ic TorqueDrive

Crane Duty Gearboxes



ICKN/26.04

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General

IC Crane Duty Gear Units are developed with reference to the best in the Industry and offer the following salient features:

- Categorical Development for Crane Duty Applications in Triple & Quadruple Reductions
- Gear Units are fully metric
- High Power / Torque ratings
- Caters to a wide range of Ratio and Power range

SALIENT FEATURES:

The Mechanical Capacity tables apply to normal conditions, i.e., driven by an electric motor, ambient temperature 20° C. Capacities for intermediate speeds can be interpolated linearly. Higher drive speeds than indicated can be provided on request.

DESIGN FEATURES:

- Centre Distances are chosen from ISO preferred number series
- Highest quality heat treated profile ground helical gears
- Modular concept of design ensuring high degree of interchangeability of parts and sub-assemblies
- Optimal power to weight ratio in low volume ensures installation in most difficult situations

GEARBOX CONFIGURATION:

- Gearbox available in both Horizontal and Vertical configuration for Travel and Hoist drive applications
- Solid Double Extended Input and Solid Single Extended output shaft variant available as a standard Catalogue combination. Combinations of Other Shaft Extensions available.
- Available in Fabricated Housing to cater to all Industrial demands as a standard Offering.
- Split housing design at the Shaft axes ensuring maintenance friendly features.

MECHANICAL CAPACITIES:

- Calculated as per the latest international standards

THERMAL CAPACITIES:

- Optimized Thermal Rating due to increased surface area.
- Standard drive units are cooled by natural heat dissipation through Convection / Radiation from External surfaces
- Thermal Ratings to be checked as given in Thermal Rating chart.

Triple Reduction	Quadruple Reduction
97	96

APPROX. EFFICIENCIES ON FULL LOAD (%):

SOUND / NOISE LEVEL:

- Allowable Sound Pressure Level: 85 dB(A) @ 1m distance from gearbox emitting surfaces

VIBRATION LEVEL:

- Allowable vibration level as per latest International Standards

Triple Reduction	Quadruple Reduction
i_N: 14 - 80	i_N: 50 - 315

GEARBOX RATIO RANGE:

Actual ratio deviation: ±3% for Nominal Ratio ≤ 250, ±5% for Nominal Ratio > 250.

DIRECTION OF ROTATION:

Either direction of rotation available.

PRODUCT QUALITY:

Units are manufactured under a stringent quality system certified to ISO: 9001 guaranteeing uniformly high standard.

DELIVERY:

Gear Units are supplied without oil and to be filled with recommended lubricant grade during operation. The Gear housing is protected against corrosion approx. for a period of 180 days from supply.

Where gear units are to operate in abnormal conditions and (or) are to stand for long period without running, consult IC

Explanation of symbols used in the dimensional drawings:



= Breather



= Oil Dipstick

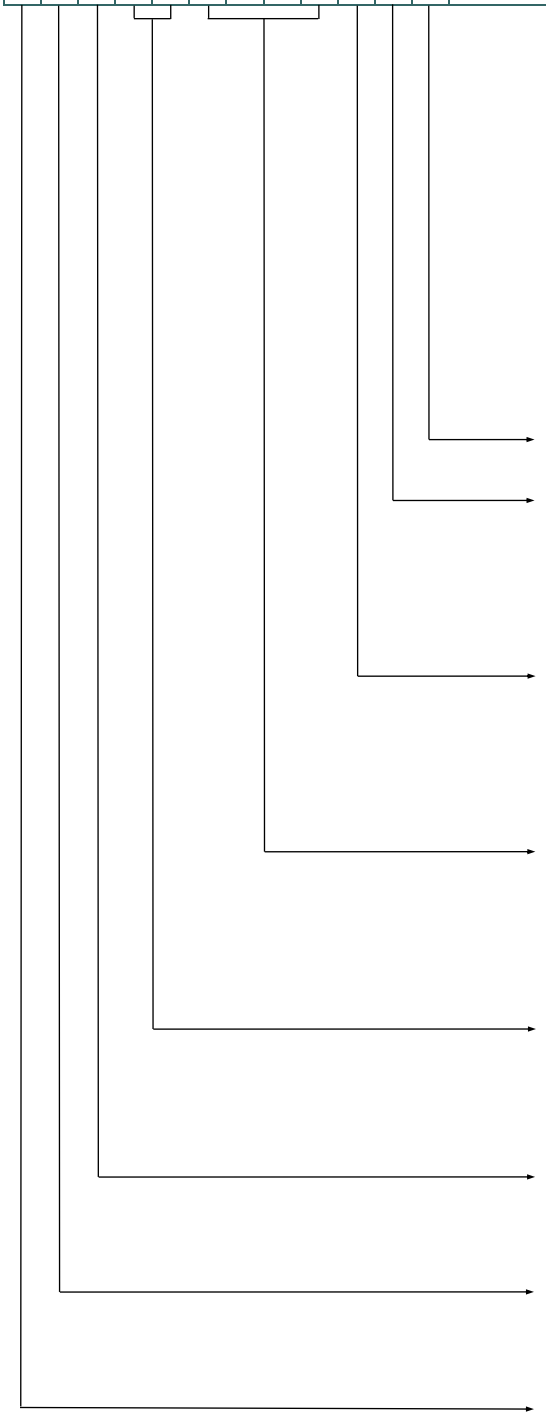


= Oil drain

As improvement in design are being made, this specification is not to be regarded as binding in details and drawings and capacities are subject to alterations without notice. Get Certified Principal dimensions and specifications while Ordering.

Gearbox Designation

1	2	3	4	5	6	7	8	9	10	11	12	No. of Character
K	**H**	**3**	**2**	**8**	**0**	**3**	**1**	**5**	**0**	**1**	**A**	**Model Nomenclature**



Handing Details

Shaft Extension Feature (example below):
- 0 Single Input, Single Output
- 1 Double Input, Single Output (DIS)
- 2 Single Input, Double Output (DOS)
- 3 Double Input, Double Output (DIOS)

With Components (Gears / Pinions / Output Shafts etc.)
- 0 With Standard Gears / Pinions & Standard Output Shaft
- 1 With Reinforced Gears / Pinions & Standard Output Shaft
- 2 With Standard Gears / Pinions & Reinforced Output Shaft
- 3 With Reinforced Gears / Pinions & Reinforced Output Shaft

Gear Unit Nominal ratio (example below):
- 0315 Ratio = 31.5:1
- 0630 Ratio = 63:1
- 2800 Ratio = 280:1
- 4500 Ratio = 450:1

Gear Unit Size (example below):
- 16 Centre Distance = 160 mm
- 22 Centre Distance = 225 mm
- 45 Centre Distance = 450 mm

No. of Stages
- 3 Triple stage
- 4 Quadruple stage

Mounting Arrangement
- H Horizontal
- V Vertical

Gear Unit Type
- K Crane Duty Helical with Fabricated Steel Gear Case

As improvement in design are being made, this specification is not to be regarded as binding in details and drawings and capacities are subject to alterations without notice. Get Certified Principal dimensions and specifications while Ordering.

Selection in Crane Installations (Method-I FEM):

When Gear Units are used with alternating loads typically existing in Crane installations – a classification according to FEM is recommended.

For this purpose, the ***Factor for driven machine 'f1'*** and the ***Peak torque factor 'f3'*** can be derived in accordance with the group of mechanism standard values M1...M8 in Table 1 below depending on the load (state of loading of mechanism L1...L4) and the duty (classes of utilization of mechanism T0...T9).

