ELECON
BEVEL HELICAL COOLING TOWER
GEAR BOXES

ELECON
GEARING THE FUTURE

www.elecon.com

India's Largest Manufacturer of Industrial Gears

Way back in 1951, Elecon set out on its journey to scale new heights of technical excellence, creating landmarks at every juncture, From elevators and conveyors, to high quality gears and material handling equipments. Elecon set up a separate Gear Division in the year 1976. Elecon is also known for its pioneering acts in India. The first to introduce modular design concept, case-hardened and ground gear technology in India. These path breaking efforts are backed by full fledged departments employing a strong, skilled work force. It has supplied hi-tech equipments to major core sectors such as Fertilizer Plants, Cement Plants, Coal and Lignite Mines, Power Plants, Textile, Plastic, Steel Plants and Port Mechanization in India and abroad.

Modern Infrastructure

- Elecon Design & Manufactures - A wide range of worm, parallel shaft and right angle shaft helical and spiral bevel helical gears with horizontal and vertical output shaft in various sizes, from single to quadruple stage reduction. These gears are compact and light, Saving space, reducing foundation structure costs and lubricating oil consumption.
- Deploying modern technology - CAD / CAM in Engineering and Manufacturing on a continuous basis is the selling point of the company.
- Elecon Gear Division is acknowledged as the most modern in the industry. More than 90% of ELECON machinery is computer controlled (CNC) ensuring high degree of precision in Manufacture, Design and Quality testing of gear components with DIN/AGMA international specifications.
- Elecon is expertise in providing customized gear boxes for Steel Mill, High Speed Turbine, Sugur Mill, Marine, Coast Guard and Navy Ship, Plastic Extrusions, antenna drives and Satellite for the Indian Space programme.
- Elecon is prepared to deliver within deadlines. It is made possible through highly on-line computerised system of advanced Planning and Scheduling software.

Series Gear units are the results of decades of experience in Design and production, taking advantage of the most recent relevant research in the field of gearing technology.

Double Reduction Spiral Bevel Gear Units are intended to satisfy characteristic requirements and conditions encountered in cooling tower applications. This series covers models from KBVCT 160 to 400 in double stage and Ratio from 8 to 16.

Ratio

All ratios are reducing and defined as the ratio of Input speed to output speed. Double Reduction ratios are within ±3%.

Ratings

All mechanical ratings listed are calculated as per DIN Standard.

Selection

The required ratio is established by dividing the input or driver speed by the output speed. Select the ratio from the table that is the closest to the required ratio. Select the Gear Unit from the table that has the mechanical rating listed under the required ratio column that is equal to or greater than the required (Power rating X Service factor).

Recommendation :- A service factor of minimum 3.8 must be applied while selecting the required gear box.

The "service rating"* of the gearbox shall be equal to or greater than the name plate rating of the electric motor.

The maximum momentary or starting load may not exceed 200% of the mechanical power rating of the speed reducer.

For selection of a gear box for an application using a driver other than an electric motor, consult the Elecon.

* Service rating = Mechanical rating from table/service factor

Direction of Rotation

Normally the direction of rotation (DOR) is clockwise for input and output shafts. (as seen from the end of the shaft towards the gearbox)

In case of DOR requirement is counter clockwise, the gearbox can be used as it is, but it is advised to check with Elecon & get a confirmation.

Salient Features:

Double reduction spiral bevel gear units designed for Cooling Tower installations with the features Split Casting Gear case, pump less lubrication. Oil is delivered to all requisite locations using an oil slinger in conjunction with an elaborate oil management system.

Housing and Castings

Castings are of rigid design and built to absorb internal and external loads with minimum deflection. Gear case and covers are designed to assure permanent alignment of bearings and gears under load. All casting materials are gray cast iron for effective damping of noise and vibration. Mating of Housing with casing are sealed using " formed-in-place" gasket material that eliminates "weeping". Gear cases are predrilled with pilot holes to assist in installation of dowel pins.

Spiral Bevel Gears

Spiral bevel gears are finished using State of the art hard cut process, with special software monitoring to match the profile of the mating gears.

Helical Gears

Helical gears are designed specifically for drive service and are precision machined from high grade alloy steel, case hardened and precision ground to provide low noise, low vibration operation.

Bearings

All bearings are roller type, provided by major manufacturers. All bearings are sized to meet or exceed the minimum life requirements.

