19	21.5	6	M6	30	105	120	180	90	140	12	85	14	162	352	353
3050	50	53.5	14	M12	75	19	21.5	6	M6	30	125	150	215	115	180	15	105	14	195	412	413
3060	60	64	18	M12	90	28	31	8	M8	40	150	180	260	140	210	16	125	18	240	496	484
3070	70	74.5	20	M16	100	28	31	8	M8	40	165	205	300	150	250	18	140	18	280	531	519

DIMENSIONS OF FOOT MOUNTED UNITS
(MODEL 080-120)



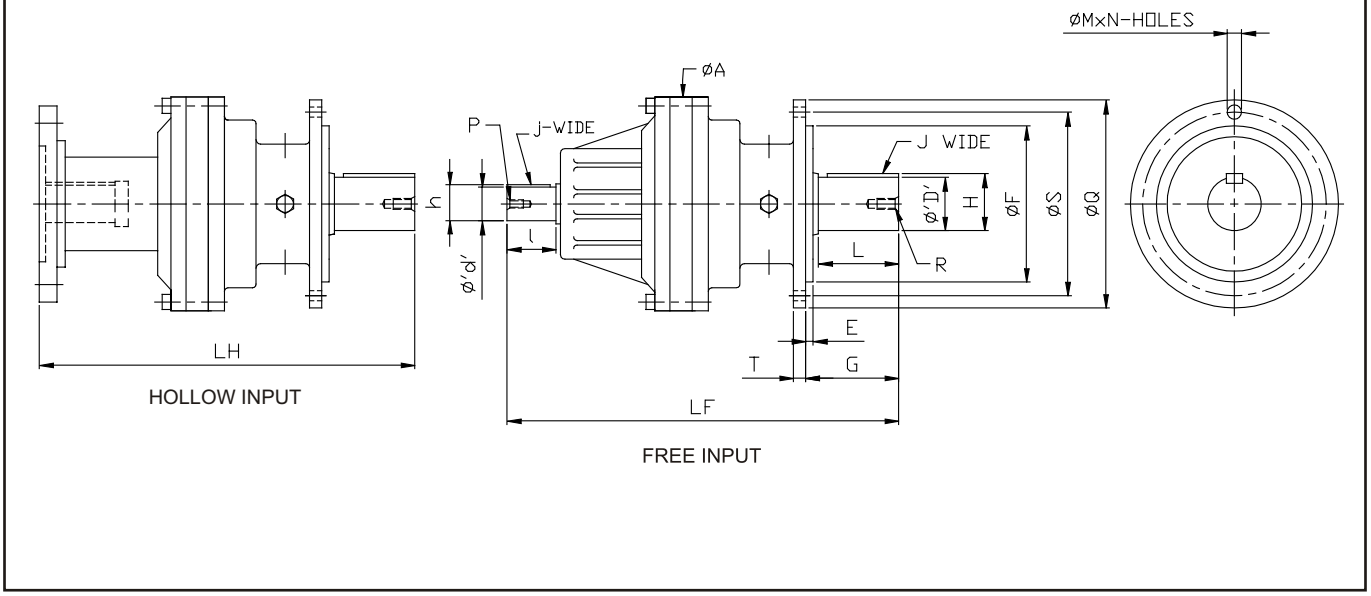
HOLLOW INPUT

FREE INPUT

Model	Output Shaft					Input Shaft					Foot Mounting								Overall		
	D j6	H	J p9	R	L	d j6	h	j p9	p	l	C	X	Y	E	F	T	G	M	A	LF	LH
SINGLE STAGE																					
1080	80	85.5	22	M16	120	50	54	14	M12	75	190	245	360	200	310	22	160	23	325	578	543
1095	95	100	25	M20	140	60	64	18	M12	90	220	250	410	200	350	25	195	23	375	644	614
1110	110	116	28	M20	170	60	64	18	M12	90	240	300	450	230	380	25	235	27	415	717	667
1120	120	127	32	M20	180	70	74.5	20	M16	100	265	325	500	245	425	30	264	27	455	784	734
DOUBLE STAGE																					
2080	80	85.5	22	M16	120	38	41	10	M10	55	190	245	360	200	310	22	160	23	325	622	618
2095	95	100	25	M20	140	50	54	14	M12	75	220	250	410	200	350	25	195	23	375	716	669
2110	110	116	28	M20	170	50	54	14	M12	75	240	300	450	230	380	25	235	27	415	827	802
2120	120	127	32	M20	180	50	54	14	M12	75	265	325	500	245	425	30	264	27	455	930	880
TRIPPLE STAGE																					
3080	80	85.5	22	M16	120	38	41	10	M10	55	190	245	360	200	310	22	160	23	325	660	642
3095	95	100	25	M20	140	38	41	10	M10	55	220	250	410	200	350	25	195	23	375	708	725
3110	110	116	28	M20	170	38	41	10	M10	55	240	300	450	230	380	25	235	27	415	816	822
3120	120	127	32	M20	180	50	54	14	M12	75	265	325	500	245	425	30	264	27	455	952	905