To take into account the load distribution in case of alternating loads within a representative period of time t, the cubic mean factor '**K**' is calculated by:

Where, P_1, P_2, P_3 ..... P_N are the Operating Load cycles with corresponding periods t_1, t_2, t_3..... t_N respectively.

$$K = \sqrt[3]{\left(\frac{P_1}{P}\right)^3 \cdot \frac{t_1}{t} + \ldots \left(\frac{P_n}{P}\right)^3 \cdot \frac{t_n}{t}}$$

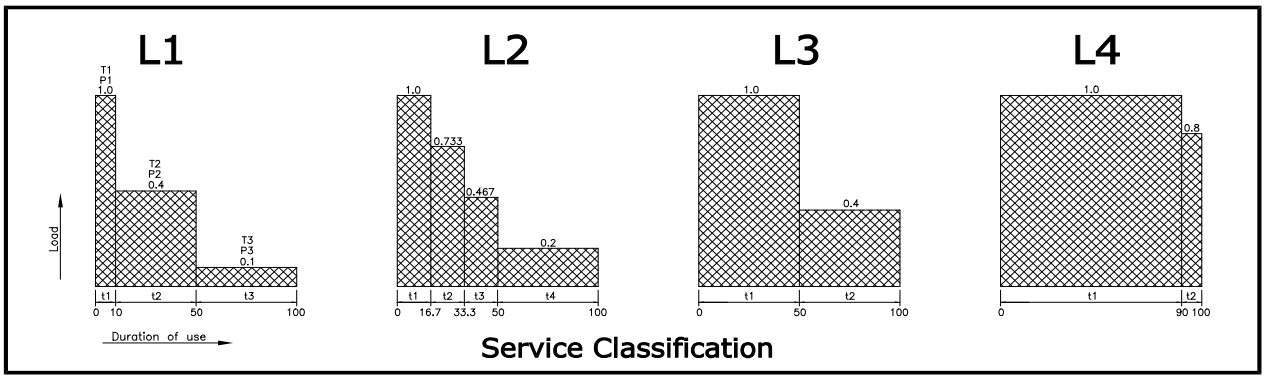


TABLE 1: Guidance for Group classification of a mechanism (in accordance to FEM 1.001)

Type of appliance		Particulars concerning nature of use	Type of mechanism				
References	Designation		Hoisting	Slewing	Luffing	Traverse	Travel
1	Hand-operated appliances		M1	-	-	M1	M1
2	Erection cranes		M2-M3	M2-M3	M1-M2	M1-M3	M2-M3
3	Erection and dismantling cranes for power stations, machine shops, etc.		M2	-	-	M2	M2
4	Stocking and reclaiming transporters	Hook duty	M5-M6	M4	-	M4-M5	M5-M6
5	Stocking and reclaiming transporters	Grab or magnet	M7-M8	M6	-	M6-M7	M7-M8
6	Workshop cranes		M6	M4	-	M4	M5
7	Overhead travelling cranes, pig breaking cranes, scrapyard cranes	Grab or magnet	M8	M6	-	M6-M7	M7-M8
8	Ladle cranes		M7-M8	-	-	M4-M5	M6-M7
9	Soaking-pit cranes		M8	M6	-	M7	M8
10	Stripper cranes, open-hearth furnace-charging cranes		M8	M6	-	M7	M8
11	Forge cranes		M8	-	-	M5	M6
12.a	Bridge cranes for unloading, bridge cranes for containers,	a) Hook or spreader duty	M6 - M7	M5-M6	M3 - M4	M6 - M7	M4 - M5
12.b	Other bridge cranes (with crab and/or slewing jib crane)	b) Hook duty	M4 - M5	M4-M5	-	M4 - M5	M4 - M5
13	Bridge cranes for unloading, bridge cranes (with crab and/or slewing jib crane)	Grab or magnet	M8	M5-M6	M3-M4	M7-M8	M4-M5
14	Drydock cranes, shipyard jib cranes, jib cranes for dismantling	Hook duty	M5-M6	M4-M5	M4-M5	M4-M5	M5-M6
15	Dockside cranes (slewing, on gantry etc.), floating cranes and pantoon derricks	Hook duty	M6-M7	M5-M6	M5-M6	-	M3-M4
16	Dockside cranes (slewing, on gantry etc.), floating cranes and pantoon derricks	Grab or magnet	M7-M8	M6-M7	M6-M7	-	M4-M5
17	Floating cranes and pontoon derricks for very heavy loads (usually greater than 100 t)		M3-M4	M3-M4	M3-M4	-	-
18	Deck cranes	Hook duty	M4	M3-M4	M3-M4	M2	M3
19	Deck cranes	Grab or magnet	M5-M6	M3-M4	M3-M4	M4-M5	M3-M4
20	Tower cranes for building		M4	M5	M4	M3	M3
21	Derricks		M2-M3	M1-M2	M1-M2	-	-
22	Railway cranes allowed to run in train		M3-M4	M2-M3	M2-M3	-	-

Selection in Crane Installations (Method-I):

TABLE 2: Mechanism Class

Loads Charges		Group Classification of Mechanism	Classes of utilization of Mechanism									
State of loading	Definitions		T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
			Service life in hours									
			≤ 200	> 200 ≤ 400	> 400 ≤ 800	> 800 ≤ 1600	> 1600 ≤ 3200	> 3200 ≤ 6300	> 6300 ≤ 12500	> 12500 ≤ 25000	> 25000 ≤ 50000	> 50000
L1 (Light)	Max. load only exceptionally, but only very low loads continuously	k ≤ 0.50	M1	M1	M1	M2	M3	M4	M5	M6	M7	M8
L2 (Medium)	Max. load quite often, but low loads continuously	0.5 < k ≤ 0.63	M1	M1	M2	M3	M4	M5	M6	M7	M8	M8
L3 (Heavy)	Max. load frequently and medium loads continuously	0.63 < k ≤ 0.80	M1	M2	M3	M4	M5	M6	M7	M8	M8	M8
L4 (Very Heavy)	Loads regularly nearest to max. load	0.80 < k ≤ 1.00	M2	M3	M4	M5	M6	M7	M8	M8	M8	M8

TABLE 3: f1 = Factor for driven machine

State of loading	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
L1 (Light)	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.1	1.2
L2 (Medium)	0.8	0.8	0.8	0.9	0.9	1.0	1.1	1.2	1.3	1.4
L3 (Heavy)	0.8	0.8	0.9	1.0	1.0	1.1	1.2	1.3	1.4	1.6
L4 (Very Heavy)	0.9	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.8	2.0

TABLE 4: f2 = Factor for Prime Mover = 1 (When driven by Electric or Hydraulic Motor)

TABLE 5a: f3 = Peak Torque for Constant Load Direction

State of loading	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
L1 (Light)	0.5	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8
L2 (Medium)	0.5	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8
L3 (Heavy)	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8	0.9
L4 (Very Heavy)	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8	0.9

TABLE 5b: f3 = Peak Torque for Alternating Load Direction

State of loading	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
L1 (Light)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.12
L2 (Medium)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.12
L3 (Heavy)	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.12	1.25
L4 (Very Heavy)	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.12	1.25

Selection in Crane Installations (Method-I):

TABLE 6: f4 = Factor for Ambient Temperature without Auxiliary Cooling

Ambient Temp °C	Duration of Operations per Hour in %				
	100	80	60	40	20
10	1.12	1.34	1.57	1.80	2.05
20	1.00	1.2	1.4	1.6	1.8
30	0.88	1.06	1.23	1.41	1.58
40	0.75	0.9	1.05	1.2	1.35
50	0.63	0.76	0.88	1.01	1.13

