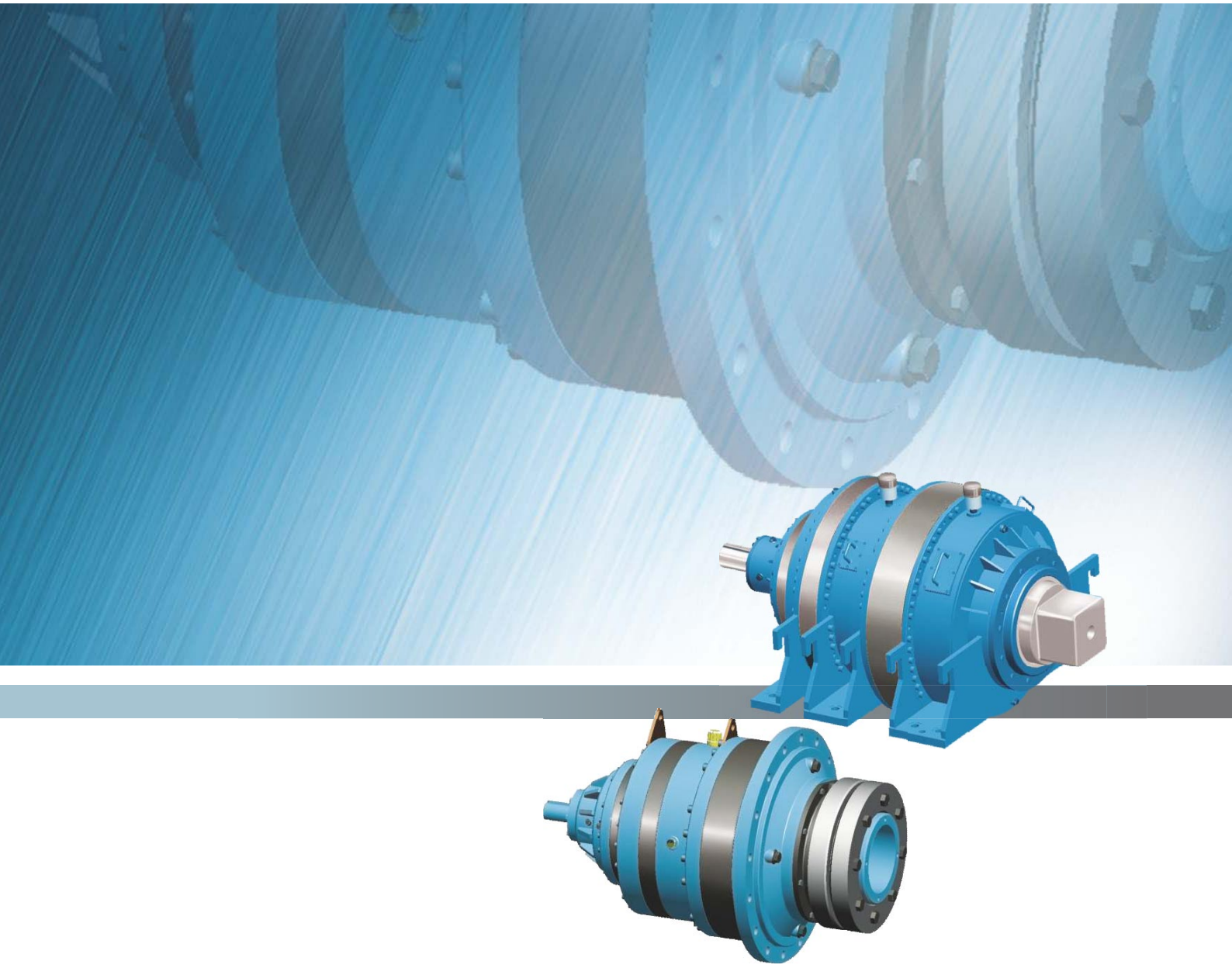
SAMT
Specialised Air Motors and Transmission

PREMIUM



PREMIUM

PLANETARY GEAR UNITS

Modular Planetary Gearbox
for Industrial Applications

PREMIUM

PREMIUM PLANETARY GEAR UNITS

PREMIUM PLANETARY GEAR UNITS

The Premium Planetary Gear Units are reliable drive components for the use of different industrial core sector :

- Sugar Mill
- Conveyor plants
- Fertilizer plants
- Coal & lignite mines
- Power plants
- Textile & Plastic
- Steel plants
- Sponge Iron plants
- Paper Machineries
- Mobile Hydrolic application

Planetary Gearboxes have much higher mechanical rating capacity compared to parallel shaft Gears. The power being transmitted gets equally distributed among three or five planets in each stage resulting in reduced induced stress which optimizes the size as well accommodates higher ratio.

Significant advantages of Premium Planetary Gear Unit

- Compact design with optimum power density
- Long operating life
- Modular construction
- Interchangeability
- Less noise & vibration
- Ease of maintenance

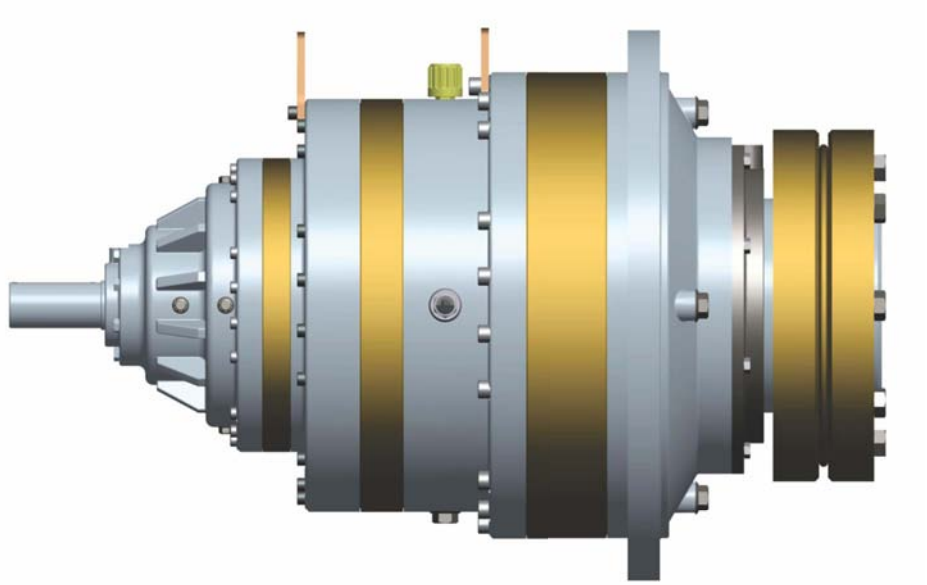
Description :

Premium Planetary Gear Units covers nominal torque range between 17kNm. and 3600 kNm.

Foot & Flange mounting type planetary units are available with ring diameter 330mm to 1930mm in double, triple & quadruple stage, depending upon ratio.

Housings :

Heavily loades housing parts are made out of spheroid graphite cast iron. Fabricated housings are also available on request.



PREMIUM PLANETARY GEAR UNITS

Gears & Pinions :

Sun & planet gears have spur gear teeth and are case-hardened and ground to precision grade accuracy with softer core provides improved wear and fatigue resistance.

Annulus gears are manufactured from high quality alloy steel, through hardened, nitriding depends on size & torque rating. Gear teeth are designed for long life fatigue resistance for the stated nominal torque.

Bearing arrangement :

Planets and shafts are exclusively supported by amply sized antifriction rolling bearings.

Seals :

Input and output shafts have radial shaft seals. For special applications we provide seals with refillable labyrinth.

Input Shaft :

Available features,

- Solid shaft with key
- Solid shaft with spline.
- Hollow with spline.

Output Shaft :

Available features,

- Solid shaft with key.
- Solid shaft with external spline.
- Solid shaft with square end.
- Hollow shaft with internal spline.
- Hollow shaft with shrink disk.
- Hollow shaft with internal spline & bracket.

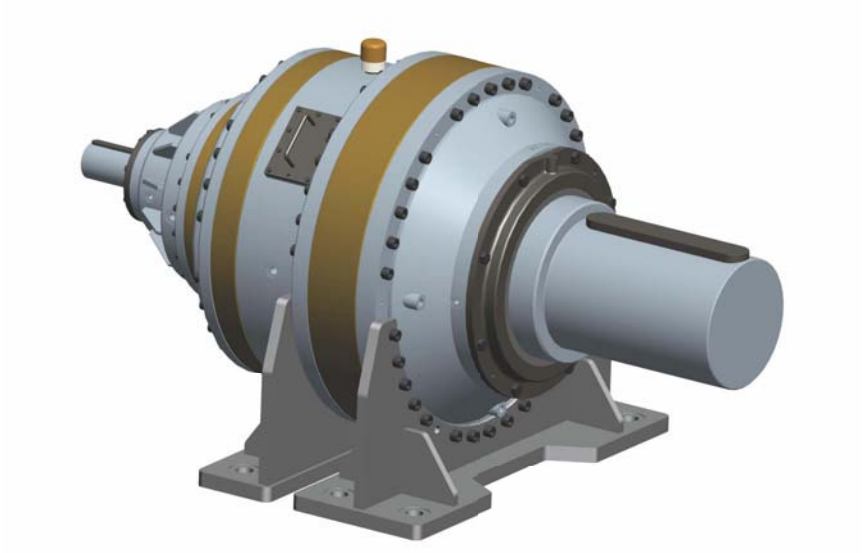
Note: All internal and external spline available (as per DIN 5480) on request.

Lubrication :

The Gear units are provided with dip lubrication as a standard feature. In case of dip lubrication, all parts to be lubricated are lying in the oil.

In case of force lubrication, extreme ambient temperature and other specific features please refer to us.

The gear unit can be operated in any mounting position in order to guarantee adequate lubrication; the mounting position must be stated.



