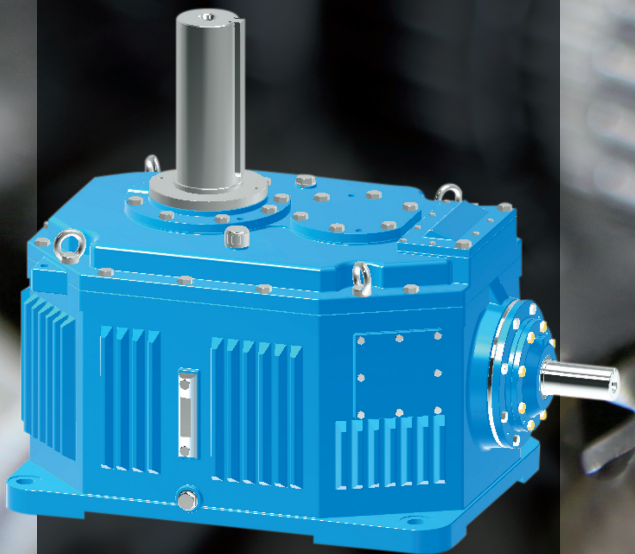




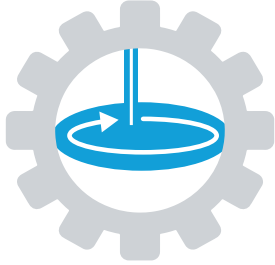
Cooling Tower Gearbox

RC Series

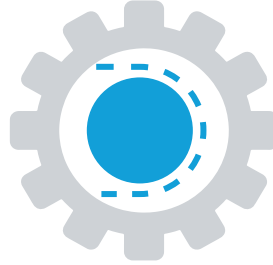




+ You will find us in use (almost) everywhere



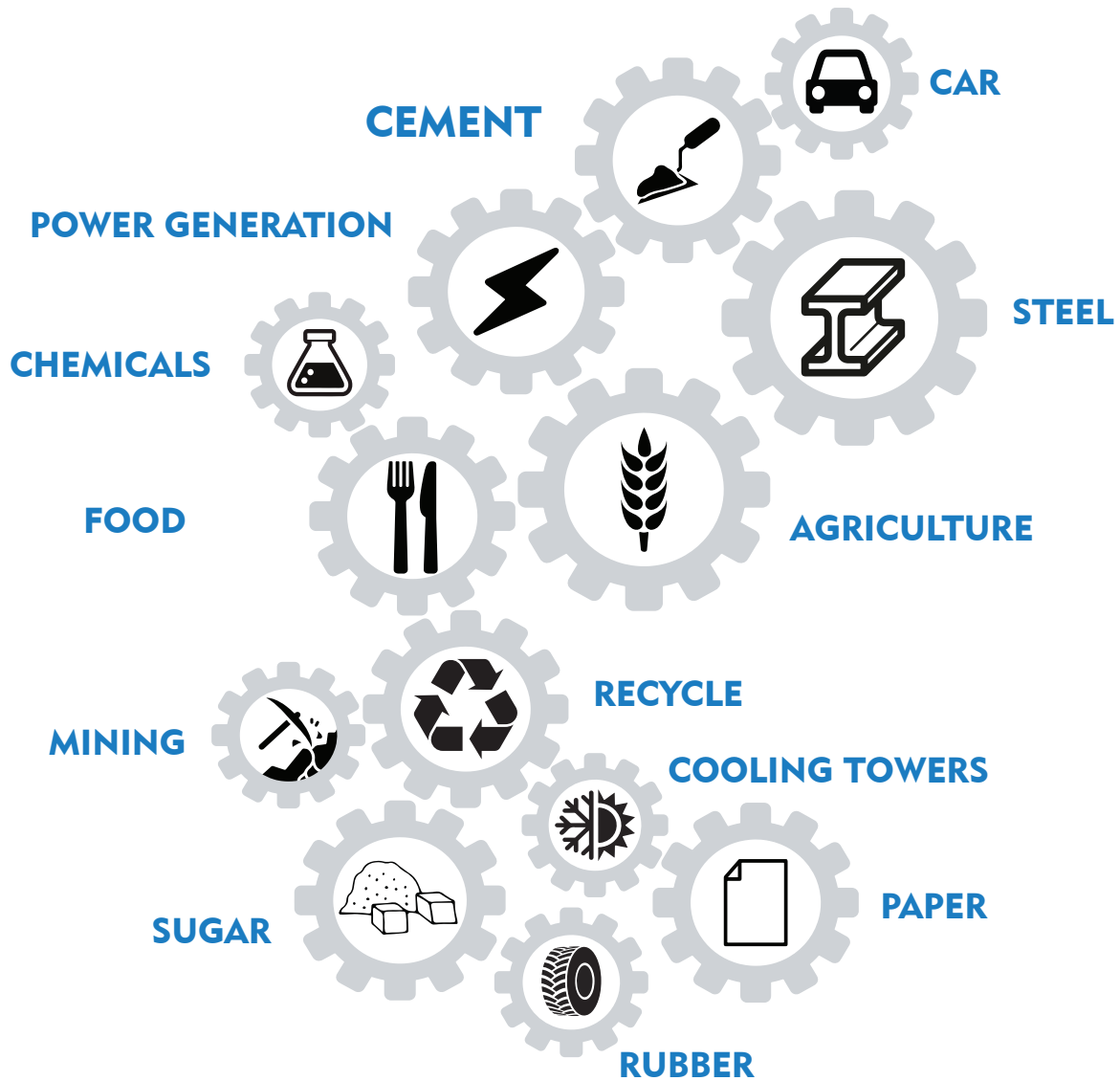
Agitators+Mixers



Conveyors+Material Handling



Water

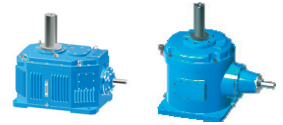


Be it Supply of new gearboxes, Service or Repair, Premium Stephan with our Partners can provide the complete package.

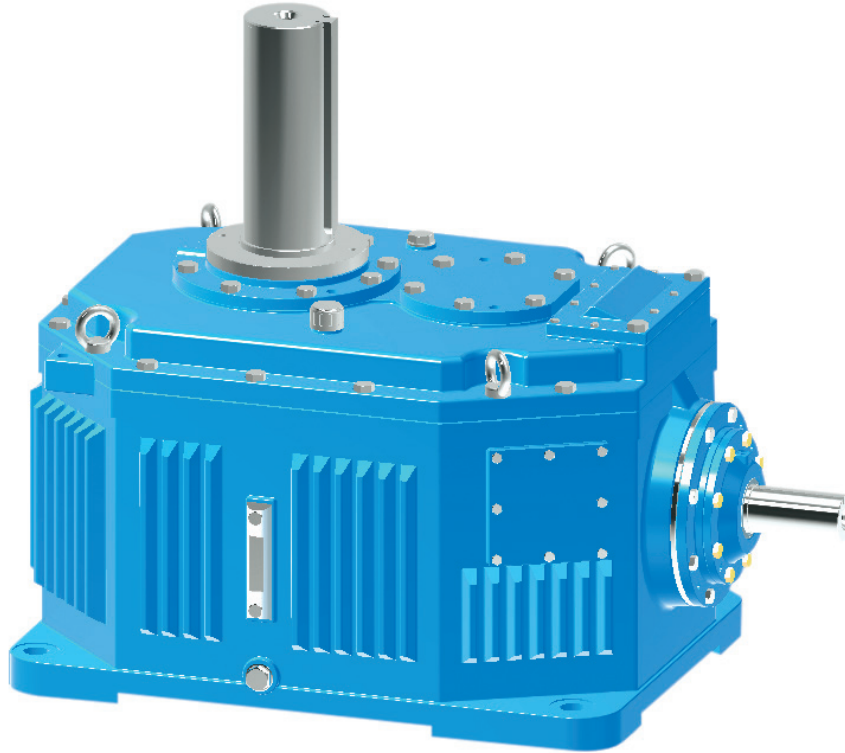


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1. INTRODUCTION



Premium Transmission is known worldwide for reliable and high quality fan drive, supported by superior customer service. We focused on designing, manufacturing & renewing Cooling Tower gearbox that stands up to years of exposure in extreme environment. This is proven by the large no. of premium Cooling Tower gearbox installed all over the world.

2. PRODUCT RANGE

RC-Series Right angle Single reduction gear drive comes with six sizes from RC-065 to RC-175 covers Ratio ranges 2:1 to 9.5:1 & Double reduction gear drive comes with eight sizes from RC-1008 to RC-2016 covers Ratio ranges 7.5:1 to 20:1.

RC-Series are designed to offers the selection of cooling tower gearbox model & ratios to meet almost any cooling tower design and application.

3. PRODUCT FEATURES

Most significant advantages of RC-Series are

-  Two Part casting with multiple channels in top bearing housing ensuring top bearing lubrication.
-  Four Point Foundation.
-  Pump less lubrication.
-  Both input and output shafts have two each single lipped spring loaded oil seal to protect the oil leakage.
-  All drives come with standard oil slinger for splash lubrication in either direction.



4. DESIGN FEATURES

4.1 Spiral Bevel Gears

Spiral bevel gears are forged from alloy steel case hardened and lapped in sets. This process provide superior tooth bending strength and long life.