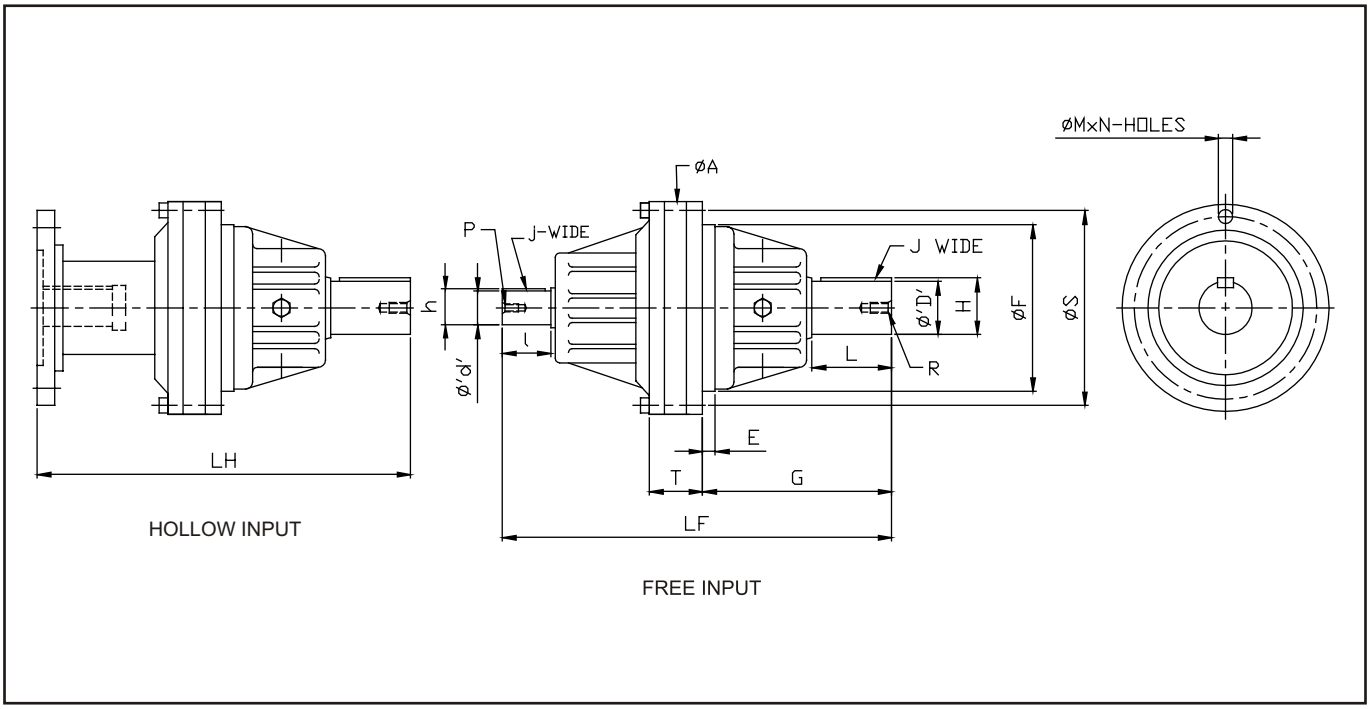
- All dimensions are in mm
- Hollow input dimensions are as per IEC - Standard for B-5 flange type Electric Motors
- Dimensions are subject to change without prior notice
- All open dimensions will have tolerance of 1-2 mm

DIMENSIONS OF FLANGE MOUNTED UNITS
(MODEL 019-070)