Direction of rotation :

The Gear Units are bi-directional refers to output shaft direction when viewing towards the shaft end face.

Working temperature :

The working oil temperature of the planetary gears should range between +5°C to +90°C. Temperature falling outside this range could be accepted only if special lubricants, gaskets are used. For further information please contact us.

Cooling :

Up to the limit of thermal capacity gear units are cooled by radiation and convection from the surface at the Housing/Casing.

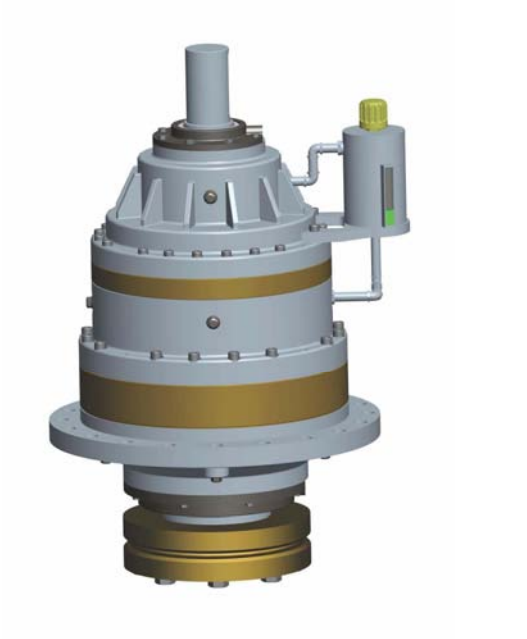
Weights & Dimensions :

The stated weights are mean values. Illustrations and dimensions are not strictly binding. All data are subject to change without notice

Operating condition :

The ambient temperatures must be known so that they can be taken into consideration while selecting the gear units for thermal conditions.

Where ambient temperatures are lower than -10 °C, the factors affecting the oil to be used and the materials to be used for the gear unit components must be sufficiently taken into consideration. Please refer to us.



Environmental conditions such as salt water, salt-laden air, aggressive substances, dust, and mud falling or flying stones, excessive pressure, heavy vibrations and extreme shock loads must be disclosed.

Delivery :

Premium Planetary Gear Units are supplied without oil. The Gear housing is protected against corrosion.

Preservation :

Standard Preservation: up to 6 months with full of Oil and free run every alternate 20-25 days.

Long term: Up to 24 months full mineral Oil or synthetic oil on PAO basis is used (PAO = American Petroleum base oil), and free run every after 20-25 days.

Further notes :

For shaft mounted gear units with torque reaction arm, the connection of the torque reaction arm on the foundation must permit the gear unit to move corresponding to the displacement of the machine shaft at any time, without constraining forces acting on the gear unit. In case of foot mounted gear units with solid shaft the provided coupling between gear unit and prime mover must also be suitable for adequate misalignment.

Explanation of symbols used in the dimensional drawings.

 = Breather

 = Oil drain

 = Oil filter

 = Oil sight glass

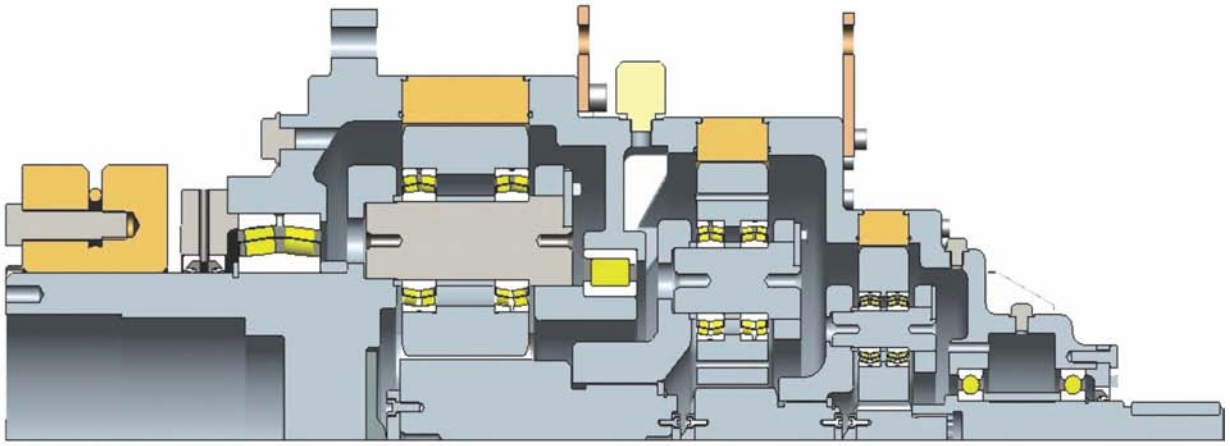
PREMIUM PLANETARY GEAR UNITS

Key to Symbols :

E_D = Operating Cycle per hours in %, e.g. E_D=80%/h.
f_1 = Factor for driven machine (Table 1)
f_2 = Factor for prime mover (Table 2)
f_3 = Peak torque factor (Table 3)
f_4 = Thermal factor (Table 4)
f_5 = Utilization factor (Table 5)
i = Actual Ratio.
i_N = Nominal Ratio.
i_s = Required ratio.
n_1 = Input RPM
n_2 = Output PRM
P_G = Required thermal capacity (kW)
P_{G1} = Thermal capacity (kW) for gear units without auxiliary cooling
P_N = Nominal power rating of gear unit (kW) see rating tables
P_r = Required power rating (kW)
P_1 = Motor power of driven machine (kW)
P_2 = Power Rating of driven machine (kW)
P_{START} = Starting power rating (kW)
t = Ambient temperature(c)
T_A = Max torque on input shaft, i.e peak operating starting or braking torque (Nm)
T_{2N} = Nominal output torque (Nm)
T_2 = Torque of driven machine (Nm)
P_{2eq} = Equivalent power rating (kW)
T_{2eq} = Equivalent torque (Nm)

Gearbox Nominal Torque Rating :

Gear unit sizes	Nominal torque ratings (Nm)
13	17000
15	24000
17	40000
20	57000
22	83000
24	120000
28	200000
33	335000
38	450000
41	595000
44	745000
48	948000
52	1165000
57	1550000
66	2530000
76	3600000



Load Classification by application, Service Factors

Table 1	Factor for driven machine				f1		
Driven Machines	Effective daily operating period under load in hours			Driven Machines	Effective daily operating period under load in hours		
	≤ 0.5	≥ 0.5-10	≥ 10		≤ 0.5	≥ 0.5-10	≥ 10
Waste water treatment				**Conveyors**			
Thickeners(central drive)	-	-	1.2	Bucket conveyors	-	1.2	1.5
Filter presses	1.0	1.3	1.5	Hauling winches	1.4	1.6	1.6
Flocculation apparata	0.8	1.0	1.3	Hoist	-	1.5	1.8
Aerator	-	1.8	2	Belt conveyors ≤ 150 kW	1.0	1.2	1.3
Ranking equipment	1.0	1.3	1.5	Belt conveyors ≥ 150 kW	1.1	1.3	1.4
Combined longitudinal	1.0	1.3	1.5	Goods lifts*	-	1.2	1.5
and rotary rakes				Passenger lifts*	-	1.5	1.8
Pre-thickeners	-	1.1	1.3	Apron conveyors	-	1.2	1.5
Screw pumps	-	1.3	1.5	Escalators	-	1.2	1.4
Water turbines	-	-	2.0	Rail traveling gears	-	1.5	-
Pumps				**Frequency converters**	-	1.8	2.0
Centrifugal pumps	1.0	1.2	1.3	**Reciprocating compressors**	-	1.8	1.9
Positive displacement pumps							
1 piston	1.3	1.4	1.8				
> 1 piston	1.2	1.4	1.5				
Dredgers				**Cranes ****			
Bucket conveyors	-	1.6	1.6	Slewing gears****	1.0	1.4	1.8
Dumping devices	-	1.3	1.5	Luffing gears	1.0	1.1	1.4
Carterpillar travelling gears	1.2	1.6	1.8	Traveling gears	1.1	1.6	2.0
Bucket wheel excavators				Hoisting gears	1.0	1.1	1.4
as pick -up	-	1.7	1.7	Derricking jib cranes	1.0	1.2	1.6
for primitive material	-	2.2	2.2	**Cooling towers**			
Cutter heads	-	2.2	2.2				
Traversing gears*	-	1.4	1.8	Cooling tower fans	-	-	2.0
Plate bending machines *	-	1.0	1.0	Blowers (axial & radial)	-	1.4	1.5
Chemical industry				**Food industry**			
Extruders	-	-	1.6	**Cane sugar production**			
Dough mills	-	1.8	1.8	Cane knives *	-	-	1.7
Rubber calenders	-	1.5	1.5	Cane mills	-	-	1.7
Cooling drum	-	1.3	1.4	**Beet sugar production**			
Mixers for				Beet cossettes macerators,	-	-	1.2
uniform media	1.0	1.3	1.4	Extraction plants, Mechanical			
non-uniform media	1.4	1.6	1.7	refrigerators, Juce boliers,	-	-	1.4
Agitators for media with				Sugar beet washing machines			
uniform density	1.0	1.3	1.5	Sugar beet cutters	-	-	1.5
non-uniform density	1.2	1.4	1.6				
non-uniform gas absorption	1.4	1.6	1.8	**Paper machines**			
Toasters	1.0	1.3	1.5				
Centrifuges	1.0	1.2	1.3	of all kind ***	-	1.8	2.0
Metal working mills				Pulper drives		On request	
Plate titers	1.0	1.0	1.2	**Centrifugal compressors**	-	1.4	1.5
Ingot pushers	1.0	1.2	1.2				