Lubrication

Lubrication of gears and bearings is entirely self contained by 'splash'. In general oil grade to be use ISO VG-320. Oil Thrower on the input shaft produces positive splash which in turn, ensures continuous circulation of oil to top bearing through channels.

Cooling

Standard gear units are cooled by normal heat dissipation through convection/radiation from externally exposed surface. Thermal rating being a critical factor in this application of Cooling towers, special focus and care have been taken in the design. Extreme conditions in a cooling tower have been considered and the gearbox has been designed for optimal performance.

Nominal Power Rating - KBVCT

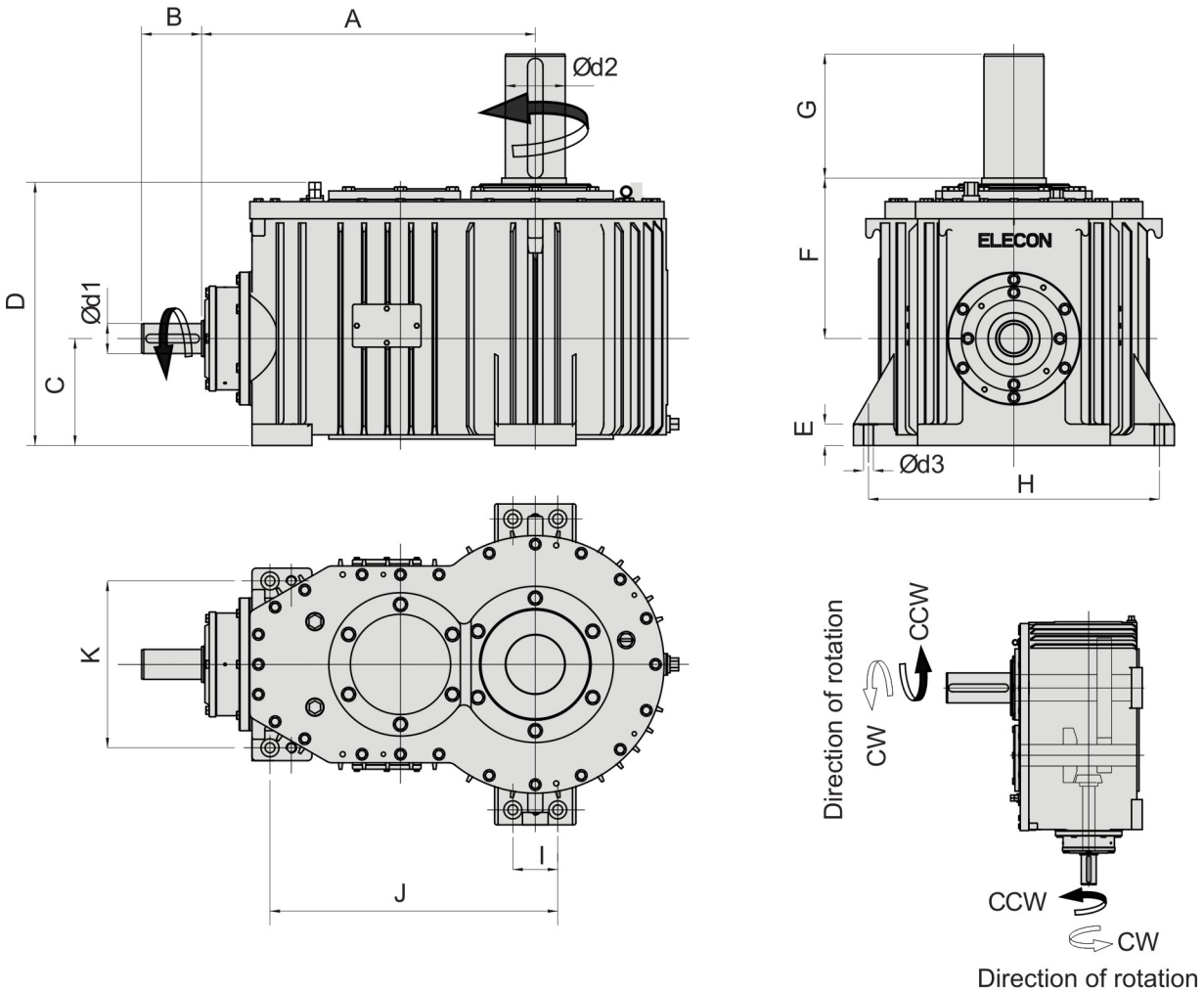
Nominal Transmi. Ratio i_N	Nominal Speed-rpm		Size of Gear unit									
			140	160	180	200	225	250	280	315	355	400
	n_1	n_2	Nominal Gear Box Power Rating (KW)									
8	1500	188	64	86	122	186	249	356	528	701	977	1355
	1000	125	43	59	84	128	171	245	363	481	670	930
9	1500	167	54	78	97	150	205	308	437	598	851	1314
	1000	111	37	54	67	104	140	212	300	410	583	902
10	1500	150	47	68	86	131	178	266	379	527	742	1078
	1000	100	32	47	59	90	122	183	260	362	509	740
11.2	1500	134	42	61	77	117	159	239	339	482	680	932
	1000	89	29	42	52	80	109	164	233	330	467	639
12.5	1500	120	39	56	70	107	145	218	311	421	597	768
	1000	80	26	39	48	73	99	149	213	289	410	527
14	1500	107	30	45	61	85	126	185	272	370	506	637
	1000	71	20	31	42	59	86	127	186	254	347	437
16	1500	94	27	41	54	78	112	166	236	330	476	598
	1000	63	18	28	37	54	77	113	162	227	327	422