4.2 Helical Gears

Helical gears are made from high alloyed steel. This gear is case carburized for wear resistance and superior bending strength. Helical gears are finished ground for smooth and quiet operation. Case hardened surface with softer core provides improved wear resistance and fatigue strength. The gear strength is calculated followed by standard ANSI/AGMA 6013-A06.

4.3 Bearing

Premium RC- Series gear drive design incorporates the use of taper and spherical roller bearing which are manufactured and supplied by reputed manufacturer. The fan shaft Thrust bearing is designed to carry all loads imposed by the fan while maintaining 100,000 Hours L_{10a} life.

LIFE SPAN OF BEARING:

Input, Intermediate shaft bearings	$\geq 50,000$ hours L_{10a} life
Output shaft bearings	$\geq 100,000$ hours L_{10a} life

4.4 Housing

Gear Case manufactured from Grey cast iron of rigid construction is used to absorb fan loads, dampen noise and vibration. Casing are rigidly designed and reinforced with internal ribbing for strength and resistance to deflection under load. Sloped floor as to rigidity and complete evacuation of oil draining.

4.5 Shaft

Direct hardening steel are used for low speed shaft & High strength case hardening steels or Volume hardening steel for high speed shaft. Shaft areas in contact with oil seals are super finished which extends the life of oil seals. Seats for bearings, coupling & fans are precise grinding.

4.6 Seals

Both input and output shafts have two each high quality single lipped spring loaded oil seal with grease accumulation in between to protect the oil leakage. Output shafts are triple protected with addition of labyrinth seals.

4.7 Lubrication

All drives come standard with oil slinger for positive splash lubrication. Oil is distributed with internal channels and baffles within gear case and covers. No mechanical oil pump required into premium cooling tower fan drive. Channels and baffles are provided ample lubrication to input, intermediate and output bearings without the need of external piping.

4.8 Rotation

The drives are designed for the high speed shaft rotation from 1750 to 1160 input rpm. However the drive operating less than the mentioned input speed range contact us to assess the needs of your own particular requirement. DOR for both High and Low speed rotation are 'Clockwise' when viewed on respective shaft ends.

4.9 Cooling

The Gear drives are cooled by normal heat dissipation through convection / radiation from externally exposed surfaces. Bearings are cooled by bath of oil from oversized oil sump rather than a fan on input shaft.

Thermal ratings: $\geq$ Service ratings @ 122°F (50°C) Discharge air temperature.

Contact Premium for the thermal rating when discharge air temperature exceeds 122°F (50°C).



4.10 Service Opening

Inspection opening to facilitate periodic inspection for oil filled & oil drained. Inspection opening is positioned for easy examining of bevel pair.

4.11 Accessories

Roller backstop device, provision for vibration transducers, provision for temperature Sensor / switch, oil level switch etc. can be provided on request. Contact Premium for additional information.

4.12 Scope of Supply

RC-Series gear units are delivered ready for installation, but without oil filling. Internal and external surfaces are painted with linear epoxy primer. External surfaces are finished with alkyd semi-gloss blue paint.

+ 5. SELECTION

- + Establish the required ratio by dividing the input or driver speed to the output or fan speed. Select the exact ratio i.e. closest to the determine ratio from table 4 & 7 on page no. 4 & 6.
- + Select the gear unit that has a service rating (Mechanical rating/2) for the selected ratio is greater than or equal to the power rating of the driver at the above input speed from table 3 & 6 on page no. 4 & 6. When the gear unit to be selected using a different service factor other than 2, multiply the service rating from table 3 & 6 on page no. 4 & 6 by 2 to get the mechanical rating. This mechanical rating is then divided by that different service factor to get the ultimate service rating. The maximum momentary or starting load may not exceed the 200% of the mechanical power rating i.e. Service rating multiplied by 2 of the gear unit.
- + Determine the actual thrust load caused by the fan weight & aerodynamic force. Thus the Actual downward thrust load calculated should be less than or equal to the thrust load capacity given in table 9 & 10 on page no. 8
- + Selection of a gear unit for an application using other than electric motor or steam turbine as a driving power source please consult Premium.

+ 6. APPROXIMATE WEIGHT & OIL CAPACITY

TABLE: 1

SINGLE REDUCTION UNIT						
UNIT SIZE	RC-065	RC-085	RC-110	RC-135	RC-155	RC-175
NET WEIGHT (lb)	130	223	350	520	700	818
OIL QUANTITY (lt)	2.5	3.5	6	10	19	23

TABLE: 2

DOUBLE REDUCTION UNIT								
UNIT SIZE	RC-1008	RC-1110	RC-1311	RC-1712	RC-1712.5	RC-1713	RC-1814	RC-2016
NET WEIGHT (lb)	790	1190	1570	2010	2090	2700	3571	5315
OIL QUANTITY (lt)	20	36	43	53	55	82	120	206