Load Classification by application, Service Factors

Table 1	Factor for driven machine				f1		
Driven Machines	Effective daily operating period under load in hours			Driven Machines	Effective daily operating period under load in hours		
	≤ 0.5	≥ 0.5-10	≥ 10		≤ 0.5	≥ 0.5-10	≥ 10
Winding machines	-	1.6	1.6	**Cableways**			
Cooling bed transfer frames	-	1.5	1.5				
Roller straighteners	-	1.6	1.6	Material ropeways	-	1.3	1.4
Roller tables				To-and fro system			
Continuous	-	1.5	1.5	aerial ropeways	-	1.6	1.8
intermittent	-	2.0	2.0	T-bar lifts	-	1.3	1.4
Reversing tube mills	-	1.8	1.8	Continuous ropeways	-	1.4	1.6
Shears				**Cement industry**			
continuous *	-	1.5	1.5				
crank type *	1.0	1.0	1.0	Concrete mixers	-	1.5	1.5
Continuous casting drivers*	-	1.4	1.4	Breakers *	-	1.2	1.4
Rolls				Rotary kilns	-	-	2.0
Reversing blooming mills	-	2.5	2.5	Tube mills	-	-	2.0
Reversing slabbing mills	-	2.5	2.5	Separators	-	1.6	1.6
Reversing wire mills	-	1.8	1.8	Roll crushers	-	-	2.0
Reversing sheet mills	-	2.0	2.0				
Reversing plate mills	-	1.8	1.8				
Roll adjustment drives	0.9	1.0	-				

Table 2 Factor for prime mover	f2
Electric motors, hydraulic motors, turbines	1.0
Piston engines 4-6 cylinders cyclic variation 1:100 to 1:200	1.25
Piston engines 1-3 cylinders cyclic variation up to 1:100	1.5

Table 3 Peak torque factor	f3			
	Load peaks per hour			
	1-5	6-30	31-100	> 100
f3 Steady direction of load	0.5	0.65	0.7	0.85
f3 Alternating direction of load	0.7	0.95	1.1	1.25

Table 4 Thermal factor	f4				
	Without auxiliary cooling				
Ambient Temp.	Operating cycle per hour (ED) in %				
	100	80	60	40	20
10°C	1.14	1.2	1.32	1.54	2.04
20°C	1.0	1.06	1.16	1.35	1.79
30°C	0.87	0.93	1.00	1.18	1.56
40°C	0.71	0.75	0.82	0.96	1.27
50°C	0.55	0.58	0.84	0.74	0.98

Table 5 Utilization factor							f5
30%	40%	50%	60%	70%	80%	90%	100%
0.66	0.77	0.83	0.90	0.90	0.95	1.0	1.0

Design for power rating of driven machine P2

*) Designed power corresponding to max. torque

**)Load can be exactly classified, for instance, according to FEM 1001

***)A check for thermal capacity is absolutely essential

****) Load can be exactly classified according to the slewing gear specification

The listed value of the factors are emperial. Prerequisite for their application is that the machinery and equipment mentioned correspond to generally accepted design and load specifications. In case of deviations from standard conditions, please refer to us.

For driven machines which are not listed in this table, please refer to us.

1. **Determination gear unit type and size**

1.1 **Calculation of required transmission Ratio:**

$$i_S = \frac{n_1}{n_2}$$

1.2 **Determine the nominal power rating:**

$$P_N \geq P_r = P_2 \times f_1 \times f_2$$

For f_1 refer Table 1 and for f_2 refer Table 2,
If P_2 is not available, use P_1 in place of P_2
in the complete selection process.

1.3 Check for over dimensioning:

$$3.33 \times P_2 \geq P_N$$

**1.4 Check for maximum Torque e.g.
Peak Operating-starting or breaking torque:**

$$P_N \geq P_{START} = \frac{T_A \times n_2}{9550} \times f_3$$

For f_3 refer Table 3
Gear unit sizes and number of gear stages are given in rating tables depending on i_N and P_N

1.5 Check whether the actual ratio i as per tables on page 18 is acceptable.

2. Determination of gear unit thermal capacity P_G

2.1 Gear Unit Utilization for the determination of the thermal capacity:

$$\text{Utilization in \%} = \frac{P_2}{P_N} \times 100$$

For factor f_5 corresponding to Utilization % refer Table 5

2.2 Adequate for gear units without auxiliary cooling:

$$P_2 \leq P_G \times f_1 \times f_4 \times f_5$$

For f_4 refer Table 4 and for f_5 refer Table 5

2.3 For higher thermal capacities, forced lubrication system is available on request.

Calculation Example 1

Known Criteria

PRIME MOVER

Electric motor	:	P_1 = 55kW
Motor speed	:	n_1 = 1500 rpm
Max. starting torque	:	T_A = 560Nm

DRIVEN MACHINE

Agitator	:	P_2 = 50kW
Speed	:	n_2 = 13.4 rpm
Duty	:	24 h / day
Starts per hour	:	1
Operating cycle per hour	:	E_D = 100%
Ambient temperature	:	40°C

Installation in a large hall

1. Selection of gear unit type

1.1 Calculation of transmission ratio

$$i_S = \frac{n_1}{n_2} = \frac{1500}{13.4} = 111.9;\ i_N = 112$$

1.2 Determination of gear unit type

Type P3LA selected (for actual ratio, see page 18)

2. Determination of gear unit size

2.1 Determination of the nominal gear unit power rating

$$P_N \geqslant P_r = P_2 \times f_1 \times f_2 = 50\ kW \times 1.5 \times 1 = 75\ kW;$$

$$P_N = 82.5\ kW > P_r = 75\ kW$$

Selected from power rating table : **type P3LA.**
Gear unit size 20, with P_N = 82.5 kW (see page 10)

$$3.33 \times P_2 \geqslant P_N \quad 3.33 \times 50\ kW = 166.4\ kW > P_N = 82.5\ kW$$

2.2 Checking the starting power rating

$$P_N \geqslant P_{START} = \frac{T_A \times n_1}{9550} \times f_3 = \frac{560 \times 1500}{9550} \times 0.5 = 44\ kW;$$

$$P_N = 82.5\ kW > P_{START} = 44\ kW$$

3. Determination of thermal capacity

3.1 Gear unit utilization

$$\text{Utilization in \%} = \frac{P_2}{P_N} \times 100 = \frac{50}{82.5} \times 100 = 60\%$$

3.2 Thermal capacity according to table for type P3LA (see page 10)

$$P_2 \leqslant P_G = P_{G1} \times f_4 \times f_5 = 51\ kW \times 0.71 \times 0.9 = 32.5\ kW;$$

$$P_2 = 50\ kW > P_G = 32.5\ kW$$

Auxiliary cooling required. Please refer to us.

Calculation Example 2

Known Criteria

PRIME MOVER

Electric motor	:	P_1 = 90 kW
Motor speed	:	n_1 = 1000 rpm
Max. starting torque	:	T_A = 1330 Nm

DRIVEN MACHINE

Sugar Mill	:	P_2 = 80kW
Speed	:	n_2 = 2.5 rpm
Duty	:	24 h / day
Starts per hour	:	1
Operating cycle per hour	:	E_D = 100%
Ambient temperature	:	40°C

Installation in a large hall

1. Selection of gear unit type

1.1 Calculation of transmission ratio

$$i_S = \frac{n_1}{n_2} = \frac{1000}{2.5} = 400;\ i_N = 400$$

1.2 Determination of gear unit type

Type P4LA selected (for actual ratio, see page 18)

2. Determination of gear unit size

2.1 Determination of the nominal gear unit power rating

$$P_N \geqslant P_r = P_2 \times f_1 \times f_2 = 80\ kW \times 1.7 \times 1 = 136\ kW;$$

$$P_N = 155\ kW > P_r = 136\ kW$$

Selected from power rating table : **type P4LA.**
Gear unit size 41, with P_N = 155 kW (see page 11)

$$3.33 \times P_2 \geqslant P_N \quad 3.33 \times 80\ kW = 266.4\ kW > P_N = 155\ kW$$

2.2 Checking the starting power rating

$$P_N \geqslant P_{START} = \frac{T_A \times n_1}{9550} \times f_3 = \frac{1330 \times 1000}{9550} \times 0.5 = 69.6kW;$$

$$P_N = 155\ kW > P_{START} = 69.6\ kW$$

3. Determination of thermal capacity

3.1 Gear unit utilization

$$\text{Utilization in \%} = \frac{P_2}{P_N} \times 100 = \frac{80}{155} \times 100 = 52\ \%$$

3.2 Thermal capacity according to table for type P4LA (see page 11)

$$P_2 \leqslant P_G = P_{G1} \times f_4 \times f_5 = 164\ kW \times 0.71 \times 0.83 = 96.6\ kW;$$

$$P_2 = 80\ kW < P_G = 96.6\ kW$$

No Auxiliary cooling required.