Thermal Rating-KBVCT

Nominal Gear Ratio i_N	Input speeds rpm n1	Size of Gear unit									
		140	160	180	200	225	250	280	315	355	400
		Thermal Capacity, P_{t1} [kW], for Gearboxes Without Cooling									
8 to 16	1500	39	50	65	91	124	141	171	221	276	356
	1000	36	49	61	86	110	136	166	212	272	342

Actual Ratio - KBVCT

Nominal Ratio	Size of Gear unit									
	140	160	180	200	225	250	280	315	355	400
8	8	7.889	7.9	8	8.118	8.105	8	7.895	8.118	8
9	8.923	8.734	8.746	8.857	8.987	8.974	8.857	8.882	9.073	8.941
10	10.154	10.013	10.027	10.154	10.303	10.287	10.154	10.02	10.401	9.882
11.2	11.385	11.176	11.242	11.333	11.5	11.421	11.333	10.931	11.307	11
12.5	12.364	12.192	12.209	12.364	12.545	12.526	12.364	12.5	12.801	12.571
14	14.182	13.985	14.005	14.182	14.39	14.368	14.182	13.995	14.206	14.154
16	16	15.778	15.8	16	16.235	16.211	16	15.789	16.235	15.667

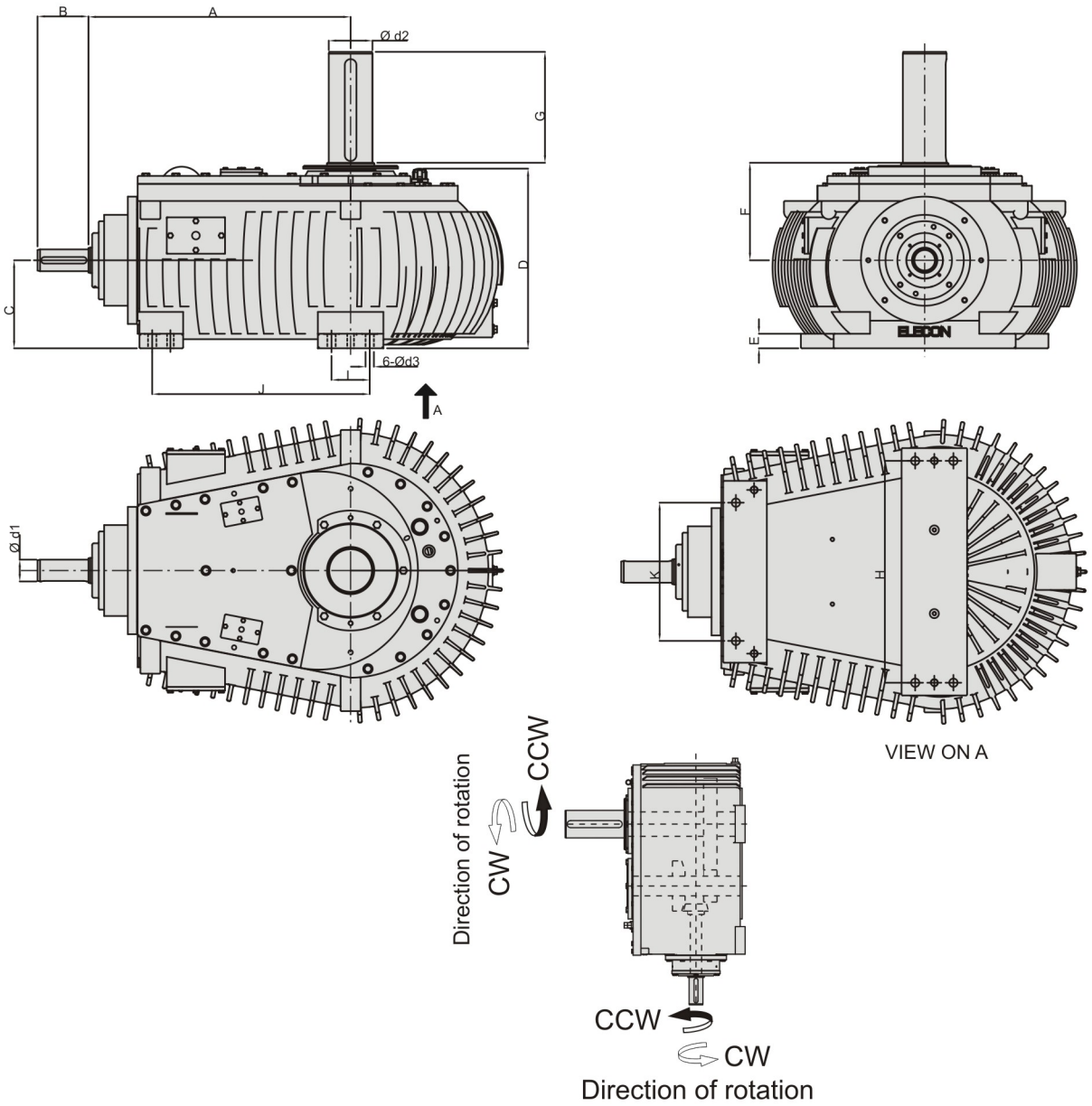


Size	ϕd1				ϕd2	ϕd3	A	C	D	E	F	G	H	I	J	K	Wei-ght (Kgs.)	Oil Qty. (Ltr.)
	i ≤ 10	B	i > 10	B														
140*																		
160	40	110	35	80	70	18	520	140	316	35	200	100	490	60	415	320	185	13
180	42	110	40	110	80	18	550	160	356	35	220	110	510	70	450	330	250	15