TABLE 7: f5 = Factor for Ambient Air Velocity

Operating Condition	Air Velocity in m/s	f5
Small Confined Space	≤ 0.5	0.75
Large Space	> 0.5 ≤ 1.4	1
Large Space	> 1.4 ≤ 3.7	1.4
Outdoors	≥ 3.7	1.9

Gearbox Selection:

1 Determine the Nominal Ratio

$$I_N = \frac{n1}{n2}$$

Select appropriate nearest Nominal Ratio i_N

2 Determine required Mechanical Power Capacity

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

3 Check maximum Torque (Starting or braking Torque)

$$P_N \geq \frac{TA \times n1}{9550} \times f3$$

Gear Unit sizes and No. of Reduction stages are given on Rating table (Based upon i_N and P_N)

4 Check whether additional Forces on the Output shaft are Permissible

5. Gear unit is adequate without Auxiliary Cooling, if

$$P_2 \leq P_G = P_T \times f_4 \times f_5$$

I_N	=	Nominal Transmission Ratio
n_1	=	Input speed (rpm)
n_2	=	Output speed (rpm)
P_2	=	Absorbed power of connected Drive Machine (if not known, consider Prime mover's consumed Power)
P_N	=	Mechanical Power Capacity (kW)
T_A	=	Starting Torque or Maximum Input Torque (Nm)
f_1	=	Factors for Driven Machine - Refer TABLE 3 (Page 5)
f_2	=	Factor for Prime Mover = 1 (When driven by Electric of Hydraulic Motor) - Refer TABLE 4 (Page 5)
f_3	=	Peak Torque for Constant Load Direction - Refer TABLE 5a (Page 5) Peak Torque for Alternating Load Direction- Refer TABLE 5b (Page 5)
f_4	=	Factor for Ambient Temperature without Auxiliary Cooling - Refer TABLE 6 (Page 6)
f_5	=	Factor for Ambient Air Velocity - Refer TABLE 7 (Page 6)

Gearbox Selection (Method-I) Example 1:

Prime Mover:	Electric Motor	Driven Machine:	Ladle Crane	Other information
Mech. Power:	77 kW	Speed n_2:	18 rpm	Gearbox required in Parallel shaft
Speed n_1:	960 rpm	Service required:	≤ 25,000 Hrs	Input Shaft: Solid Double Extended
Starting Torque T_A:	1360 Nm	Loading Type:	Medium	Output Shaft: Solid Single Extended
		Load Direction:	Constant Unidirectional	Min. Input to Output Centres required = 650 mm
		Duration of Operation per hour	60%	
		Installation Space	Large Space with Air Velocity < 3m/s	
		Ambient Temp.:	50°C	

Selection:

Gear Unit required Type: Foot Mounted Crane Duty Gearbox with Solid Double Input and Solid Single Output Shaft

Required Transmission Ratio: $I_{red} = n_1 / n_2 = 960 / 18 = 53.3$

Nearest Nominal Ratio from Table: $i_N = 56$

1. Check for Mechanical Power Capacity = $P_2 \times f_1 \times f_2$ where:

P_2 = Power Rating of Driven machine = 77 kW

f_1 = Factor for driven Machine = 1.2 (for L2 Medium Duty Loading & T7 Duration of Service)

f_2 = Factor for Prime Mover = 1.0 (when driven by Electric of Hydraulic Motor)

Therefore, P_2 = 77 x 1.2 x 1 = = 92.4 kW

Selected Gear Unit = KNH3-315, 56/1 with P_N = 95 kW from Page 9

2. Check for Starting Torque = $T_A \times n1 \times f3 / 9550$ where:

T_A = Starting Torque = 1360 Nm

n_1 = Input rpm = 960

f_3 = Factor for Peak Torque = 0.63

Therefore, P_N > 1360 x 960 x 0.63 / 9550 = 86.1 kW

3. Check for Gear Unit Adequacy without Auxiliary Cooling =

P_G = Required Thermal Capacity = PT x f4 x f5 where:

P_T = 130 kW

f_4 = Factor for Ambient Temperature without Aux. Cooling = 0.88

f_5 = Factor for Ambient Air Velocity = 1.4

Therefore, P_T = 130 x 0.88 x 1.4 = 160.1 kW

$P_2 < P_T$ Hence, Selected Gearbox is suitable without Auxiliary Cooling

Selected Gear Unit = Triple Stage, Horizontal Foot Mounted with Double Solid Input & Single Solid Output, KNH3-315, 56/1. Input to Output CD = 700mm

Gearbox Selection (Method-I) Example 2:

Prime Mover:	Electric Motor	Driven Machine:	Main Hoist	Other information
Mech. Power:	9 kW	Speed n_2:	7 rpm	Gearbox required in Parallel shaft
Speed n_1:	960 rpm	Service required:	> 50,000 Hrs	Input Shaft: Solid Double Extended
Starting Torque T_A:	140 Nm	Loading Type:	Very Heavy	Output Shaft: Solid Single Extended
		Load Direction:	Alternating	Min. Input to Output Centres required = 550 mm
		Duration of Operation per hour	80%	
		Installation Space	Large Space with Air Velocity < 3m/s	
		Ambient Temp.:	50°C	

Selection:

Gear Unit required Type: Foot Mounted Crane Duty Gearbox with Solid Double Input and Solid Single Output Shaft

Required Transmission Ratio: $I_{red} = n_1 / n_2 = 960 / 7 = 137.1$

Nearest Nominal Ratio from Table: $i_N = 140$

1. Check for Mechanical Power Capacity = $P_2 \times f_1 \times f_2$ where:

P_2 = Power Rating of Driven machine = 9 kW

f_1 = Factor for driven Machine = 2.0 (for L4 Heavy Duty Loading & T9 Duration of Service)

f_2 = Factor for Prime Mover = 1.0 (when driven by Electric of Hydraulic Motor)

Therefore, P_2 = 9 x 2.0 x 1 = = 18.0 kW

Selected Gear Unit = KNH4-250, 140/1 with P_N = 19 kW from Page 10

2. Check for Starting Torque = $T_A \times n1 \times f3 / 9550$ where:

T_A = Starting Torque = 160 Nm

n_1 = Input rpm = 960

f_3 = Factor for Peak Torque = 1.25

Therefore, P_N > 140 x 960 x 1.25 / 9550 = 17.6 kW

3. Check for Gear Unit Adequacy without Auxiliary Cooling =

P_G = Required Thermal Capacity = PT x f4 x f5 where:

P_T = 65 kW

f_4 = Factor for Ambient Temperature without Aux. Cooling = 0.76

f_5 = Factor for Ambient Air Velocity = 1.4

Therefore, P_T = 65 x 0.76 x 1.4 = 69.1 kW

$P_2 < P_T$ Hence, Selected Gearbox is suitable without Auxiliary Cooling

Selected Gear Unit = Quadruple Stage, Horizontal Foot Mounted with Double Solid Input & Single Solid Output, KNH4-250, 140/1. Input to Output CD = 645 mm

Selection in Crane Installations (Method-II):

As per Indian standard IS:807, Cranes are broadly classified into eight classes in depending on duty and number of hours in service per year.
The new classification of cranes can approximately be compared as following as provided in standard IS:3177:

Old Equivalent	New Classification	Average Working Hours Per Day	Average Total Life in Working Hours, Min	Mech. S.F. Min. 'f6'
I	M1	0.5 - 4	400	1.2
	M2		800	
	M3		1,600	
II	M4	4 - 6	3,200	1.4
	M5		6,300	
III	M6	6 - 9	25,000	1.6
IV	M7	6 - 9	35,000	2.0
	M8	12	75,000	

Gearbox Selection (Method-II) Example 1:

Prime Mover:	**Electric Motor**	**Driven Machine:**	**Main Hoist**	**Other information**
Mech. Power:	9 kW	Speed n_2:	7 rpm	Gearbox required in Parallel shaft
Speed n_1:	960 rpm	Mechanism Class:	M8	Input Shaft: Solid Double Extended
Starting Torque T_A:	140 Nm	Loading Type:	Very Heavy	Output Shaft: Solid Single Extended
		Load Direction:	Alternating	Min. Input to Output Centres required = 550 mm
		Duration of Operation per hour	80%	
		Installation Space	Large Space with Air Velocity < 3m/s	
		Ambient Temp.:	50°C	

Selection:

Gear Unit required Type: Foot Mounted Crane Duty Gearbox with Solid Double Input and Solid Single Output Shaft

Required Transmission Ratio: $I_{red} = n_1 / n_2 = 960 / 7 = 137.1$

Nearest Nominal Ratio from Table: $i_N = 140$

1. Check for Mechanical Power Capacity = $P_2 \times f_6$ where:

P_2 = Power Rating of Driven machine = 9 kW

f_6 = Mech. S.F. Min. = 2.0 (for M8 Mechanism Class)

Therefore, P_2 = 9 x 2.0 = 18.0 kW

Selected Gear Unit = KNH4-250, 140/1 with P_N = 19 kW from Page 10

2. Check for Starting Torque = $T_A \times n1 \times f3 / 9550$ where:

T_A = Starting Torque = 140 Nm

n_1 = Input rpm = 960

f_3 = Factor for Peak Torque = 1.25

Therefore, P_N > 140 x 960 x 1.25 / 9550 = 17.6 kW

3. Check for Gear Unit Adequacy without Auxiliary Cooling =

P_G = Required Thermal Capacity = PT x f4 x f5 where:

P_T = 65 kW

f_4 = Factor for Ambient Temperature without Aux. Cooling = 0.76

f_5 = Factor for Ambient Air Velocity = 1.4

Therefore, P_T = 65 x 0.76 x 1.4 = 69.1 kW

$P_2 < P_T$ Hence, Selected Gearbox is suitable without Auxiliary Cooling

Selected Gear Unit = Quadruple Stage, Horizontal Foot Mounted with Double Solid Input & Single Solid Output, KNH4-250, 140/1. Input to Output CD = 645 mm

Mechanical Power Capacity $P_{N\ (kW)}$ - Triple Reduction

Nom. Ratio iN	Input speed (rpm) n_1	Nom. Output speed (rpm) n_2	Unit - KNH3 / KNV3												
			125	140	160	180	200	225	250	280	315	355	400	450	500
14	1500	107	34	47	66	102	143	205	288	390	560	800	980	-	-
	1000	71	23	31	44	68	95	137	192	260	373	533	653	1067	1233
	750	54	17	24	33	51	72	103	144	195	280	400	490	800	925
16	1500	94	32	42	62	90	136	190	268	362	500	750	950	-	-
	1000	63	21	28	41	60	91	127	179	241	333	500	633	935	1153
	750	47	16	21	31	45	68	95	134	181	250	375	475	701	865
18	1500	83	29	38	55	82	122	168	232	318	452	653	900	-	-
	1000	56	19	25	37	55	81	112	155	212	301	435	600	880	1020
	750	42	15	19	28	41	61	84	116	159	226	327	450	660	765
20	1500	75	26	36	52	77	115	158	220	302	429	587	848	-	-
	1000	50	17	24	35	51	77	105	147	201	286	391	565	810	1000
	750	38	13	18	26	38	58	79	110	151	215	293	424	607	750
22.4	1500	67	23	35	48	69	103	140	194	266	385	533	756	-	-
	1000	45	15	23	32	46	69	94	129	177	257	356	504	721	984
	750	33	12	18	24	35	52	70	97	133	193	267	378	541	738
25	1500	60	20	28	43	61	93	126	174	242	341	475	681	-	-
	1000	40	13	19	28	41	62	84	116	161	227	317	454	639	882
	750	30	10	14	21	30	47	63	87	121	171	237	341	479	662
28	1500	54	19	25	38	55	83	111	153	215	308	427	599	860	1190
	1000	36	13	17	25	36	55	74	102	143	205	285	399	573	794
	750	27	10	13	19	27	41	55	76	107	154	214	300	430	595
31.5	1500	48	17	22	33	50	73	98	138	190	271	375	532	775	1070
	1000	32	11	15	22	33	49	66	92	127	181	250	354	517	714
	750	24	9	11	17	25	37	49	69	95	135	188	266	388	535
35.5	1500	42	14	19	28	43	62	83	117	162	228	328	455	665	927
	1000	28	9	12	19	29	41	55	78	108	152	219	303	444	618
	750	21	7	9	14	22	31	41	59	81	114	164	228	333	464
40	1500	38	12	17	25	38	55	73	103	142	199	303	403	587	816
	1000	25	8.0	11.3	17	25	36	49	69	95	133	202	269	391	544
	750	19	6.0	8.5	13	19	27	37	52	71	99	152	202	293	408
45	1500	33	11	15	23	34	49	66	91	125	176	267	354	511	717
	1000	22	7.3	10.0	15	22	33	44	61	84	117	178	236	340	478
	750	17	5.5	7.5	11	17	25	33	45	63	88	134	177	255	359
50	1500	30	10	13	20	30	43	58	84	112	154	227	311	457	621
	1000	20	6.7	8.9	13	20	28	39	56	75	103	151	207	305	414
	750	15	5.0	6.7	10	15	21	29	42	56	77	114	156	229	311
56	1500	27	9	12	18	27	38	52	72	97	142	211	278	401	556
	1000	18	6	8	12	18	25	35	48	65	95	141	185	267	371
	750	13	5	6	9	13	19	26	36	49	71	106	139	200	278
63	1500	24	8	11	16	23	34	47	68	87	122	188	251	349	502
	1000	16	5.3	7.1	11	16	23	31	45	58	82	125	167	232	334
	750	12	4.0	5.3	8.0	11.7	17.0	23	34	44	61	94	125	174	251
71	1500	21	6	9	13	20	29	39	57	77	114	156	219	312	450
	1000	14	4.0	6.0	9	13	19	26	38	51	76	104	146	208	300
	750	11	3.0	4.5	6.7	10.0	14.5	19.6	28	39	57	78	110	156	225
80	1500	19	5	7	12	17	24	33	48	65	89	127	187	262	357
	1000	13	3.3	4.7	7.7	11.3	16.0	22	32	43	59	85	125	175	238
	750	9	2.5	3.5	5.8	8.5	12.0	16	24	33	45	64	94	131	179

Thermal Capacity P_T (kW)

Nom. Ratio iN	125	140	160	180	200	225	250	280	315	355	400	450	500
	Triple Reduction KNH3 / KNV3												
14 - 22.4	37	41	54	66	81	104	130	160	211	267	338	430	526
25-35.5	30	32	43	52	64	83	103	127	167	212	268	341	418
40-56	23	25	33	41	50	64	80	99	130	165	208	265	325
63-80	20	22	29	36	44	57	72	88	116	147	186	236	289