PREMIUM PLANETARY GEAR UNITS

Nominal Power Rating P_N in kW
Type : P2LA, P2LF Two Stage Inline Planetary Gear Units
Size : 13 - 76

Nominal Ratio	Input Speed rpm	Nominal Output Speed	GEAR UNIT SIZES															
			13	15	17	20	22	24	28	33	38	41	44	48	52	57	66	76
			NOMINAL RATING IN kW															
16	1500	93.8	164	232	412	560	815	1156	1928	3288	4410	5735	7180	8998	11485	14780	24542	34850
	1000	62.5	109	155	275	373	543	771	1285	2192	2940	3823	4787	5999	7657	9853	16361	23233
	750	46.9	82	116	206	280	408	578	964	1644	2205	2868	3590	4499	5743	7390	12271	17425
18	1500	83.3	152	215	373	506	737	1071	1785	2944	3912	5310	6648	8460	10210	13704	20902	30228
	1000	55.6	101	143	249	337	491	714	1190	1963	2608	3540	4432	5640	6807	9136	13935	20152
	750	41.7	76	108	187	253	369	536	893	1472	1956	2655	3324	4230	5105	6852	10451	15114
20	1500	75.0	135	191	331	450	655	952	1586	2624	3490	4720	5910	7520	9123	12240	18650	26950
	1000	50.0	90	127	221	300	437	635	1057	1749	2327	3147	3940	5013	6082	8160	12433	17967
	750	37.5	68	96	166	225	328	476	793	1312	1745	2360	2955	3760	4562	6120	9325	13475
22.5	1500	66.7	123	173	301	408	594	864	1451	2406	3198	4317	5405	6878	8353	11142	17122	24802
	1000	44.4	82	115	201	272	396	576	967	1604	2132	2878	3603	4585	5569	7428	11415	16535
	750	33.3	62	87	151	204	297	432	726	1203	1599	2159	2703	3439	4177	5571	8561	12401
25	1500	60.0	110	155	269	365	531	772	1309	2174	2890	3894	4875	6204	7525	9969	15564	22460
	1000	40.0	73	103	179	243	354	515	873	1449	1927	2596	3250	4136	5017	6646	10376	14973
	750	30.0	55	78	135	183	266	386	655	1087	1445	1947	2438	3102	3763	4985	7782	11230
28	1500	53.6	96	135	235	319	464	674	1159	1930	2567	3449	4318	5326	6574	8709	13840	19895
	1000	35.7	64	90	157	213	309	449	773	1287	1711	2299	2879	3551	4383	5806	9227	13263
	750	26.8	48	68	118	160	232	337	580	965	1284	1725	2159	2663	3287	4355	6920	9948
31.5	1500	47.6	87	122	213	289	421	612	1002	1670	2224	2981	3732	4834	5814	7904	11962	17290
	1000	31.7	58	81	142	193	281	408	668	1113	1483	1987	2488	3223	3876	5269	7975	11527
	750	23.8	44	61	107	145	211	306	501	835	1112	1491	1866	2417	2907	3952	5981	8645

Thermal Rating P_{G1} in kW *

	Air Velocity m/s	GEAR UNIT SIZES															
		13	15	17	20	22	24	28	33	38	41	44	48	52	57	66	76
Small confined space	< 1.4	28	37	50	68	80	100	141	250	258	404	462	512	571	727	---	---
Large indoor space	⩾ 1.4 - 3.7	40	52	72	98	118	149	210	364	402	595	720	823	946	1253	1472	---
Outdoors	>3.7	49	64	88	119	145	184	261	448	504	741	915	1056	1224	1646	2024	2270

*) Values apply to horizontal mounting position. For other mounting position please refer to us.

PREMIUM PLANETARY GEAR UNITS

Nominal Power Rating P_N in kW
Type : P3LA, P3LF Three Stage Inline Planetary Gear Units
Size : 13 - 76

Nominal Ratio	Input Speed rpm	Nominal Output Speed	GEAR UNIT SIZES															
			13	15	17	20	22	24	28	33	38	41	44	48	52	57	66	76
			NOMINAL RATING IN kW															
63	1500	23.8	40	59	107	143	204	300	492	824	1156	1462	1885	2290	2865	3736	6200	8842
	1000	15.9	27	39	71	95	136	200	328	549	771	975	1257	1527	1910	2491	4133	5895
	750	11.9	20	30	54	72	102	150	246	412	578	731	943	1145	1433	1868	3100	4421
71	1500	21.1	37	54	93	129	185	268	448	744	997	1328	1658	2120	2570	3460	5545	7820
	1000	14.1	25	36	62	86	123	179	299	496	665	885	1105	1413	1713	2307	3697	5213
	750	10.6	19	27	47	65	93	134	224	372	499	664	829	1060	1285	1730	2773	3910
80	1500	18.8	33	47.5	83	115	166	240	397	662	887	1182	1474	1885	2280	3076	4950	6960
	1000	12.5	22	32	55	77	111	160	265	441	591	788	983	1257	1520	2051	3300	4640
	750	9.4	16	24	42	58	83	120	199	331	444	591	737	943	1140	1538	2475	3480
90	1500	16.7	29	42.5	74	102	146	212	353	588	789	1046	1310	1675	2034	2734	4400	6196
	1000	11.1	19	28	49	68	97	141	235	392	526	697	873	1117	1356	1823	2933	4131
	750	8.3	15	21	37	51	73	106	177	294	395	523	655	838	1017	1367	2200	3098
100	1500	15.0	26.5	38.5	67	92.5	132	194	320	534	710	956	1200	1532	1861	2500	4040	5672
	1000	10.0	18	26	45	62	88	129	213	356	473	637	800	1021	1241	1667	2693	3781
	750	7.5	13	19	34	46	66	97	160	267	355	478	600	766	931	1250	2020	2836
112	1500	13.4	23.5	34.5	60	82.5	120	172	286	478	640	862	1080	1382	1680	2256	3645	5120
	1000	8.9	16	23	40	55	80	115	191	319	427	575	720	921	1120	1504	2430	3413
	750	6.7	12	17	30	41	60	86	143	239	320	431	540	691	840	1128	1823	2560
125	1500	12.0	21	31	54.5	75	107	156	250	436	562	788	990	1248	1537	2048	3334	4686
	1000	8.0	14	21	36	50	71	104	167	291	375	525	660	832	1025	1365	2223	3124
	750	6.0	11	16	27	38	54	78	125	218	281	394	495	624	769	1024	1667	2343
140	1500	10.7	19	28	48.5	67	96	140	235	394	528	710	892	1120	1386	1830	3007	4230
	1000	7.1	13	19	32	45	64	93	157	263	352	473	595	747	924	1220	2005	2820
	750	5.4	10	14	24	34	48	70	118	197	264	355	446	560	693	915	1504	2115
160	1500	9.4	16.5	24	42.5	48.5	84	122	205	344	462	629	794	988	1230	1620	2734	3750
	1000	6.3	11	16	28	32	56	81	137	229	308	419	529	659	820	1080	1823	2500
	750	4.7	8	12	21	24	42	61	103	172	231	315	397	494	615	810	1367	1875
180	1500	8.3	14.5	21	37	51	73	106	182	305	408	557	704	866	1090	1414	2360	3324
	1000	5.6	10	14	25	34	49	71	121	203	272	371	469	577	727	943	1573	2216
	750	4.2	7	11	19	26	37	53	91	153	204	279	352	433	545	707	1180	1662
200	1500	7.5	13	19	33.5	46.5	67	96	165	276	370	482	605	745	942	1218	1980	2875
	1000	5.0	9	13	22	31	45	64	110	184	247	321	403	497	628	812	1320	1917
	750	3.8	7	10	17	23	34	48	83	138	185	241	303	373	471	609	990	1438
225	1500	6.7	11.5	17.5	30	41.5	60	87	135	220	320	416	524	676	814	1102	1763	2486
	1000	4.4	8	12	20	28	40	58	90	147	213	277	349	451	543	735	1175	1657
	750	3.3	6	9	15	21	30	44	68	110	160	208	262	338	407	551	882	1243

Thermal Rating P_{G1} in kW *

	Air Velocity m/s	GEAR UNIT SIZES															
		13	15	17	20	22	24	28	33	38	41	44	48	52	57	66	76
Small confined space	< 1.4	15	19	26	36	44	59	88	132	159	206	467	337	399	537	737	900
Large indoor space	⩾1.4 - 3.7	20	25	35	51	61	82	119	178	216	283	364	462	545	737	1015	1252
Outdoors	>3.7	25	31	43	60	73	98	144	215	262	343	440	562	660	895	1235	1529

*) Values apply to horizontal mounting position. For other mounting position please refer to us.

Nominal Power Rating P_N in kW
Type : P4LA, P4LF Four Stage Inline Planetary Gear Units.
Size : 17 - 76