200	50	110	45	110	90	23	590	180	396	40	240	125	540	80	485	340	335	18
225	55	110	50	110	100	23	630	190	416	40	255	140	580	85	563	360	455	21

Shaft ends with key as per DIN – 6885, Sheet 1, from A
Shaft centering as per DIN – 332 from DS (With threads)

Tolerance field for shaft ends ISO fit up to Ø 50mm k6 over Ø 50mm m6
*- On request

☞ The volume of oil indicated in the table is only a rough guide line, depending on the ratio the actual oil volume can vary.
The exact level of oil is to be maintained as per the dipstick marking or the level indicator as applicable.



Size	ϕd1				ϕd2	ϕd3	A	C	D	E	F	G	H	I	J	K	Wei-ght (Kgs.)	Oil Qty. (Ltr.)
	i ≤ 10	B	i > 10	B														
250	60	140	55	110	110	23	675	225	436	40	290	210	610	90	505	370	665	27
280	65	140	60	140	120	23	720	242	505	40	268	305	610	105	597.5	380	900	32
315	75	140	70	140	140	23	780	280	615	50	390	305	680	105	672.5	390	1215	40
355	90	170	80	170	160	33	885	315	695	50	440	350	820	135	767.5	460	1675	64
400	100	210	90	170	170	33	1055	355	880	60	600	350	925	135	907.5	510	2320	75

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Shaft centering as per DIN – 332 from DS (With threads)