- *Interpolate for other Input speeds.*

Mechanical Power Capacity $P_{N\ (kW)}$ Quadruple Reduction

Nom. Ratio iN	Input speed (rpm) n_1	Nom. Output speed (rpm) n_2	Unit - KNH4 / KNV4												
			125	140	160	180	200	225	250	280	315	355	400	450	500
50	1500	30.0	-	-	21	30	45	62	85	116	170	235	330	477	659
	1000	20.0	-	-	14	20	30	41	57	77	113	157	220	318	439
	750	15.0	-	-	11	15	23	31	43	58	85	118	165	238	330
56	1500	26.8	-	-	19	26	40	53	74	103	147	204	287	410	569
	1000	17.9	-	-	13	18	26	35	49	68	98	136	191	273	379
	750	13.4	-	-	10	13	20	27	37	51	74	102	143	205	284
63	1500	23.8	-	-	17	24	35	47	66	91	130	180	255	370	512
	1000	15.9	-	-	11	16	23	31	44	61	86	120	170	247	342
	750	11.9	-	-	9	12	18	23	33	45	65	90	127	185	256
71	1500	21.1	-	-	14	22	32	42	60	82	118	165	234	338	461
	1000	14.1	-	-	9	15	22	28	40	54	79	110	156	225	307
	750	10.6	-	-	7	11	16	21	30	41	59	83	117	169	230
80	1500	18.8	-	-	13	19	28	37	53	72	103	145	207	298	406
	1000	12.5	-	-	9	13	19	25	35	48	69	97	138	199	270
	750	9.4	-	-	7	10	14	19	26	36	52	73	104	149	203
90	1500	16.7	-	-	11	17	25	34	48	64	92	132	183	268	369
	1000	11.1	-	-	7	11	17	23	32	43	61	88	122	179	246
	750	8.3	-	-	6	9	12	17	24	32	46	66	91	134	184
100	1500	15.0	-	-	10	15	21	29	41	55	77	115	156	230	320
	1000	10.0	-	-	7	10	14	19	27	36	52	77	104	153	213
	750	7.5	-	-	5	7	11	14	20	27	39	58	78	115	160
112	1500	13.4	-	-	9	13	19	26	37	50	70	101	142	204	285
	1000	8.9	-	-	6	9	13	17	25	33	46	68	95	136	190
	750	6.7	-	-	5	7	10	13	19	25	35	51	71	102	142
125	1500	12.0	-	-	8	12	17	23	32	44	61	91	125	178	251
	1000	8.0	-	-	5	8	11	15	21	29	41	61	83	119	167
	750	6.0	-	-	4	6	9	12	16	22	31	46	62	89	125
140	1500	10.7	-	-	7	11	15	20	29	40	55	82	111	157	221
	1000	7.1	-	-	5	7	10	14	19	27	37	55	74	104	147
	750	5.4	-	-	3.5	5.3	7.7	10.2	14.4	20.0	28	41	55	78	110
160	1500	9.4	-	-	6	9	13	18	25	35	49	73	98	141	192
	1000	6.3	-	-	4	6	9	12	17	23	33	49	65	94	128
	750	4.7	-	-	3.0	4.7	6.7	9.0	12.7	17.4	25	37	49	70	96
180	1500	8.3	-	-	5	8	12	16	23	31	44	64	86	124	169
	1000	5.6	-	-	3.3	5.6	8.0	10.8	15.3	20.8	29	43	58	83	112
	750	4.2	-	-	2.5	4.2	6.0	8.1	11.5	15.6	22	32	43	62	84
200	1500	7.5	-	-	4	7	10	13	20	24	39	54	74	111	151
	1000	5.0	-	-	2.7	4.7	6.7	8.7	13.3	16.0	26	36	49	74	101
	750	3.8	-	-	2.0	3.5	5.1	6.5	10.0	12.0	20	27	37	56	76
224	1500	6.7	-	-	4	6	9	12	18	23	34	47	66	98	135
	1000	4.5	-	-	2.7	4.1	6.1	8.0	12.0	15.3	23	31	44	65	90
	750	3.3	-	-	2.0	3.1	4.6	6.0	9.0	11.5	17	24	33	49	68
250	1500	6.0	-	-	3	5	8	11	16	21	31	42	57	86	120
	1000	4.0	-	-	2.0	3.3	5.4	7.3	10.7	14.0	21	28	38	57	80
	750	3.0	-	-	1.5	2.5	4.1	5.5	8.0	10.5	16	21	29	43	60
280	1500	5.4	-	-	3.0	5.0	7.2	9.0	14.0	18.0	27	38	51	78	107
	1000	3.6	-	-	2.0	3.3	4.8	6.0	9.3	12.0	18	25	34	52	71
	750	2.7	-	-	1.5	2.5	3.6	4.5	7.0	9.0	14	19	26	39	53
315	1500	4.8	-	-	3.0	4.0	6.0	8.0	12.0	16.0	25	34	46	69	99
	1000	3.2	-	-	2.0	2.7	4.0	5.3	8.0	10.7	17	23	31	46	66
	750	2.4	-	-	1.5	2.0	3.0	4.0	6.0	8.0	13	17	23	35	50

Thermal Capacity P_T (kW)

Nom. Ratio iN	125	140	160	180	200	225	250	280	315	355	400	450	500
	Quadruple Reduction KNH4 / KNV4												
50-80	-	-	43	53	65	84	105	129	170	216	272	346	425
90-125	-	-	34	42	52	67	83	103	135	171	216	275	337
140-200	-	-	27	33	40	52	65	80	105	133	168	214	262
225-315	-	-	24	29	36	46	58	71	93	118	150	190	233

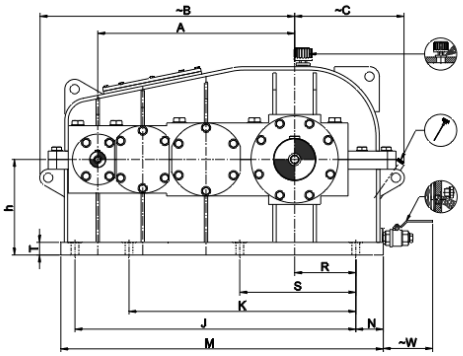
- *Interpolate for other Input speeds.*

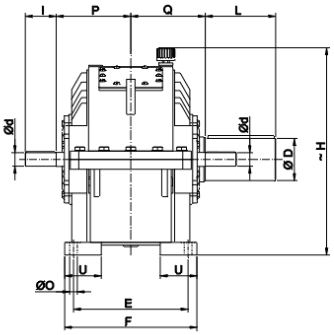
Rated Output Torque T2 (kNm)