+ 7. SERVICE RATING SINGLE REDUCTION

TABLE: 3
SERVICE RATING (hp) at Service Factor= 2

GEAR UNIT SIZE	INPUT SPEED (rpm)	NOMINAL RATIO																			
		2.0	2.5	3.0	3.25	3.5	3.75	4.0	4.25	4.5	4.75	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5
RC-065	1750	25	25	20	18	17		15		12		10									
	1450	21	21	17	15	14		12		10		8									
	1160	17	17	13	12	11		10		8		7									
RC-085	1750			45	43	39	36	33	32	28	27	25	20	18	15	15					
	1450			37	36	32	30	27	26	23	22	21	17	15	12	12					
	1160			30	29	26	24	22	11	19	18	17	13	12	10	10					
RC-110	1750					75	74	72	71	64	59	55	44	39	33	30	25	24			
	1450					62	61	60	59	53	49	46	37	32	27	25	21	20			
	1160					50	49	48	47	42	39	37	29	26	22	20	17	16			
RC-135	1750							110		93	88	83	71	63	59	48	43	40	35	30	
	1450							91		77	73	69	59	52	49	40	36	33	29	25	
	1160							73		62	58	55	47	42	39	32	29	26	23	20	
RC-155	1750											110	100	90	85	75	65	55	50	45	
	1450											91	83	75	70	62	54	46	41	37	
	1160											73	66	60	56	50	43	36	33	30	
RC-175	1750												126	112	102	88	80	60	60	57	50
	1450												104	92	84	73	66	50	50	47	41
	1160												84	74	68	58	53	40	40	38	33

+ 8. EXACT RATIO SINGLE REDUCTION

TABLE: 4

GEAR UNIT SIZE	NOMINAL RATIO																			
	2.0	2.5	3.0	3.25	3.5	3.75	4.0	4.25	4.5	4.75	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5
RC-065	2.0	2.474	2.941	3.267	3.5		4.0		4.5		4.909									
RC-085			3.000	3.286	3.5	3.750	4.0	4.250	4.5	4.727	5.000	5.545	6.0	6.556	7.000					
RC-110					3.5	3.750	4.0	4.250	4.5	4.727	4.909	5.545	6.0	6.556	7.000	7.375	8.000			
RC-135							4.0		4.5	4.727	4.909	5.545	6.0	6.556	7.000	7.375	8.000	8.429	9.000	
RC-155											4.909	5.545	5.9	6.556	7.125	7.375	8.000	8.429	8.857	
RC-175												5.545	5.9	6.556	7.125	7.375	8.143	8.429	9.143	9.571

Note: Exact Ratio deviation within $\pm 2\%$ with nominal ratio for Single reduction unit.



+ 9. DIMENSION DETAILS SINGLE REDUCTION (mm)