Tolerance field for shaft ends ISO fit up to Ø 50mm k6 over Ø 50mm m6

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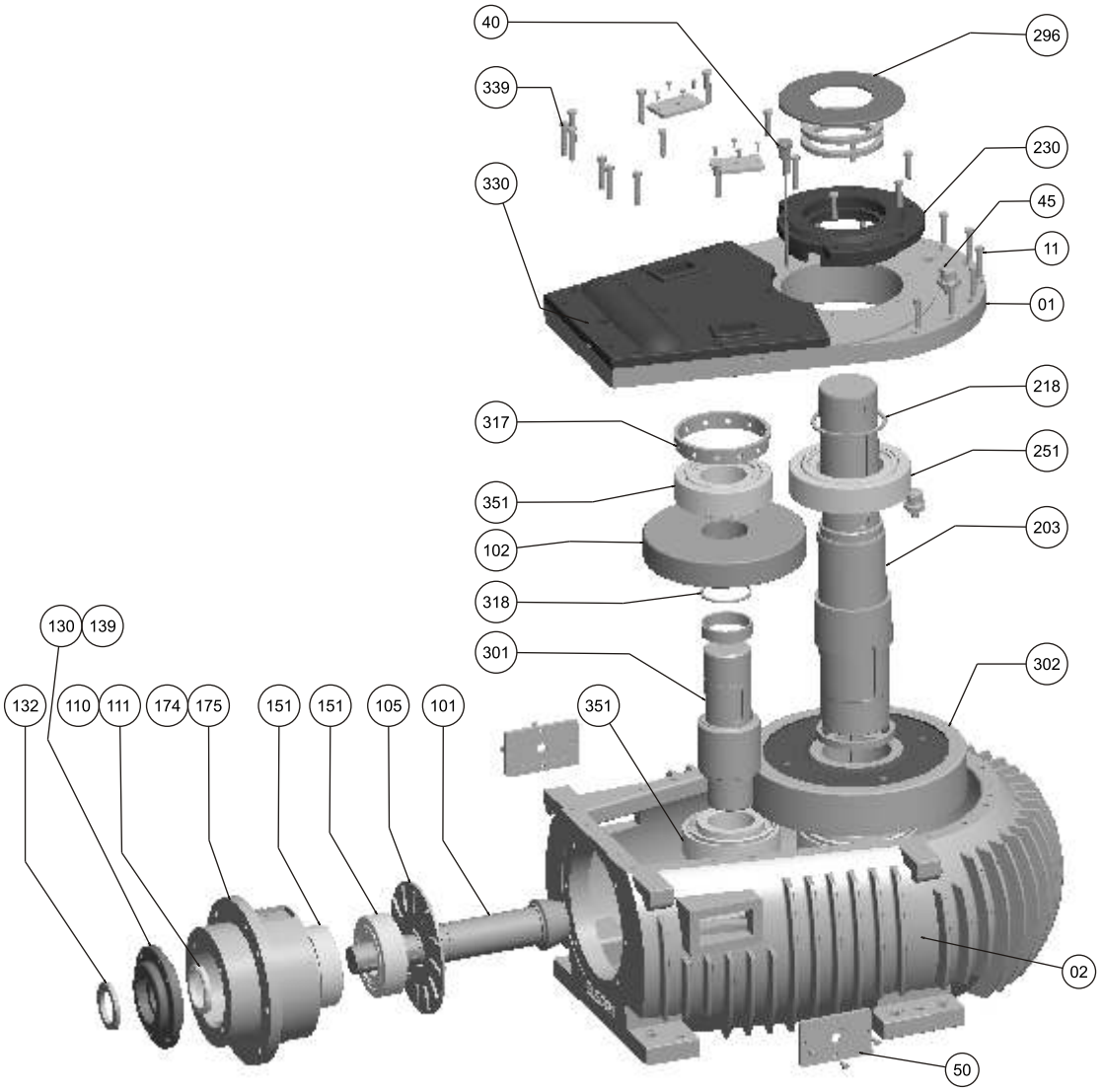
Exploded View