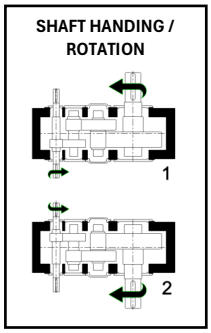
Nom. Ratio	Unit - KNH3 / KNV3												
	125	140	160	180	200	225	250	280	315	355	400	450	500
14	3.0	4.1	5.8	9.1	12.7	18.2	25.7	34.8	49.9	71.4	87.4	142.8	165.1
16	3.2	4.2	6.2	9.1	13.8	19.3	27.2	36.7	50.7	76.1	96.5	142.4	175.7
18	3.3	4.3	6.3	9.4	14.0	19.3	26.6	36.5	52.0	75.1	103.5	151.8	176.0
20	3.3	4.5	6.6	9.7	14.6	20.1	28.0	38.4	54.6	74.7	107.9	154.6	191.0
22.4	3.2	5.0	6.8	9.8	14.6	19.9	27.6	37.9	54.8	76.0	107.7	154.2	210.4
25	3.1	4.5	6.7	9.6	14.8	20.0	27.6	38.4	54.3	75.5	108.4	152.5	210.5
28	3.3	4.4	6.6	9.6	14.5	19.5	27.0	37.9	54.4	75.5	105.9	152.1	210.5
31.5	3.3	4.4	6.5	9.8	14.5	19.5	27.3	37.8	53.8	74.6	105.7	154.2	212.9
35.5	3.1	4.2	6.3	9.8	14.0	18.8	26.6	36.8	51.9	74.5	103.4	151.2	210.8
40	3.0	4.2	6.3	9.5	13.7	18.3	25.9	35.7	49.9	76.1	101.3	147.4	204.9
45	3.1	4.3	6.5	9.6	14.2	19.0	26.2	36.2	50.8	77.2	102.3	147.7	207.4
50	3.1	4.2	6.4	9.5	13.5	18.4	26.7	35.6	48.9	72.3	99.0	145.5	197.7
56	3.1	4.2	6.4	9.4	13.4	18.3	25.4	34.3	50.2	74.6	98.3	141.6	196.6
63	3.1	4.2	6.3	9.3	13.4	18.6	27.0	34.7	48.6	74.8	99.8	138.7	199.5
71	2.7	4.0	6.0	9.0	13.1	17.8	25.7	35.0	51.8	70.9	99.5	142.0	204.5
80	2.5	3.5	5.7	8.5	12.0	16.5	24.1	32.6	44.7	63.8	93.9	131.6	179.5

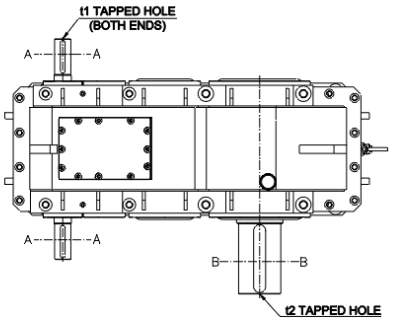
Nom. Ratio	Unit - KNH4 / KNV4												
	125	140	160	180	200	225	250	280	315	355	400	450	500
50	-	-	6.6	9.5	14.4	19.6	27.0	36.9	54.0	74.9	105.0	151.7	209.8
56	-	-	6.7	9.3	14.1	18.9	26.1	36.5	52.4	72.7	102.1	146.1	202.6
63	-	-	6.8	9.5	14.0	18.8	26.5	36.4	52.0	72.0	102.1	148.3	205.5
71	-	-	6.3	9.9	14.6	19.0	27.1	36.9	53.5	74.7	105.8	153.0	208.6
80	-	-	6.6	9.8	14.2	18.8	26.8	36.4	52.3	73.8	105.2	151.3	205.9
90	-	-	6.2	9.7	14.1	19.5	27.2	36.7	52.3	75.4	104.4	153.2	210.9
100	-	-	6.3	11.7	13.5	18.3	25.9	34.8	49.2	73.2	99.5	146.4	203.6
112	-	-	6.4	9.4	13.6	18.2	26.3	35.2	49.5	72.2	101.4	145.3	202.9
125	-	-	6.3	9.3	13.6	18.3	25.4	34.7	48.8	72.4	99.3	141.5	199.5
140	-	-	6.2	9.3	13.6	18.1	25.6	35.7	49.0	73.1	98.9	139.8	196.8
160	-	-	6.0	9.5	13.5	18.2	25.8	35.2	49.7	74.1	99.0	142.7	194.5
180	-	-	5.7	9.6	13.8	18.6	26.4	35.8	50.6	73.6	99.2	142.6	193.8
200	-	-	5.0	8.9	12.8	16.5	25.4	30.5	49.6	68.7	94.2	141.4	192.5
224	-	-	5.7	8.8	12.9	17.1	25.6	32.7	48.1	66.9	94.0	138.9	192.8
250	-	-	4.7	7.9	12.8	17.5	25.4	33.4	49.3	66.8	90.7	137.2	190.2
280	-	-	5.3	8.8	12.7	15.9	24.7	31.8	48.1	67.2	90.1	137.0	189.0
315	-	-	5.9	7.9	11.9	15.9	23.8	31.8	49.7	67.6	91.5	137.2	196.9

Dimensions Horizontal Unit - KNH3 (mm)

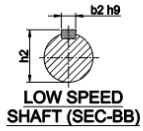










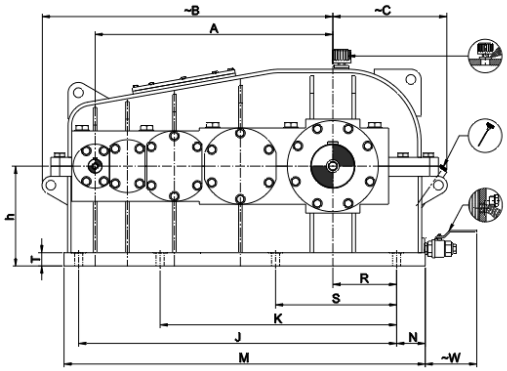


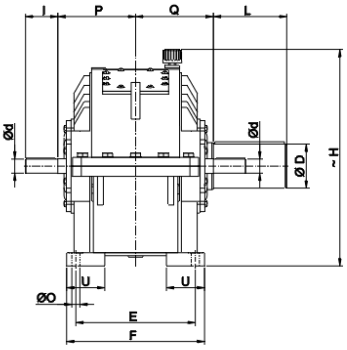
Unit	Input Shaft						Output Shaft					
	d	l	P	b1	h1	t1	D	L	Q	b2	h2	t2
KNH3-125	24	50	125	8.000 / 7.964	27.00 / 26.80	M8x19	60	105	125	18.000 / 17.957	64.0 / 63.8	M20x42
KNH3-140	24	50	135	8.000 / 7.964	27.00 / 26.80	M8x19	65	105	135	18.000 / 17.957	69.0 / 68.8	M20x42
KNH3-160	29	60	150	8.000 /7.964	32.00 / 31.80	M10x22	75	105	150	20.000 / 19.948	79.5 / 79.3	M20x42
KNH3-180	29	60	160	8.000 /7.964	32.00 / 31.80	M10x22	85	130	160	22.000 / 21.948	90.0 / 89.8	M20x42
KNH3-200	34	80	175	10.000 / 9.964	37.00 / 36.80	M12x28	100	165	175	28.000 / 27.948	106.0 / 105.8	M24x50
KNH3-225	39	80	195	12.000 / 11.957	42.00 / 41.80	M16x36	110	165	195	28.000 / 27.948	116.0 / 115.8	M24x50
KNH3-250	49	110	215	14.000 / 13.957	52.50 / 52.30	M16x36	110	165	215	28.000 / 27.948	116.0 / 115.8	M24x50
KNH3-280	54	110	230	16.000 / 15.957	58.00 / 57.80	M20x42	120	165	230	32.000 / 31.938	127.0 / 126.8	M24x50
KNH3-315	59	110	265	18.000 / 17.957	63.00 / 62.80	M20x42	140	200	265	36.000 / 35.938	148.0 / 147.8	M30x60
KNH3-355	72	140	295	20.000 / 19.948	76.50 / 76.30	M20x42	160	240	295	40.000 / 39.938	169.0 / 168.7	M30x60
KNH3-400	80	170	325	22.000 / 21.948	85.00 / 84.80	M20x42	180	280	325	45.000 / 44.938	190.0 / 189.7	M30x60
KNH3-450	90	170	360	25.000 / 24.948	95.00 / 94.80	M24x50	210	280	360	50.000 / 49.938	221.0 / 220.7	M30x60
KNH3-500	100	210	390	28.000 / 27.948	106.00 / 105.80	M24x50	230	280	390	50.000 / 49.938	241.0 / 240.7	M36x74