Model	Output Shaft					Input Shaft					Flange Mounting								Overall		
	D j6	H	J p9	R	L	d j6	h	j p9	p	l	Q	S	Fh8	E	T	G	N	M	A	LF	LH
SINGLE STAGE																					
1019	19	21.5	6	M6	30	14	16	5	-	25	120	102	80	2	10	34	4	11	100	185	181
1028	28	31	8	M8	42	19	21.5	6	M6	30	135	115	95	3	10	47	4	11	130	226	227
1038	38	41	10	M10	55	28	31	8	M8	40	155	135	100	5	13	65	8	9	162	292	280
1050	50	53.5	14	M12	75	38	41	10	M10	55	200	165	130	10	12	90	8	14	195	373	356
1060	60	64	18	M12	90	38	41	10	M10	55	220	190	160	10	16	105	8	14	240	440	434
1070	70	74.5	20	M16	100	50	53.5	14	M12	75	240	200	160	12	16	120	8	14	280	509	462
DOUBLE STAGE																					
2019	19	21.5	6	M6	30	14	16	5	-	25	120	102	80	2	10	34	4	11	100	214	210
2028	28	31	8	M8	42	14	16	5	-	25	135	115	95	3	10	47	4	11	130	248	244
2029	28	31	8	M8	42	19	21.5	6	M6	30	135	115	95	3	10	47	4	11	130	267	268
2038	38	41	10	M10	55	19	21.5	6	M6	30	155	135	100	5	13	65	8	9	162	312	313
2039	38	41	10	M10	55	28	31	8	M8	40	155	135	100	5	13	65	8	9	162	344	332
2050	50	53.5	14	M12	75	28	31	8	M8	40	200	165	130	10	12	90	8	14	195	393	381
2060	60	64	18	M12	90	38	41	10	M10	55	220	190	160	10	16	105	8	14	240	476	459
2070	70	74.5	20	M16	100	38	41	10	M10	55	240	200	160	12	16	120	8	14	280	512	494
TRIPPLE STAGE																					
3019	19	21.5	6	M6	30	14	16	5	-	25	120	102	80	2	10	34	4	11	100	244	240
3028	28	31	8	M8	42	14	16	5	-	25	135	115	95	3	10	47	4	11	130	277	273
3029	28	31	8	M8	42	19	21.5	6	M6	30	135	115	95	3	10	47	4	11	130	307	308
3038	38	41	10	M10	55	14	16	5	-	25	155	135	100	5	13	65	8	9	162	333	329
3039	38	41	10	M10	55	19	21.5	6	M6	30	155	135	100	5	13	65	8	9	162	352	353
3050	50	53.5	14	M12	75	19	21.5	6	M6	30	200	165	130	10	12	90	8	14	195	412	413
3060	60	64	18	M12	90	28	31	8	M8	40	220	190	160	10	16	105	8	14	240	496	484
3070	70	74.5	20	M16	100	28	31	8	M8	40	240	200	160	12	16	120	8	14	280	531	519

DIMENSIONS OF FLANGE MOUNTED UNITS
(MODEL 080-120)



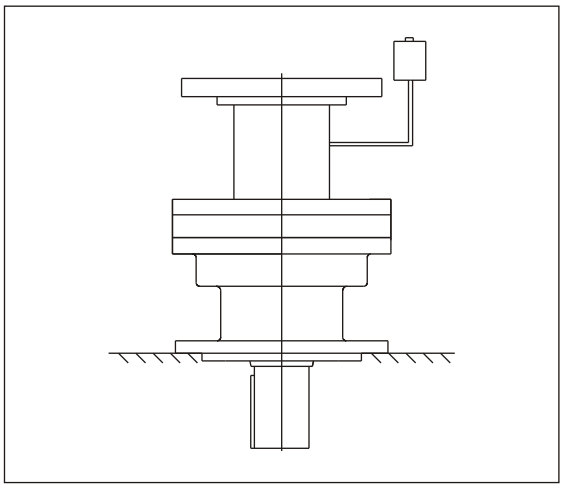
Model	Output Shaft					Input Shaft					Flange Mounting								Overall	
	D j6	H	J p9	R	L	d j6	h	j p9	p	l	A	S	Fh8	E	T	G	N	M	LF	LH
SINGLE STAGE																				
1080	80	85.5	22	M16	120	50	54	14	M12	75	325	300	265	10	85	295	12	14	578	543
1095	95	100	25	M20	140	60	64	18	M16	90	375	345	310	10	90	330	12	18	644	614
1110	110	116	28	M20	170	60	64	18	M16	90	415	385	350	15	100	370	12	18	717	667
1120	120	127	32	M20	180	70	74.5	20	M16	100	455	425	385	15	105	410	12	18	784	734
DOUBLE STAGE																				
2080	80	85.5	22	M16	120	38	41	10	M10	55	325	300	265	10	85	295	12	14	622	618
2095	95	100	25	M20	140	50	54	14	M12	75	375	345	310	10	90	330	12	18	716	669
2110	110	116	28	M20	170	50	54	14	M12	75	415	385	350	15	100	400	12	18	827	802
2120	120	127	32	M20	180	50	54	14	M12	75	455	425	385	15	105	410	12	18	930	880
TRIPPLE STAGE																				
3080	80	85.5	22	M16	120	38	41	10	M10	55	325	300	265	10	85	295	12	14	660	642
3095	95	100	25	M20	140	38	41	10	M10	55	375	345	310	10	90	330	12	18	708	725
3110	110	116	28	M20	170	38	41	10	M10	55	415	385	350	15	100	400	12	18	816	822
3120	120	127	32	M20	180	50	54	14	M12	75	455	425	385	15	105	410	12	18	952	905