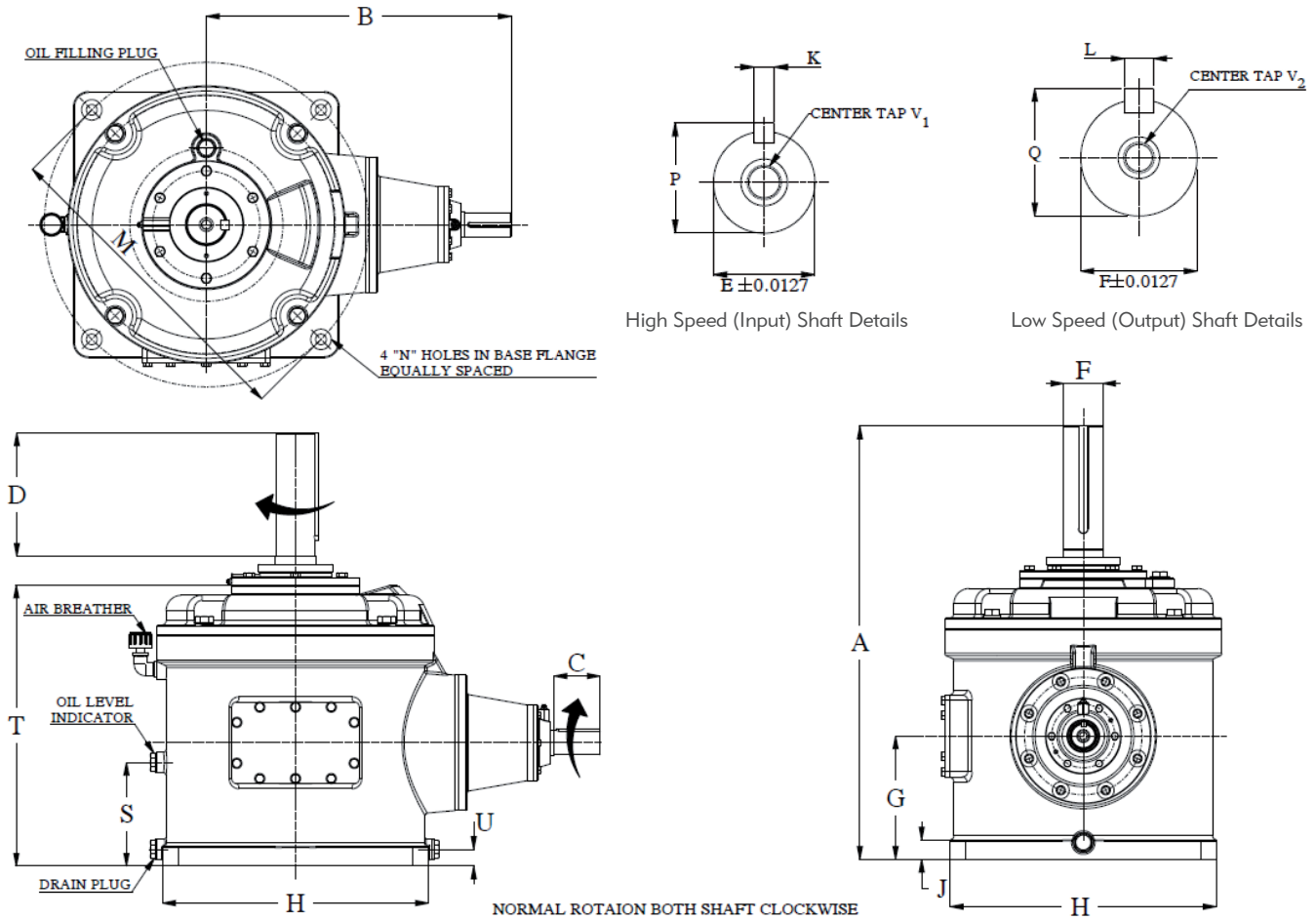


TABLE: 5

GEAR UNIT SIZE	A	B	C	D	E	F	G	H	J	K	P	L	Q	M	N	S	T	U	V1	V2
RC-065	451.0	276.0	57.0	152.5	25.375	44.425	127.0	254	16.0	6.401 6.350	28.12 27.97	9.576 9.525	48.54 48.39	232.0	14	100	251	27	M10X22	M16X36
RC-085	590.5	362.0	68.0	203.0	31.725	50.775	152.4	279	25.5	7.976 7.925	35.15 35.00	12.751 12.700	56.29 56.13	330.0	18	125	336	25	M12X28	M16X36
RC-110	667.0	447.5	84.0	216.0	38.075	60.300	177.8	343	28.5	9.576 9.525	42.19 42.04	15.926 15.875	67.18 67.03	406.5	18	145	402	25	M12X28	M20X42
RC-135	752.5	533.5	95.0	228.5	47.600	66.650	203.2	406	32.0	9.576 9.525	51.715 51.565	15.926 15.875	73.53 73.38	508.0	21	170	460	33	M16X36	M20X42
RC-155	805.0	586.0	98.5	241.5	47.600	76.175	241.3	483	32.0	9.576 9.525	51.715 51.565	19.101 19.050	84.46 84.30	559.0	21	203	504	33	M16X36	M20X42
RC-175	848.0	597.0	90.5	241.5	47.600	76.175	241.3	521	38.0	9.576 9.525	51.715 51.565	19.101 19.050	84.46 84.30	635.0	21	203	550	33	M16X36	M20X42



+ 10. SERVICE RATING DOUBLE REDUCTION

TABLE: 6
SERVICE RATING (hp) at Service Factor= 2

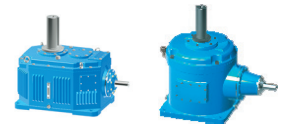
GEAR UNIT SIZE	INPUT SPEED (rpm)	NOMINAL RATIO																		
		7.5	8.0	8.5	9.0	9.5	10.0	10.5	11	12	12.5	13	14	15	15.5	16	17	18	19	20
RC-1008	1750	100	100	100	100	95	90	86	82	75		75	60							
	1450	83	83	83	83	79	75	71	68	62		62	50							
	1160	66	66	66	66	63	60	57	54	50		50	40							
RC-1110	1750	142	142	141	140	135	130	130	130	125		125	120							
	1450	118	118	117	116	112	108	108	108	104		104	99							
	1160	94	94	93	93	89	86	86	86	83		83	80							
RC-1311	1750			208	206	198	190	183	176	165		160	155				137			
	1450			172	171	164	157	151	146	137		133	128				114			
	1160			138	137	131	126	121	117	109		106	103				91			
RC-1712	1750				312	300		280	271	255	255	241	229	214	198	200	188	178		
	1450				259	249		232	225	211	211	200	190	177	164	166	156	147		
	1160				207	198		186	180	169	169	161	152	142	131	133	125	118		
RC-1712.5	1750								309	297		275	254	237	233	236	231	225	201	181
	1450								256	246		227	210	196	192	196	191	186	167	150
	1160								205	197		182	168	156	154	156	153	149	133	120
RC-1713	1750								390			323	310	288	280	285	272	252	241	224
	1450								323			268	257	238	231	236	225	208	199	185
	1160								259			214	205	190	185	189	180	167	159	148
RC-1814	1750									454		419	371	345	356	345	324	300	291	272
	1450									376		346	307	285	295	286	268	248	241	233
	1160									301		277	245	228	236	229	215	198	192	187
RC-2016	1750											500	480	460	454	440	405	400	380	360
	1450											414	398	381	376	365	335	331	315	298
	1160											331	318	305	301	292	268	265	252	239