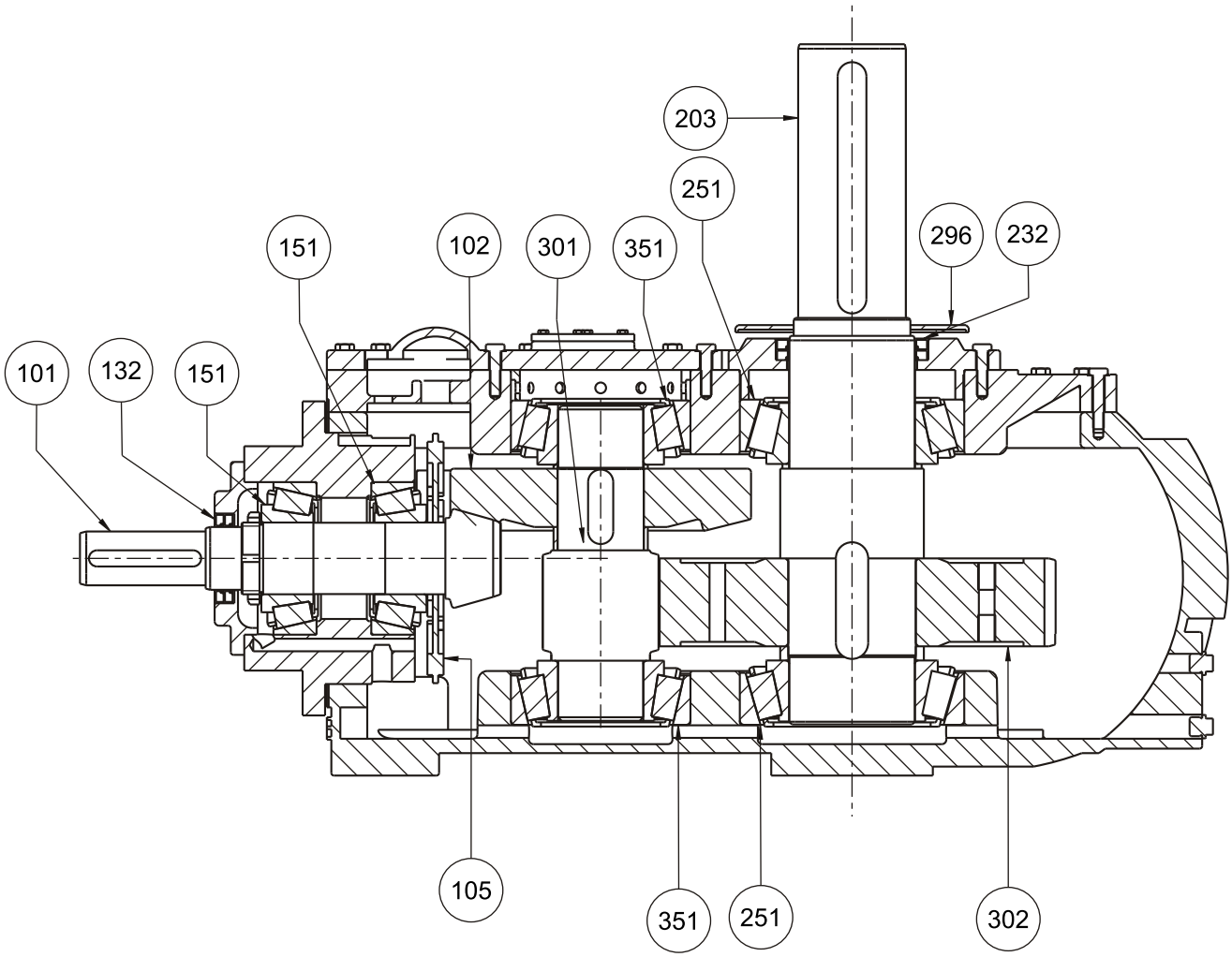
Part List of Exploded View

Sr. No.	Part
1	Gear Case Top
2	Gear Case Bottom
11	Case Joining Bolt
40	Oil Level Dipstick
45	Breather Plug
50	Inspection Cover
101	Sb Pinion
102	Sb Wheel
105	Oil Thrower
110	Lock Nut

Sr. No.	Part
111	Lock Washer
130	Open Cover
132	Oil Seal
139	Hex. Head Screw
151	Taper Roller Bearing
174	Bearing Housing
175	Hex. Head Screw
203	Output Shaft
218	Distance Piece
230	Open Cover
251	Taper Roller Bearing

Sr. No.	Part
296	Protection Disc
301	Intermediate Pinion
302	Gear Wheel
317	C Type DP
318	Distance Piece
330	Blank Cover
339	Hex. Head Screw
351	Taper Roller Bearing

Cross Sectional View



Item Nos.	Description	Qty.
101	Input Spiral Bevel Pinion	1
102	Spiral Bevel Wheel	1
105	Oil Thrower	1
132	Input Oil Seal	1
151	Input Bearing	2
203	Output Shaft	1
232	Output Oil Seal	2

Item Nos.	Description	Qty.
251	Output Bearing	2
296	Protection Cover	1
301	Helical Pinion Shaft	1
302	Output Gear Wheel	1
351	Intermediate Bearing	2

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