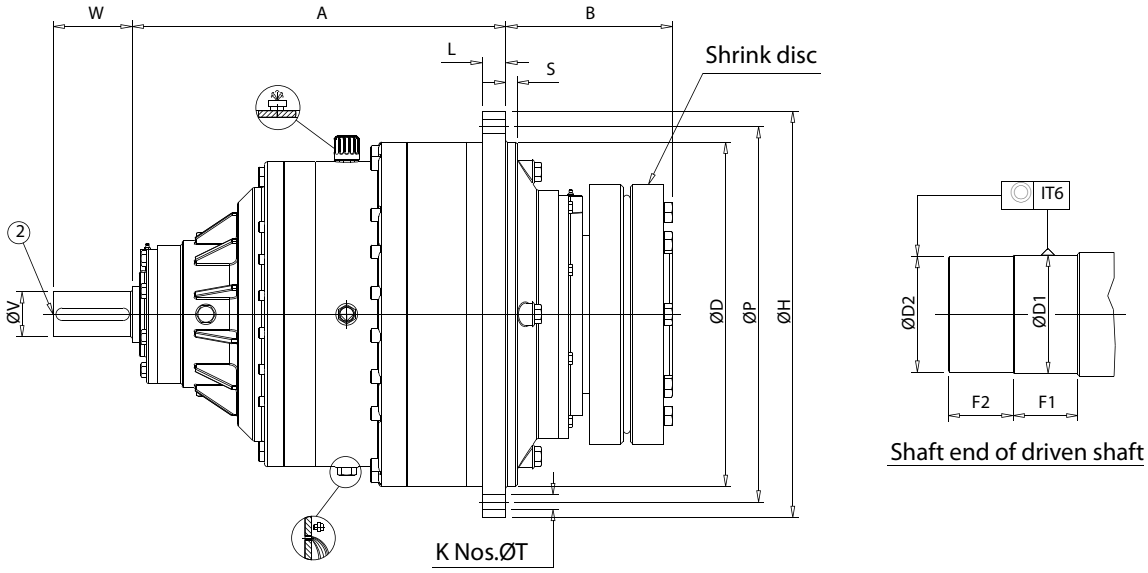
Nominal Ratio	Input Speed rpm	Nominal Output Speed	GEAR UNIT SIZES													
			17	20	22	24	28	33	38	41	44	48	52	57	66	76
			NOMINAL RATING IN kW													
250	1500	6.0	24.5	36	51	72	123	206	276	359	449	572	718	937	1580	2280
	1000	4.0	16	24	34	48	82	137	184	239	299	381	479	625	1053	1520
	750	3.0	12	18	25.5	36	62	103	138	180	225	286	359	469	790	1140
280	1500	5.4	22	31.5	46	67	112	186	250	332	416	530	649	867	1360	1974
	1000	3.6	15	21	31	45	75	124	167	221	277	353	433	578	907	1316
	750	2.7	11	16	23	33.5	56	93	125	166	208	265	325	434	680	987
315	1500	4.8	20	28	41	59.5	100	165	222	295	369	471	577	771	1208	1755
	1000	3.2	13	19	27	40	67	110	148	197	246	314	385	514	805	1170
	750	2.4	10	14	20.5	30	50	82.5	111	148	185	236	289	386	604	878
355	1500	4.2	17.5	25	36.5	53	88	147	197	262	328	418	513	685	1075	1560
	1000	2.8	12	17	24	35	59	98	131	175	219	279	342	457	717	1040
	750	2.1	9	13	18	26.5	44	73.5	99	131	164	209	257	343	538	780
400	1500	3.8	15.5	22	32.5	47	78	131	176	233	292	372	456	610	956	1387
	1000	2.5	10	15	22	31	52	87	117	155	195	248	304	407	637	925
	750	1.9	8	11	16	23.5	39	65.5	88	117	146	186	228	305	478	694
450	1500	3.3	14	20	29.5	42.5	71	119	159	212	265	337	414	553	874	1269
	1000	2.2	9	13	20	28	47	79	106	141	177	225	276	369	583	846
	750	1.7	7	10	15	21	35.5	59	80	106	133	169	207	277	437	635
500	1500	3.0	13	18.5	26.5	38.5	64.5	108	145	194	242	308	378	506	800	1161
	1000	2.0	9	12	18	26	43	72	96	129	161	205	252	337	533	774
	750	1.5	6.5	9.3	13	19	32	54	72	97	121	154	189	253	400	581
560	1500	2.7	11.5	16.5	24.5	35	58.5	98	132	177	222	280	346	460	731	1062
	1000	1.8	8	11	16	23	39	65	88	118	148	187	231	307	487	708
	750	1.3	6	8	12	17.5	29	49	66	89	111	140	173	230	366	531
630	1500	2.4	10.5	14.5	21.5	31.5	52	87.8	118	158	198	250	309	410	660	958
	1000	1.6	7	10	14	21	35	59	79	105	132	167	206	273	440	639
	750	1.2	5	7	11	16	26	44	59	79	99	125	155	205	330	479
710	1500	2.1	9	13	19	27	45.5	76.5	103	138	173	218	270	358	584	849
	1000	1.4	6	9	13	18	30	51	69	92	115	145	180	239	389	566
	750	1.1	4.5	6.5	9.5	13.5	23	38	52	69	87	109	135	179	292	425
800	1500	1.9	8	11.5	17	24.5	40.5	68.5	92	125	156	197	244	323	527	766
	1000	1.3	5	8	11	16	27	46	61	83	104	131	162	215	351	511
	750	0.9	4	6	8.5	12	20	34	46	62	78	99	122	162	264	383
900	1500	1.7	7	10	14.5	21	35.5	59.5	80.5	110	138	174	216	286	467	678
	1000	1.1	5	7	10	14	24	40	54	73	92	116	144	191	311	452
	750	0.8	3.5	5	7	10.5	18	30	40	55	69	87	108	143	234	339
1000	1500	1.5	6	9	13	19	32.5	54	72.5	99.5	125	156	195	256	421	612
	1000	1.0	4	6	9	13	22	36	48	66	83	104	130	171	281	408
	750	0.8	3	4.5	6.5	9.5	16	27	36	50	62	78	97	128	211	306
1100	1500	1.4	6	8	12	17.5	29	49	66	90	113	142	177	232	364	529
	1000	0.9	4	5	8	12	19	33	44	60	75	94	118	155	243	353
	750	0.7	3	4	6	9	15	25	33	45	57	71	88	116	182	265
1250	1500	1.2	5	7	10.5	15	26	43	58	80	100	124	157	203	322	468
	1000	0.8	3	5	7	10	17	29	39	53	67	82	104	135	215	312
	750	0.6	2.5	3.5	5	7.5	13	22	29	40	50	62	78	102	161	234
1400	1500	1.1	4.5	6.5	9.5	14	23.5	39	53	69	86.5	107	135	175	278	405
	1000	0.7	3	4	6	9	16	26	35	46	58	71	90	117	185	270
	750	0.5	2	3	5	7	12	20	27	35	43	53	68	88	139	203
1600	1500	0.9	4	6	8.5	12	18	30	43	57	74.5	93	108	159	241	350
	1000	0.6	3	4	6	8	12	20	29	38	50	62	72	106	161	233
	750	0.5	2	3	4	6	9	15	22	29	37	47	54	80	121	175

Thermal Rating P_{G1} in kW *

	Air Velocity m/s	GEAR UNIT SIZES												
		17	20	22	24	28	33	38	41	44	48	52	57	66	76
Small confined space	< 1.4	17	22	25	34	50	77	89	122	152	191	228	319	418	520
Large indoor space	⩾ 1.4 - 3.7	23	30	34	46	68	104	120	164	204	256	307	429	562	699
Outdoors	>3.7	28	36	41	55	82	125	143	196	245	308	369	516	676	840

*) Values apply to horizontal mounting position. For other mounting position please refer to us.

Planetary Gear Units
Size : 13 - 52

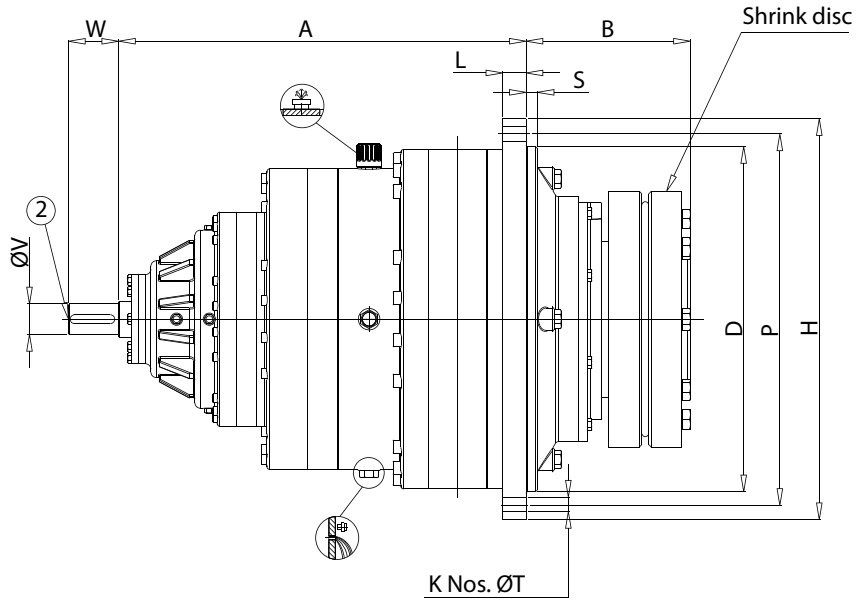


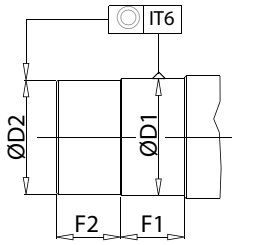
Dimensions and Weight

Gearbox size	Shaft end input side		Driven machine shaft				L	H	D h7	A	B	P	S	Flange bolts		Weight (Kg) 4)	Oil quantity (Liters)
	V 1)	W	D1 3)	D2 3)	F1	F2								T	K		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nos.		
13	55	90	120	115	65	65	28	408	330	386	203	368	6	18	24	172	5
15	55	90	130	125	70	70	28	463	385	425	210	427	6	18	28	234	7
17	70	120	140	135	85	85	32	530	430	515	215	490	11	22	20	351	11
20	75	120	160	155	90	90	39	610	500	553	254	560	12	26	20	495	15
22	85	140	180	175	95	95	39	660	550	614	265	610	12	26	24	644	19
24	95	160	210	205	105	105	42	720	610	654	290	665	12	26	32	887	30
28	110	180	250	245	120	120	50	865	720	817	300	800	12	33	24	1450	40
33	120	210	300	295	135	135	55	980	840	852	403	915	12	33	36	2054	70
38	130	210	330	325	152	152	60	1140	960	895	415	1050	24	39	32	2797	93
41	150	240	360	355	165	165	65	1225	1040	1008	462	1135	28	39	36	3778	136
44	160	280	420	415	180	180	70	1315	1110	1121	485	1215	29	45	36	4996	160
48	170	280	480	475	190	190	80	1475	1230	1208	490	1360	30	52	32	6134	210
52	180	280	510	505	195	195	85	1555	1310	1258	560	1440	34	52	36	7690	260

1) Shaft diameter tolerance as per IS: 3688 : 2006 (ISO/R 775 : 2006)
2) For shaft end V with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
3) Up to 160 tolerance h6 and > 160 tolerance g6
4) Weight without shrink disc and oil.