+ 11. EXACT RATIO DOUBLE REDUCTION

TABLE: 7

GEAR UNIT SIZE	NOMINAL RATIO																		
	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	12.0	12.5	13.0	14.0	15.0	15.5	16.0	17.0	18.0	19.0	20.0
RC-1008	7.470	7.979	8.519	8.925	9.659	10.196	10.566	10.982	11.975		12.830	13.946							
RC-1110	7.557	8.072	8.439	9.029	9.563	10.094	10.456	11.109	12.113		12.979	13.825							
RC-1311			8.664	9.077	9.531	10.032	10.590	11.040	11.928		12.978	13.905				16.846			
RC-1712				9.064	9.518		10.575	11.025	11.912	12.388	13.163	14.040	15.043	15.577	15.793	16.921	18.222		
RC-1712.5								11.072	11.910		13.056	14.000	15.076	15.556	15.975	16.799	17.750	18.859	20.170
RC-1713								10.947			13.040	13.855	15.053	15.326	16.296	16.825	18.120	18.889	19.798
RC-1814									12.080		12.761	13.806	14.726	15.684	15.969	17.033	17.924	18.952	19.771
RC-2016											12.882	13.941	14.870	15.411	15.933	16.846	17.924	18.952	19.771

Note: Exact Ratio deviation within $\pm 2.5\%$ with nominal ratio for Double reduction unit.



+ 12. DIMENSION DETAILS DOUBLE REDUCTION (mm)