- All dimensions are in mm
- Hollow input dimensions are as per IEC - Standard for B-5 flange type Electric Motors
- Dimensions are subject to change without prior notice
- All open dimensions will have tolerance of 1-2 mm

6 INSTALLATION AND MAINTENANCE

Every unit supplied by us comes with an Installation & Maintenance Manual which gives detailed information on Delivery conditions, Installation Guidelines, Commissioning, Lubrication, Maintenance & Ordering Spares. However, we are repeating a part of this information below for ready reference. :

6.1 Delivery Conditions



TRX Planetary drives are supplied with anti-rust coating on input shaft as well as output shaft, which is resistant to corrosion for at least six months. TRX drives with male shaft are supplied alongwith a key. In case of hollow shaft, the hollow shaft is without key. For installation with output shaft vertically downward, an oil cup with Elbow & a Breather Plug is also provided with the unit. The Drives are not pre-filled with oil. However, they are tested with oil filled upto correct level, approved and then oil is drained before dispatch to avoid spillage from the breather plug. Routine Test Certificate and Warrantee Certificate is also provided with the unit.

6.2 Installation guidelines

The TRX Drive supplied to you should be installed carefully on a Rigid Base. The detailed installation guidelines are given in our Installation & Maintenance Manual, which must be read carefully before installing & commissioning the unit.

6.3 Commissioning

The drives supplied by us are not pre-filled with oil. You need to fill up the correct grade of oil or grease (depending upon Model) before commissioning. Models 1019, 2019 & 3019 are grease lubricated & are pre-filled with grease before despatch. You need not fill up grease in these units. All other drives are oil-lubricated and oil must be filled in these units before commissioning. All the drives have oil filling / breather plug, oil level plug and oil drain plug. The drain plug is supplied with a rubber or a copper washer. The oil should be filled from the oil-filling plug till it fills upto the oil level plug, indicating oil level. In case of drives mounted with output shaft vertically downward or upward, an elbow with a separate oil cup is provided in place of breather plug and the breather plug is positioned at top of the oil cup. Oil should be filled in from this plug till it shows in the oil level plug.

Before commissioning the drive, check that sprockets or pulleys etc. are aligned properly and that the tension in belts or chains is not excessive. Please also check that the drain and level plugs are tightened properly, otherwise the oil may start leaking form these points. Do not start the drive directly on full load during the first commissioning. Initially, let the drive run freely on no load & then gradually increase the load upto the recommended level.

6.4 Maintenance

The oil level in the gear box should be checked regularly to make sure that the oil is filled in the gear box upto the indicated oil level. The first oil change is recommended after 500 working hours. Subsequently, the oil change interval should be about 10000 working hours. In case the gear box is being painted, please make sure that the oil seals are protected from the paint film. Periodically, check that all the clamping bolts, foundation bolts and plugs for proper tightness. No other maintenance is required for these gear boxes.

6.1 Lubrication

Lubrication plays a great role in the performance and life of any power transmission element. Care should be taken to ensure the proper lubrication of TRX Planetary drives. Standard Planetary Gear Boxes are lubricated by Grease or oil depending on the temperature as under:

Grease Model 019 in single, double, triple & four stages is grease lubricated

Oil Models 028, 038, 050, 060, 070, 080, 095, 110, 120 in single, double, triple & four stages are oil lubricated.

Grease Lubrication

Grease lubricated Planetary Gear Boxes are filled with Lithium base Grease, before despatch from our factory.

Oil Lubrication

In case of oil lubricated gear boxes, the gear boxes are tested with proper grade of oil in the factory. Subsequently, the oil is drained from the gear box before despatch. Hence the oil must be filled in these gear boxes before taking any trial. The grade of oil to be used depends on the ambient temperature. The viscosity of the oil to be used for different ambient temperatures is as under:

Ambient Temp	-10 to + 10^{O}C	5 to 40^{O}C	30 to 65^{O}C	40 to 75^{O}C
Viscosity ISO-VG	100	150	220	320

The following grades of oil / grease are recommended.