Planetary Gear Units
Size : 13 - 52





Shaft end of driven shaft

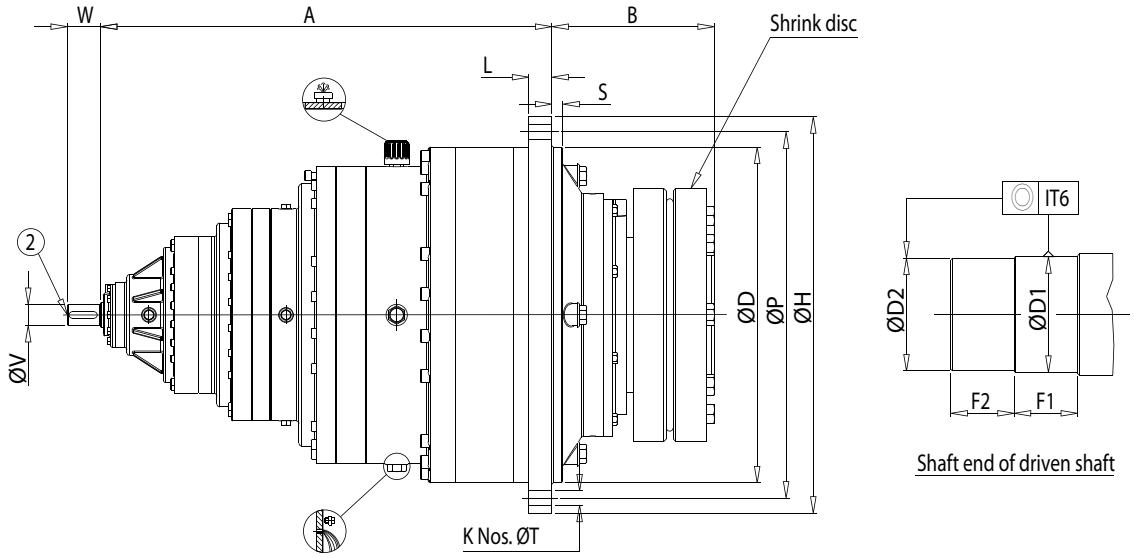
Dimensions and Weight

Gearbox size	Shaft end input side		Driven machine shaft				L	H	D h7	A	B	P	S	Flange bolts		Weight (Kg) 4)	Oil quantity (Liters)
	V 1)	W	D1 3)	D2 3)	F1	F2								T	K		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nos.		
13	55	90	120	115	65	65	28	408	330	458	203	368	6	18	24	182	5
15	55	90	130	125	70	70	28	463	385	500	210	427	6	18	28	226	7
17	55	90	140	135	85	85	32	530	430	588	215	490	11	22	20	358	12
20	55	90	160	155	90	90	39	610	500	617	254	560	12	26	20	505	15
22	55	90	180	175	95	95	39	660	550	660	265	610	12	26	24	643	20
24	60	120	210	205	105	105	42	720	610	732	290	665	12	26	32	900	34
28	75	120	250	245	120	120	50	865	720	880	300	800	12	33	24	1380	45
33	85	140	300	295	135	135	55	980	840	1013	403	915	12	33	36	2065	70
38	95	160	330	325	152	152	60	1140	960	1050	415	1050	24	39	32	2930	95
41	100	180	360	355	165	165	65	1225	1040	1149	462	1135	28	39	36	3855	138
44	110	180	420	415	180	180	70	1315	1110	1314	485	1215	29	45	36	5241	160
48	120	180	480	475	190	190	80	1475	1230	1408	490	1360	30	52	32	6326	235
52	130	210	510	505	195	195	85	1555	1310	1444	560	1440	34	52	36	7824	270

1) Shaft diameter tolerance as per IS: 3688 : 2006 (ISO/R 775 : 2006)
2) For shaft end V with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
3) Up to 160 tolerance h6 and > 160 tolerance g6
4) Weight without shrink disc and oil.

Type : P4LA

Four Stage Inline Flange Mounting
Planetary Gear Units
Size : 17 - 52

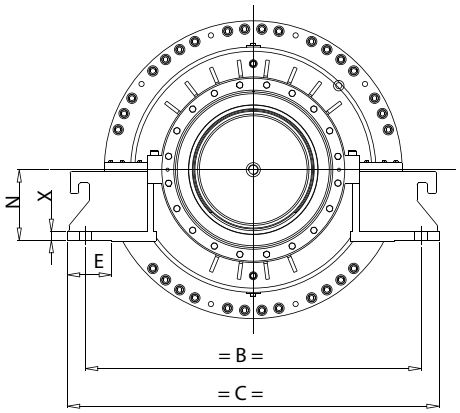


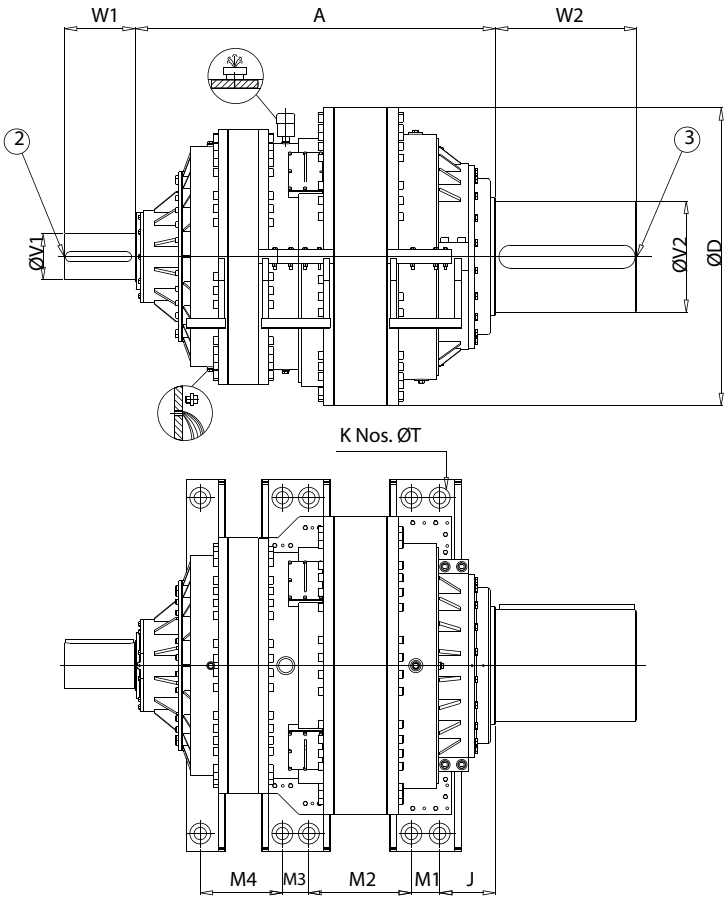
Dimensions and Weight

Gearbox size	Shaft end input side		Driven machine shaft				L	H	D h7	A	B	P	S	Flange bolts		Weight (Kg) 4)	Oil quantity (Liters)
	V 1)	W	D1 3)	D2 3)	F1	F2								T	K		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nos.		
17	38	60	140	135	85	85	32	530	430	657	215	490	11	22	20	370	13
20	38	60	160	155	90	90	39	610	500	700	254	560	12	26	20	517	16
22	38	60	180	175	95	95	39	660	550	749	265	610	12	26	24	657	21
24	38	60	210	205	105	105	42	720	610	820	290	665	12	26	32	950	37
28	50	90	250	245	120	120	50	865	720	941	300	800	12	33	24	1498	50
33	60	120	300	295	135	135	55	980	840	1088	403	915	12	33	36	2194	76
38	70	120	330	325	152	152	60	1140	960	1151	415	1050	24	39	32	3075	99
41	70	120	360	355	165	165	65	1225	1040	1270	462	1135	28	39	36	4045	150
44	80	140	420	415	180	180	70	1315	1110	1326	485	1215	29	45	36	5231	170
48	90	160	480	475	190	190	80	1475	1230	1559	490	1360	30	52	32	6480	235
52	90	160	510	505	195	195	85	1555	1310	1603	560	1440	34	52	36	7854	292

1) Shaft diameter tolerance as per IS: 3688 : 2006 (ISO/R 775 : 2006)
2) For shaft end V with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
3) Up to 160 tolerance h6 and > 160 tolerance g6
4) Weight without shrink disc and oil.