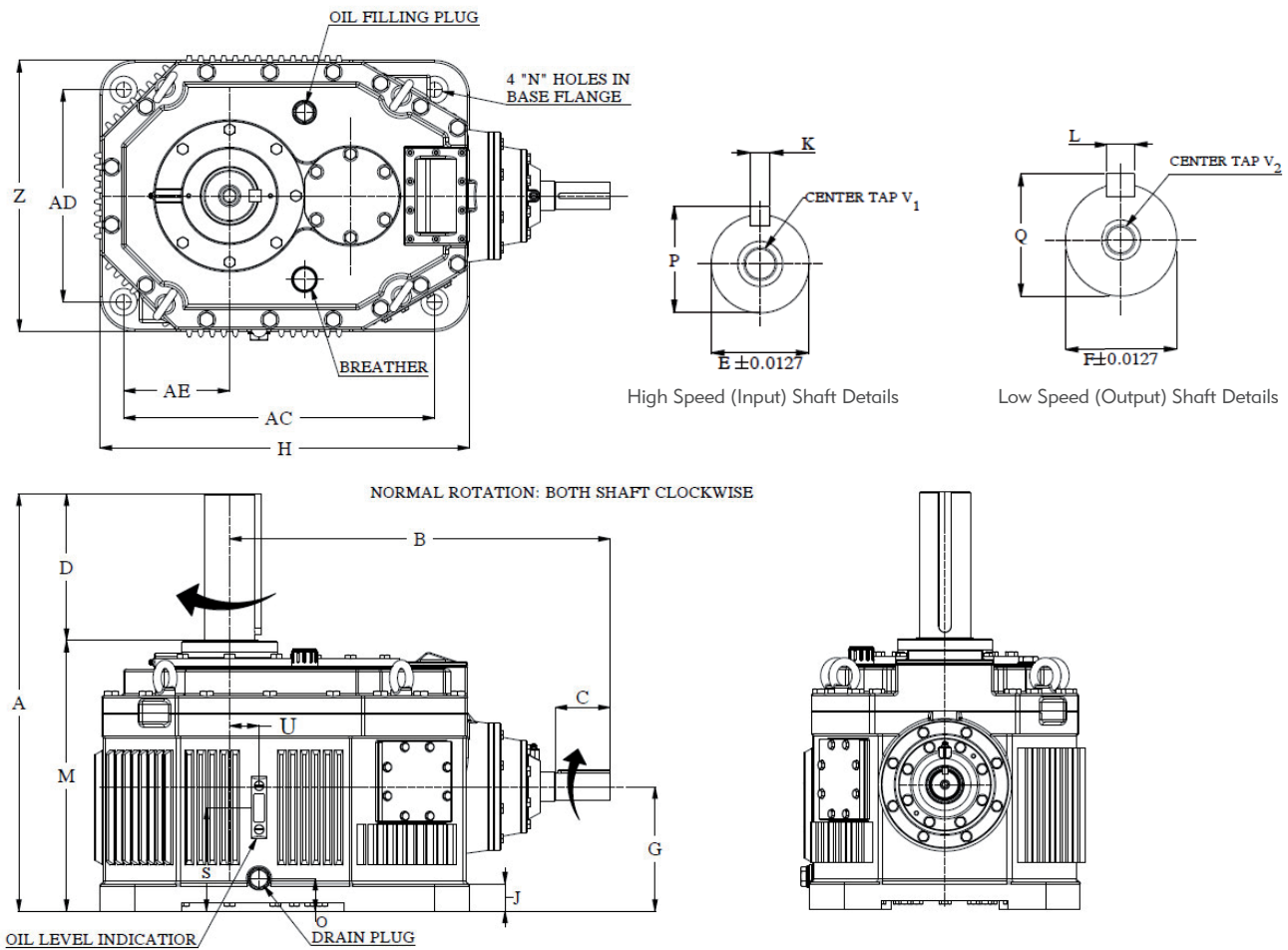


TABLE: 8

UNIT SIZE	A	B	C	D	E	F	G	J	K	P	L	Q
RC-1008	724.0	660	95.0	254.00	47.600	88.875	215.9	47.5	9.576 9.525	51.715 51.565	22.276 22.225	98.53 98.37
RC-1110	829.0	756	95.0	305.00	47.600	101.575	241.3	47.5	9.576 9.525	51.715 51.565	25.475 25.400	112.60 112.45
RC-1311	873.0	773	125.5	305.00	61.874	114.275	260.4	47.5	15.926 15.875	68.76 68.61	25.475 25.400	125.30 125.15
RC-1712	911.0	857	125.5	305.00	61.874	126.975	279.4	47.5	15.926 15.875	68.76 68.61	31.826 31.750	140.77 140.61
RC-1712.5	937.0	908	147.5	305.00	74.574	126.975	304.8	47.5	19.101 19.050	82.85 82.70	31.826 31.750	140.77 140.61
RC-1713	968.5	946	147.5	305.00	74.574	139.675	304.8	38.0	19.101 19.050	82.85 82.70	31.826 31.750	153.47 153.31
RC-1814	1136.5	997	149.0	381.00	79.350	165.049	368.3	63.5	19.101 19.050	87.626 87.611	38.202 38.100	181.61 181.45
RC-2016	1235.0	1111	152.5	381.00	88.875	190.449	406.4	76.0	22.276 22.225	98.53 98.37	44.552 44.450	209.68 209.53

UNIT SIZE	O	M	N	S	U	V1	V2	H	Z	AC	AD	AE
RC-1008	57	470.0	27	180	46	M16X36	M24X50	641	470	540	368	184.0
RC-1110	57	524.0	27	200	45	M16X36	M24X50	768	559	660	457	225.5
RC-1311	60	568.0	33	220	65	M20X42	M24X50	845	597	743	495	263.5
RC-1712	75	606.0	33	235	131	M20X42	M24X50	933	641	800	508	254.0
RC-1712.5	75	632.0	33	260	131	M20X42	M24X50	933	641	800	508	254.0
RC-1713	75	663.5	33	260	92	M20X42	M30X60	1038	743	886	591	295.0
RC-1814	78	755.5	40	315	128	M20X42	M30X60	1124	810	946	632	316.0
RC-2016	91	854.0	46	350	140	M24X50	M30X60	1340	972	1137	768	384.0



+ 13. AXIAL THRUST LOAD CAPACITY (POUND) ON LOW SPEED SHAFT

13.1 Single Reduction based on S.F.= 2

TABLE: 9

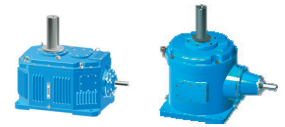
UNIT SIZE	RC-065	RC-085	RC-110	RC-135	RC-155	RC-175
INPUT SPEED (rpm)	1750					
OUTPUT SPEED (rpm)	≤ 875	≤ 584	≤ 500	≤ 438	≤ 350	≤ 318
THRUST (Pound)	2238	2494	3169	3483	3888	3663
INPUT SPEED (rpm)	1450					
OUTPUT SPEED (rpm)	≤ 750	≤ 500	≤ 429	≤ 375	≤ 300	≤ 273
THRUST (Pound)	2337	2652	3371	3596	4157	3955
INPUT SPEED (rpm)	1160					
OUTPUT SPEED (rpm)	≤ 600	≤ 400	≤ 343	≤ 300	≤ 240	≤ 218
THRUST (Pound)	2517	2899	3685	4112	4584	4382