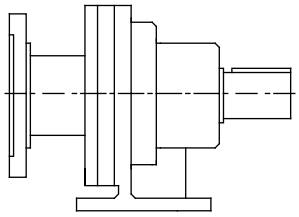
Lubricants

Brand	**Oil**		**Grease**
	Ambient 30 to 65^{O}C	**Ambient 40 to 75^{O}C**	
Indian Oil	SERVOMRSH 220	SERVOMESH 320	Servo Gem-2
Hindustan Petroleum	GERVIL EP 220	GERVIL EP 320	Beacon-2
Bharat Petroleum	ENERGOL GRHP220	ENERGOL GRHP320	Alvania No. 2
ESSO	SPARTAN EP 220	SPARTAN EP 320	Multifax-EP-2
SHELL	OMALA EP 220	OMALA EP 320	Alitho-30

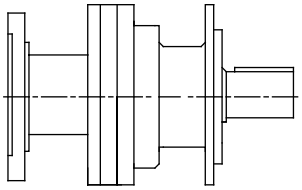
The units are designed to work upto a maximum surface temperature of 85^{O} C. If the temperature of the unit during running exceeds 85^{O} C, please contact us

We are sure that our gear boxes will give you a trouble free service for years and you will come to us for all your future requirement of Drives.

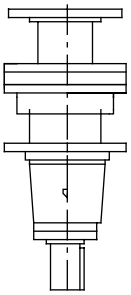
OUR RANGE OF PRODUCT



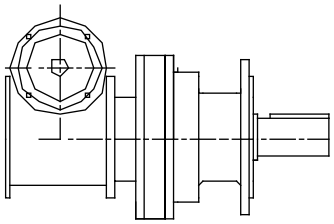
FOOT TYPE PLANETARY DRIVE



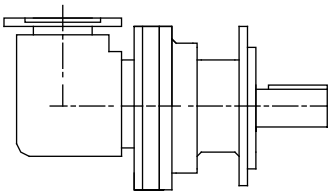
FLANGE TYPE PLANETARY DRIVE



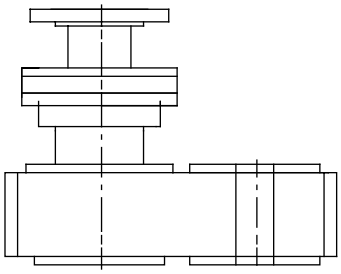
AGITATOR TYPE PLANETARY DRIVE



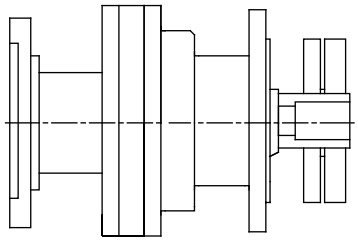
WORM PLANETARY DRIVE



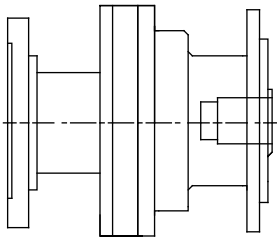
BEVEL PLANETARY DRIVE



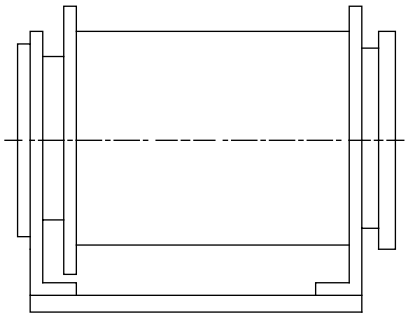
CUSTOM BUILT GEARED DRIVE



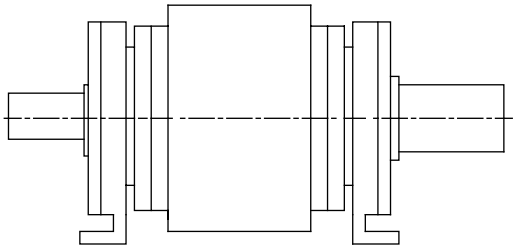
PLANETARY DRIVE HOLLOW O/P WITH SHRINK DISK



PLANETARY DRIVE HOLLOW O/P KEYWAY/SPLINED



WINCH



PLANETARY CREEP DRIVE

TRANSMATIX

OFFICE

106, Parth Co-operative Housing Society, Ganesh Peth Lane, Dadar (W), Mumbai 400028.
TEL/FAX : (022) 2437 60 04, 2422 78 87
e-mail : satishdharap@vsnl.com

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