Planetary Gear Units
Size : 41 - 76





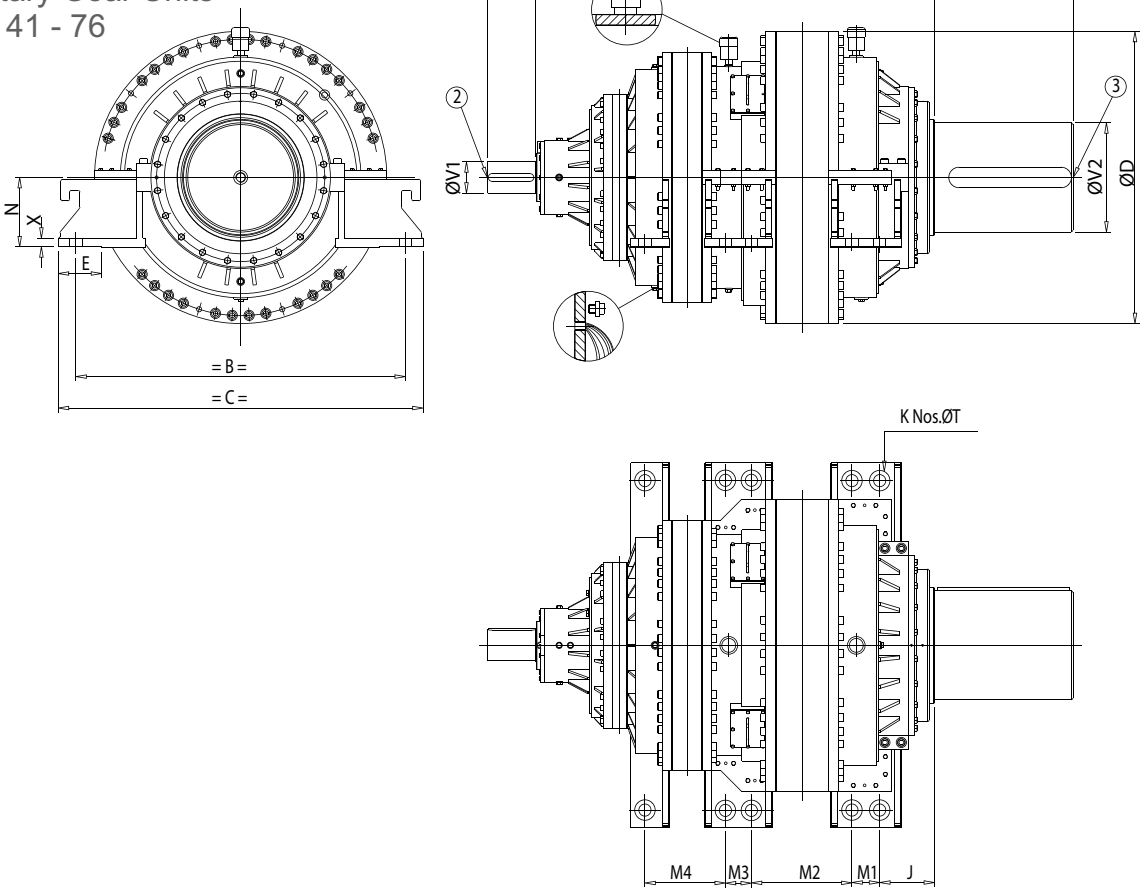
Dimensions and Weight

Gearbox size	Shaft end input side		Shaft end output		A	C	D		E	B J	N	X	Foot bolts details						Weight (Kg)	Oil quantity (Liters)
	V1 1)	W1	V2 1)	W2									M1	M2	M3	M4	T	K		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nos.	4)	
41	150	240	380	500	1361	1350	1040	250	1200	180	300	40	160	375	-	380	45	8	4223	136
44	160	280	420	600	1513	1470	1110	250	1270	210	350	40	160	466	-	352	45	8	5888	160
48	170	280	440	600	1593	1590	1230	250	1390	209	350	50	160	438	-	440	45	8	6995	210
52	180	280	450	600	1749	1672	1310	250	1472	308	400	50	160	527	-	405	45	8	8514	260
57	220	380	500	600	1815	1807	1445	280	1607	231	400	50	180	585	-	452	50	8	12880	230
66	260	400	600	750	2039	2104	1685	280	1900	296	400	50	200	533	200	440	68	10	19610	345
76	280	450	630	750	2176	2365	1930	280	2165	298	400	50	200	595	200	450	68	10	26850	512

1) Shaft diameter V1 & V2 tolerance as per IS: 3688 : 2006 (ISO/R 775 : 2006)
2) For shaft end V1 with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
3) For shaft end V2 with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
4) Weight without shrink disc and oil.

Type : P3LF

Three Stage Inline Foot Mounting
Planetary Gear Units
Size : 41 - 76

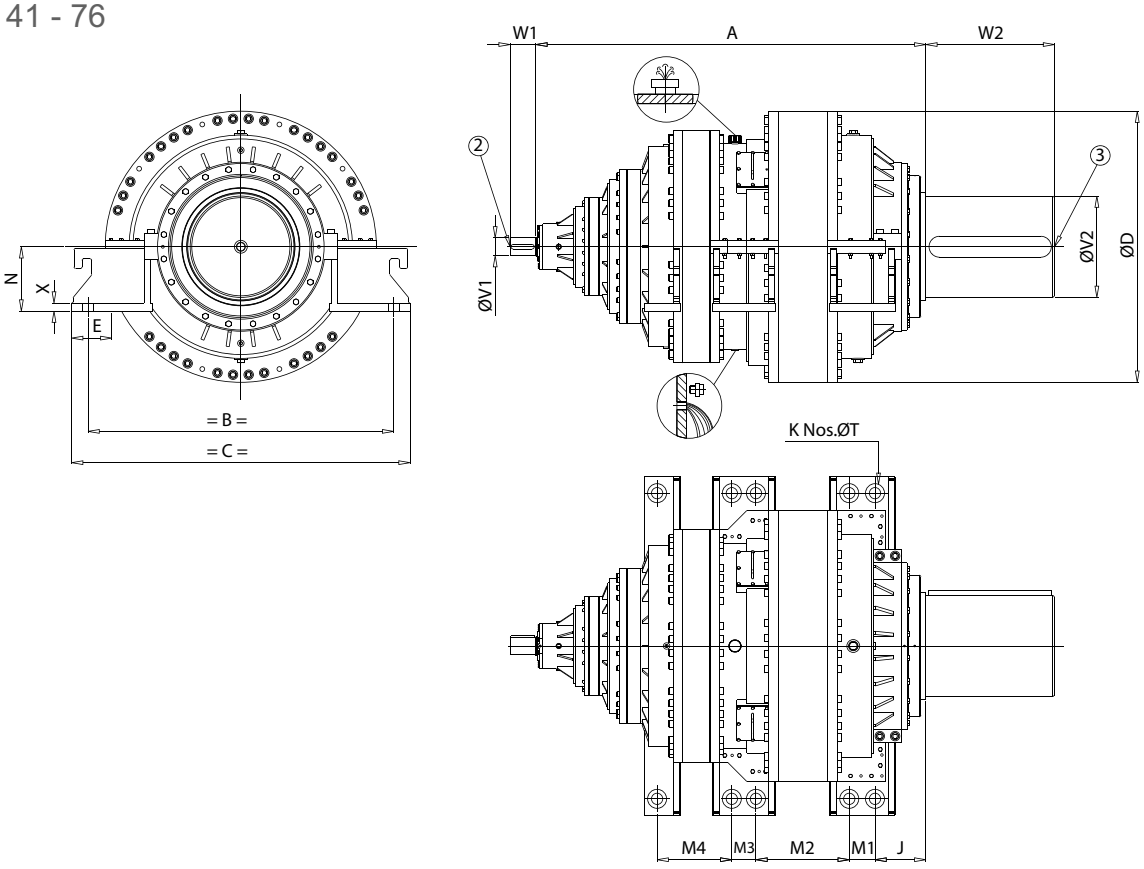


Dimensions and Weight

Gearbox size	Shaft end input side		Shaft end output		A	C	D	E	B	J	N	X	Foot bolts details						Weight (Kg) 4)	Oil quantity (Liters)
	V1 1)	W1	V2 1)	W2									M1	M2	M3	M4	T	K		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nos.		
41	100	180	380	500	1502	1350	1040	250	1200	180	300	40	160	375	-	380	45	8	4120	138
44	110	180	420	600	1706	1470	1110	250	1270	210	350	40	160	466	-	352	45	8	6010	160
48	120	180	440	600	1793	1590	1230	250	1390	209	350	50	160	438	-	440	45	8	6950	235
52	130	210	450	600	1938	1672	1310	250	1472	308	400	50	160	527	-	405	45	8	8660	270
57	150	240	500	600	2040	1807	1445	280	1607	231	400	50	180	585	-	452	50	8	13260	232
66	180	280	600	750	2299	2104	1685	280	1900	296	400	50	200	533	200	440	68	10	19700	351
76	190	340	630	750	2416	2365	1930	280	2165	298	400	50	200	595	200	450	68	10	26900	525

1) Shaft diameter V1 & V2 tolerance as per IS: 3688 : 2006 (ISO/R 775 : 2006)
2) For shaft end V1 with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
3) For shaft end V2 with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
4) Weight without shrink disc and oil.

Planetary Gear Units
Size : 41 - 76



Dimensions and Weight

Gearbox size	Shaft end input side		Shaft end output										Foot bolts details						Weight (Kg) 4)	Oil quantity (Liters)
	V1 1)	W1	V2 1)	W2	A	C	D		E	B J	N	X	M1	M2	M3	M4	T	K		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nos.		
41	70	120	380	500	1623	1350	1040	250	1200	180	300	40	160	375	-	380	45	8	4680	150
44	80	140	420	600	1718	1470	1110	250	1270	210	350	40	160	466	-	352	45	8	6160	170
48	90	160	440	600	1944	1590	1230	250	1390	209	350	50	160	438	-	440	45	8	7350	235
52	90	160	450	600	2094	1672	1310	250	1472	308	400	50	160	527	-	405	45	8	8640	292
57	95	160	500	600	2135	1807	1445	280	1607	231	400	50	180	585	-	452	50	8	13400	290
66	110	160	600	750	2420	2104	1685	280	1900	296	400	50	200	533	200	440	68	10	20200	330
76	110	160	630	750	2535	2365	1930	280	2165	298	400	50	200	595	200	450	68	10	27500	480

1) Shaft diameter V1 & V2 tolerance as per IS: 3688 : 2006 (ISO/R 775 : 2006)
2) For shaft end V1 with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
3) For shaft end V2 with parallel key according to DIN 6885/1 and Centre hole Form DS in shaft ends as per DIN 332
4) Weight without shrink disc and oil.