13.2 Double Reduction based on S.F.= 2

TABLE: 10

UNIT SIZE	RC-1008	RC-1110	RC-1311	RC-1712	RC-1712.5	RC-1713	RC-1814	RC-2016
INPUT SPEED (rpm)	1750							
OUTPUT SPEED (rpm)	≤ 233	≤ 233	≤ 206	≤ 194	≤ 159	≤ 159	≤ 146	≤ 135
THRUST (Pound)	3776	5013	5170	7238	6451	11083	13263	26976
INPUT SPEED (rpm)	1450							
OUTPUT SPEED (rpm)	≤ 200	≤ 200	≤ 176	≤ 167	≤ 136	≤ 136	≤ 125	≤ 115
THRUST (Pound)	4091	5485	5395	8025	6924	12116	14634	28744
INPUT SPEED (rpm)	1160							
OUTPUT SPEED (rpm)	≤ 160	≤ 160	≤ 141	≤ 133	≤ 109	≤ 109	≤ 100	≤ 92
THRUST (Pound)	4496	5547	5665	8925	7553	13488	16253	31023

Note: Axial Thrust Load Capacity given on the table based on the calculated bearing life on Output Shaft greater than 100,000 hours L_{10a} life. For actual Axial Thrust Load greater than the given table capacity Contact Premium to get the desired bearing life.



14. APPROVED LUBRICATION

Premium gear units are supplied without oil. Before operating it is essential to ensure that they are filled to correct oil levels as per oil level indicator with lubricants recommended by Premium. Overfilling can cause overheating and leakage. Lubricants listed in 14.1 are suitable for normal ambient temperatures and operating duties. All gear units in this range are designed to operate under full load at a maximum temperature of 200°F (95°C).

In certain applications where extreme conditions, are to be met, e.g. low temperature operation, 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.

If the gear drive is started when the ambient temperature is below 20°F (-7°C) use a lube oil heater. Where ambient temperatures are lower than 14°F (-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.

TABLE: 11

Out put Speed Range r/min	Recommended ISO Grade		
	Ambient Temp		
	20° F to 50° F (-7° C to 10° C)	50° F to 77° F (10° C to 25° C)	77° F to 122° F (25° C to 50° C)
1000-700	VG 220	VG 320	VG 460
700-400	VG 220	VG 320	VG 460
700-70	VG 320	VG 460	VG 460

14.1 LUBRICANT SPECIFICATION

Viscosity mm ² /s (cSt) at 104 F												TRIBOL
	Bharat Petroleum	Indian Oil	Hindustan Petroleum	BP Energol	Castrol	Mobilgear	Shell Omala Oil	Cepsa Engr-najes	Klüberoil	Aral	Chevron Gear Compound	Tribol
Recommended Mineral Oil												
ISO VG460 AGMA 7EP	Amocam Oil 460	Servomesh SP 460	Parthan EP 460	GR-XP 460	Alpha SP 460	Mobilgear 600 XP 460	Omala S2 GX 460	HP 460	Klüberoil GEM 1 460N	Degol BG 460	EP 460	Tribol 1100/460
ISO VG320 AGMA 6EP	Amocam Oil 320	Servomesh SP 320	Parthan EP 320	GR-XP 320	Alpha SP 320	Mobilgear 600 XP 320	Omala S2 GX 320	HP 320	Klüberoil GEM 1 320N	Degol BG 320	EP 320	Tribol 1100/320
ISO VG220 AGMA 5EP	Amocam Oil 220	Servomesh SP 220	Parthan EP 220	GR-XP 220	Alpha SP 220	Mobilgear 600 XP 220	Omala S2 GX 220	HP 220	Klüberoil GEM 1 220N	Degol BG 220	EP 220	Tribol 1100/220
Recommended Synthetic Oil												
ISO VG460 AGMA 7S	-	Servosyn 460 Plus	Parthan SL 460	-	Optigear Synthetic X 460	Mobil SHC 634	Omala S4 GXV 460	HPX 460	Klubesynth GEM 4 460N	-	-	Tribol 800/460
ISO VG320 AGMA 6S	-	Servosyn 320 Plus	Parthan SL 320	-	Optigear Synthetic X 320	Mobil SHC 632	Omala S4 GXV 320	HPX 320	Klubesynth GEM 4 320N	-	-	Tribol 800/320
ISO VG220 AGMA 5S	-	Servosyn 220 Plus	Parthan SL 220	-	Optigear Synthetic X 220	Mobil SHC 630	Omala S4 GXV 220	HPX 220	Klubesynth GEM 4 220N	-	-	Tribol 800/220



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