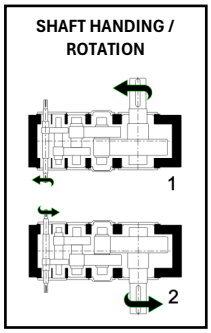
Unit	Foundation																
	A	~ B	~C	E	F	h	~ H	R	S	K	J	M	N	O	T	U	~W
KNH3-125	278	385	180	185	210	140	330	105	185	-	430	470	20	14	18	50	185
KNH3-140	311	425	200	195	220	150	350	115	205	-	470	520	25	14	20	55	185
KNH3-160	350	475	220	220	260	170	390	130	235	-	525	585	30	18	24	60	185
KNH3-180	395	520	245	240	280	190	430	145	260	-	580	650	35	18	24	65	185
KNH3-200	440	575	270	270	310	215	480	160	290	-	640	720	40	22	30	70	185
KNH3-225	495	650	295	300	340	240	540	185	330	-	735	815	40	22	30	85	185
KNH3-250	555	725	325	330	380	270	600	205	360	-	820	910	45	27	36	100	185
KNH3-280	620	810	360	360	410	300	660	230	405	-	920	1020	50	27	36	115	185
KNH3-315	700	905	405	410	470	340	740	260	460	710	1030	1140	55	33	45	130	185
KNH3-355	785	1010	445	460	530	370	805	295	520	785	1165	1285	60	33	45	140	185
KNH3-400	880	1140	505	490	570	425	915	335	580	890	1315	1445	65	39	55	155	185
KNH3-450	990	1275	560	560	640	470	1005	380	680	1000	1485	1625	70	39	55	170	185
KNH3-500	1105	1410	615	610	700	530	1125	430	720	1200	1670	1810	70	45	58	180	185

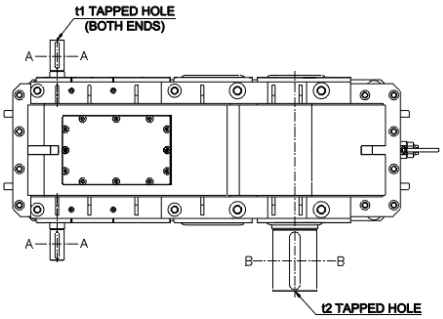
- Key and Keyways for shaft conform to IS 2048 / DIN 6885-1 / ISO/R773.
- Shaft centering conform to DIN 332/2 Form DS (with threads)

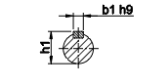
Dimensions Horizontal Unit - KNH4 (mm)



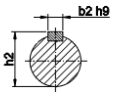








HIGH SPEED SHAFT (SEC-AA)



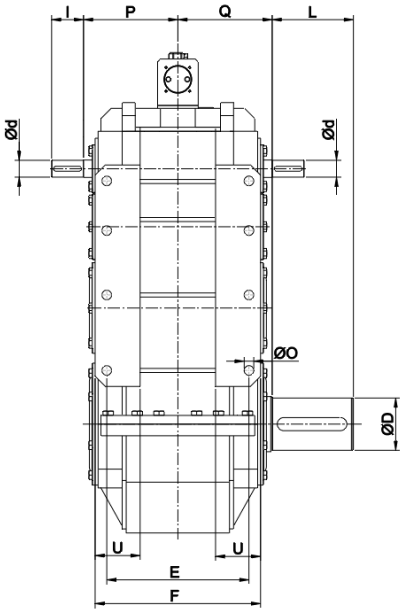
LOW SPEED SHAFT (SEC-BB)

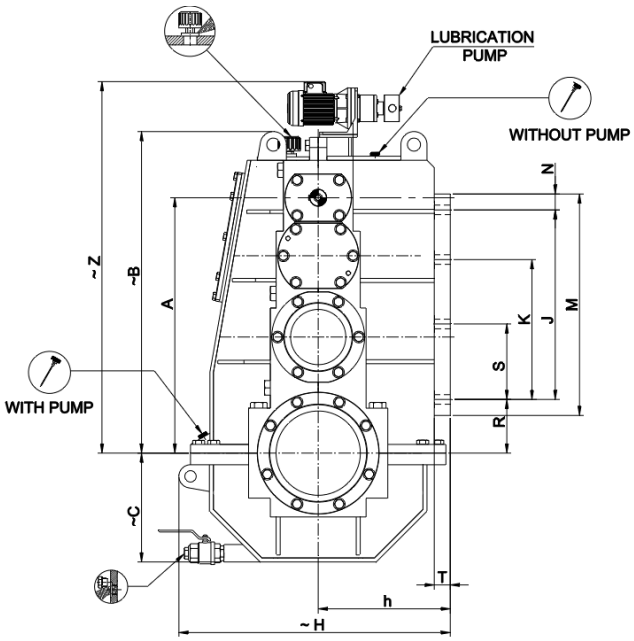
Unit	Input Shaft						Output Shaft					
	d	l	P	b1	h1	t1	D	L	Q	b2	h2	t2
KNH4-160	24	50	150	8.000 / 7.964	27.00 / 26.80	M8x19	75	105	150	20.000 / 19.948	79.5 / 79.3	M20x42
KNH4-180	24	50	160	8.000 / 7.964	27.00 / 26.80	M8x19	85	130	160	22.000 / 21.948	90.0 / 89.8	M20x42
KNH4-200	29	60	175	8.000 / 7.964	32.00 / 31.80	M10x22	100	165	175	28.000 / 27.948	106.0 / 105.8	M24x50
KNH4-225	29	60	195	8.000 / 7.964	32.00 / 31.80	M10x22	110	165	195	28.000 / 27.948	116.0 / 115.8	M24x50
KNH4-250	34	80	215	10.000 / 9.964	37.00 / 36.80	M12x28	110	165	215	28.000 / 27.948	116.0 / 115.8	M24x50
KNH4-280	39	80	230	12.000 / 11.957	42.00 / 41.80	M16x36	120	165	230	32.000 / 31.938	127.0 / 126.8	M24x50
KNH4-315	48	110	265	14.000 / 13.957	51.50 / 51.30	M16x36	140	200	265	36.000 / 35.938	148.0 / 147.8	M30x60
KNH4-355	52	110	295	16.000 / 15.957	56.00 / 55.80	M20x42	160	240	295	40.000 / 39.938	169.0 / 168.7	M30x60
KNH4-400	58	110	325	16.000 / 15.957	62.00 / 61.80	M20x42	180	280	325	45.000 / 44.938	190.0 / 189.7	M30x60
KNH4-450	62	140	360	18.000 / 17.957	66.00 / 65.80	M20x42	210	280	360	50.000 / 49.938	221.0 / 220.7	M30x60
KNH4-500	67	140	390	20.000 / 19.948	71.50 / 71.3	M20x42	230	280	390	50.000 / 49.938	241.0 / 240.7	M36x74