PREMIUM PLANETARY GEAR UNITS

Actual Ratios

TYPE : P2LA, P2LF **SIZE : 13 - 76**

NOMINAL RATIO	GEAR UNIT SIZES															
	13	15	17	20	22	24	28	33	38	41	44	48	52	57	66	76
16	16.296	16.296	16.000	16.000	16.000	16.296	16.296	16.000	16.000	16.296	16.296	16.296	16.000	16.296	16.000	16.000
18	17.600	17.600	17.692	17.692	17.692	17.600	17.600	17.692	17.692	17.600	17.600	17.600	17.692	17.600	17.692	17.692
20	19.800	19.800	19.904	19.904	19.904	19.800	19.800	19.904	19.904	19.800	19.800	19.800	19.904	19.800	19.904	19.904
22.5	21.811	21.811	21.925	21.925	21.925	21.811	21.648	21.761	21.761	21.648	21.648	21.811	21.761	21.811	21.761	21.761
25	24.420	24.420	24.548	24.548	24.548	24.420	24.002	24.127	24.127	24.002	24.002	24.420	24.127	24.420	24.127	24.127
28	27.953	27.953	28.099	28.099	28.099	27.953	27.095	27.237	27.237	27.095	27.095	27.953	27.237	27.953	27.237	27.237
31.5	30.800	30.800	30.961	30.961	30.961	30.800	31.350	31.514	31.514	31.350	31.350	30.800	31.514	30.800	31.514	31.514

TYPE : P3LA, P3LF **SIZE : 13 - 76**

NOMINAL RATIO	GEAR UNIT SIZES															
	13	15	17	20	22	24	28	33	38	41	44	48	52	57	66	76
71	70.400	70.400	70.768	70.768	70.768	70.400	70.400	70.768	70.768	70.400	70.400	70.400	70.768	70.400	70.768	70.768
80	79.200	79.200	79.614	79.614	79.614	79.200	79.200	79.614	79.614	79.200	79.200	79.200	79.614	79.200	79.614	79.614
90	89.100	89.100	89.566	89.566	89.566	89.100	89.100	89.566	89.566	89.100	89.100	89.100	89.566	89.100	89.566	89.566
100	98.149	98.149	98.662	98.662	98.662	98.149	98.149	98.662	98.662	97.416	97.416	97.416	97.925	97.416	97.925	97.925
112	109.890	109.890	110.464	110.464	110.464	109.890	109.890	110.464	110.464	108.009	108.009	108.009	108.574	108.009	108.574	108.574
125	121.050	121.050	121.683	121.683	121.683	121.050	120.146	120.774	120.774	118.090	118.090	118.978	118.707	118.978	118.707	118.707
140	135.531	135.531	136.239	136.239	136.239	135.531	133.211	133.907	133.907	130.931	130.931	133.211	131.615	133.211	131.615	131.615
160	155.140	155.140	155.951	155.951	155.951	155.140	152.485	153.282	153.282	147.804	147.804	150.378	148.577	150.378	148.577	148.577
180	177.587	177.587	178.515	178.515	178.515	177.587	172.136	173.036	173.036	166.852	166.852	172.136	167.724	172.136	167.724	167.724
200	195.672	195.672	196.695	196.695	196.695	195.672	189.666	190.658	190.658	193.053	193.053	199.167	194.062	199.167	194.062	194.062
225	215.600	215.600	216.727	216.727	216.727	215.600	219.450	220.597	220.597	223.369	223.369	219.450	224.536	219.450	224.536	224.536

TYPE : P4LA, P4LF **SIZE : 17 - 76**

NOMINAL RATIO	GEAR UNIT SIZES													
	17	20	22	24	28	33	38	41	44	48	52	57	66	76
250	256.000	256.000	256.000	260.736	260.736	256.000	256.000	260.736	260.736	260.736	256.000	260.736	256.000	256.000
280	283.072	283.072	283.072	281.600	281.600	283.072	283.072	281.600	281.600	281.600	283.072	281.600	283.072	283.072
315	318.456	318.456	318.456	316.800	316.800	318.456	318.456	316.800	316.800	316.800	318.456	316.800	318.456	318.456
355	358.263	358.263	358.263	356.400	356.400	358.263	358.263	356.400	356.400	356.400	358.263	356.400	358.263	358.263
400	403.046	403.046	403.046	400.950	400.950	403.046	403.046	400.950	400.950	400.950	403.046	400.950	403.046	403.046
450	443.977	443.977	443.977	441.669	441.669	443.977	443.977	441.669	441.669	441.669	443.977	441.669	440.663	440.663
500	489.066	489.066	489.066	486.523	486.523	489.066	489.066	482.891	482.891	482.891	485.415	482.891	481.792	481.792
560	538.733	538.733	538.733	535.932	531.931	534.712	534.712	527.961	527.961	531.931	530.721	531.931	526.759	526.759
630	603.181	603.181	603.181	600.045	595.566	598.679	598.679	591.120	591.120	595.566	594.210	595.566	583.932	583.932
710	690.452	690.452	690.452	698.131	681.735	685.299	685.299	676.646	676.646	681.735	680.183	681.735	659.306	659.306
800	773.050	773.050	773.050	769.030	763.290	767.280	767.280	750.087	750.087	755.728	754.008	755.728	730.864	730.864
900	884.899	884.899	884.899	880.297	873.726	878.294	878.294	846.908	846.908	853.277	851.335	853.277	825.204	825.204
1000	990.758	990.758	990.758	985.606	968.558	973.621	973.621	938.829	938.829	955.354	943.736	955.354	914.769	914.769
1100	1091.659	1091.659	1091.659	1085.982	1067.393	1072.972	1072.972	1034.630	1034.630	1052.649	1039.848	1052.649	1058.417	1058.417
1250	1249.605	1249.605	1249.605	1243.107	1204.951	1211.249	1211.249	1167.966	1167.966	1204.951	1174.071	1204.951	1195.037	1195.037
1400	1376.867	1376.867	1376.867	1369.707	1327.665	1334.605	1334.605	1351.373	1351.373	1394.166	1358.437	1394.166	1382.695	1382.695
1600	1517.089	1517.089	1517.089	1509.200	1536.150	1544.180	1544.180	1563.581	1563.581	1536.150	1571.755	1536.150	1599.822	1599.822

Approved Lubricants

RECOMMENDED LUBRICANT

Premium Gear units are supplied without oil. Before operating it is essential to ensure that they are filled to correct oil levels as indicated by marketing on dipsticks, with lubricants recommended by Premium. Overfilling can cause overheating and leakage.

Correct lubricant is most important and it should be noted that EP oils are recommended in all instances.

Lubricants listed are suitable for normal ambient temperatures and operating duties. All gear units are designed to operate under full load at maximum sump oil temperature of 95°C*.

Where extreme conditions, are to be met, e.g. low temperature operation or unusual loading conditions, should be referred, with full details, to Premium for recommendations.

Recommended lubricants are based on information provided by oil suppliers and responsibility cannot be accepted for the quality or suitability of oil supplied, nor to any mechanical defect resulting from unsatisfactory lubrication due to the use of sub-standard oil.

Lubricant specification (CLP DIN 51517)

If the gear drive is started when the ambient temperature is below -7°C (20°F) use a lube oil heater.

Viscosity mm/s (cSt) at 40°C	Bharat Petroleum	Indian Oil	Hindustan Petroleum	BP Energol	Castrol	SPARAN	Mobilgear	Shell Omala Oil	Cepsa Engranajes	Klüberoil GEM 1	Aral	Chevron Gear Compound	Tribo	Balmer Lawrie	Blasia
VG 460	Amocam Oil 460	Servomesh SP 460	Parthan EP-460	GR-XP 460	Alpha MW 460	Spartan EP 460	Mobilgear 634	Omala 460	HP 460	460	Degol BG 460	EP 460	Trebol 1100/460	Balmerol Protomac 460 SP	Blasia 460
VG 320	Amocam Oil 320	Servomesh SP 320	Parthan EP-320	GR-XP 320	Alpha MW 320	Spartan EP 320	Mobilgear 632	Omala 320	HP 320	320	Degol BG 320	EP 320	Trebol 1100/320	Balmerol Protomac 320 SP	Blasia 320
VG 220	Amocam Oil 220	Servomesh SP 220	Parthan EP-460	GR-XP 220	Alpha MW 220	Spartan 220	Mobilgear 930	Omala 220	HP 220	220	Degol BG 220	EP 220	Trebol 1100/220	Balmerol Protomac 220 SP	Blasia 220

Where ever other grades are required, the same will be intimated to customer through General Arrangement (GA) drawing.

* *As per ANSI/AGMA 6110-F97*

Product safety information

General - The following information is important in ensuring safety. It must be brought to the attention of personnel involved in the selection of Premium Transmission Limited power transmission equipment. those responsible for the design of the machinery in which is to be incorporated and those involved in its installation, use and maintenance.

PREMIUM power transmission equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment proper precautions must be taken as indicated in the following paragraphs, to ensure safety.

Potential Hazards - These are not necessary listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied its entirety :-

1) Fire/Explosion

(a) Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked lights in the proximity of gearbox openings, due to the risk of fire explosion.

(b) In the event of fire or serious overheating (over 300 ^{0}C), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure tothe fumes, and burned or overheated plastic/rubber materials should be handled with rubber gloves.

2) Guards

Rotating shafts and coupling must be guarded to eliminate the possibility of physical contact or entanglement of clothing. Guards should be of rigid construction and firmly secured.

3) Noise

High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of persons to noise.

4) Lifting

Where provided (on larger units) only the lifting points or eyebolls must be used for lifting operations (see maintenance manual or general arrangement drawing for lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.

5) Lubricants and Lubrication

(a) Prolonged contact with lubricants can be detrimental to the skin. The manufactures instruction must be followed when handling lubricants.

(b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and extreme cases risk of injury to personnel.

6) Electrical Equipment

Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.

7) Installation, Maintenance and Storage

(a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, Premium Transmission Limited must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration. The rotating components (gear and shafts) must be turned a few revolution once a month (to prevent bearings brinelling).

(b) External gearbox components may be supplied with preservative materials applied, in the form of a “waxed” tape or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent. Preservatives applied to the internal parts of the gear units do not require removal prior to operation.

(c) Installation must be performed in accordance with the manufacturer’s instructions and be undertaken by suitably qualified personnel.

(d) Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.

(e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and Premium Transmission Limited approved spare parts to repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.

8) Hot Surfaces and Lubricants

(a) During operation, gear units may become sufficiently hot to cause skin burns, Care must be taken to avoid accidental contact.

(b) After extended running the lubricant in gear units and lubrication systems may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.

9) Selection and Design

(a) Where gear units provide a holdback facility, ensure that back-up system are provided. Failure of the holdback device would endanger personnel or result in damage.

(b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.

(c) The equipment must not be operated in an environment or at speeds, power, torques or with external loads beyond those for which it was designed.

(d) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units.
Any further information or clarification required may be obtained by telephoning or writing to :

SAMT
Specialised Air Motors and Transmission

PREMIUM

Premium Transmission Limited

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