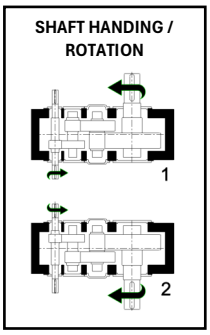
Unit	Foundation																
	A	~ B	~C	E	F	h	~ H	R	S	K	J	M	N	O	T	U	~W
KNH4-160	413	535	220	220	260	170	390	130	320	-	585	645	30	18	24	60	185
KNH4-180	466	590	245	240	280	190	430	145	260	-	650	720	35	18	24	65	185
KNH4-200	511	645	270	270	310	215	480	160	290	-	710	790	40	22	30	70	185
KNH4-225	575	720	295	300	340	240	540	185	330	-	810	890	40	22	30	85	185
KNH4-250	645	805	325	330	380	270	600	205	390	-	900	990	45	27	36	100	185
KNH4-280	720	900	360	360	410	300	660	230	405	-	1005	1105	50	27	36	115	185
KNH4-315	810	1005	405	410	470	340	740	260	460	710	1130	1240	55	33	45	130	185
KNH4-355	910	1120	445	460	530	370	805	295	520	785	1270	1390	60	33	45	140	185
KNH4-400	1020	1255	505	490	570	425	915	335	580	950	1435	1565	65	39	55	155	185
KNH4-450	1150	1405	560	560	640	470	1005	380	680	1000	1615	1755	70	39	55	170	185
KNH4-500	1285	1560	615	610	700	530	1125	430	720	1270	1810	1950	70	45	58	180	185

- Key and Keyways for shaft conform to IS 2048 / DIN 6885-1 / ISO/R773.
- Shaft centering conform to DIN 332/2 Form DS (with threads)

Dimensions Vertical Unit - KNV3 (mm)





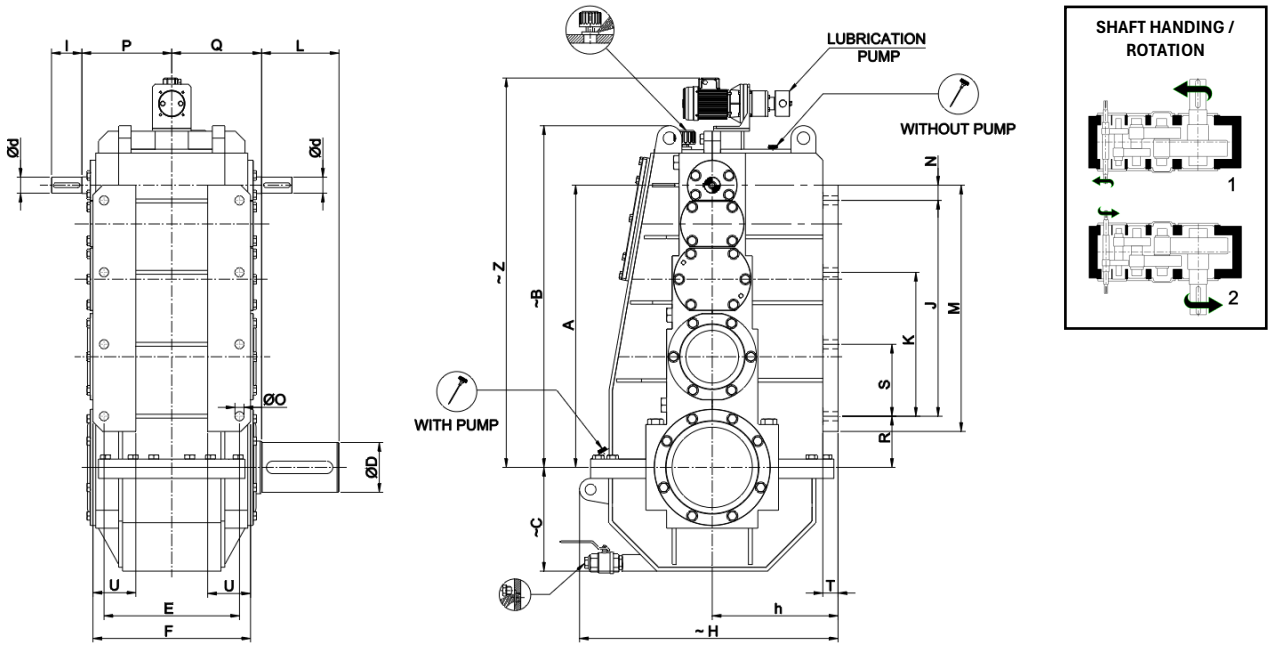


Unit	Input Shaft						Output Shaft					
	d	l	P	b1	h1	t1	D	L	Q	b2	h2	t2
KNV3-125	24	50	125	8.000 / 7.964	27.00 / 26.80	M8x19	60	105	125	18.000 / 17.957	64.0 / 63.8	M20x42
KNV3-140	24	50	135	8.000 / 7.964	27.00 / 26.80	M8x19	65	105	135	18.000 / 17.957	69.0 / 68.8	M20x42
KNV3-160	29	60	150	8.000 /7.964	32.00 / 31.80	M10x22	75	105	150	20.000 / 19.948	79.5 / 79.3	M20x42
KNV3-180	29	60	160	8.000 /7.964	32.00 / 31.80	M10x22	85	130	160	22.000 / 21.948	90.0 / 89.8	M20x42
KNV3-200	34	80	175	10.000 / 9.964	37.00 / 36.80	M12x28	100	165	175	28.000 / 27.948	106.0 / 105.8	M24x50
KNV3-225	39	80	195	12.000 / 11.957	42.00 / 41.80	M16x36	110	165	195	28.000 / 27.948	116.0 / 115.8	M24x50
KNV3-250	49	110	215	14.000 / 13.957	52.50 / 52.30	M16x36	110	165	215	28.000 / 27.948	116.0 / 115.8	M24x50
KNV3-280	54	110	230	16.000 / 15.957	58.00 / 57.80	M20x42	120	165	230	32.000 / 31.938	127.0 / 126.8	M24x50
KNV3-315	59	110	265	18.000 / 17.957	63.00 / 62.80	M20x42	140	200	265	36.000 / 35.938	148.0 / 147.8	M30x60
KNV3-355	72	140	295	20.000 / 19.948	76.50 / 76.30	M20x42	160	240	295	40.000 / 39.938	169.0 / 168.7	M30x60
KNV3-400	80	170	325	22.000 / 21.948	85.00 / 84.80	M20x42	180	280	325	45.000 / 44.938	190.0 / 189.7	M30x60
KNV3-450	90	170	360	25.000 / 24.948	95.00 / 94.80	M24x50	210	280	360	50.000 / 49.938	221.0 / 220.7	M30x60

Unit	Foundation																
	A	~ B	~C	E	F	h	~ H	R	S	K	J	M	N	O	T	U	~Z
KNV3-125	278	380	120	185	210	155	325	60	115	-	230	270	20	14	18	50	-
KNV3-140	311	420	135	195	220	175	365	70	125	-	250	290	20	14	20	55	-
KNV3-160	350	460	150	220	260	190	400	75	140	-	280	330	25	18	24	60	-
KNV3-180	395	510	170	240	280	210	440	80	160	-	320	370	25	18	24	65	-
KNV3-200	440	565	185	270	310	235	490	90	180	-	360	420	30	22	30	70	-
KNV3-225	495	640	210	300	340	260	540	95	135	270	405	465	30	22	30	85	815
KNV3-250	555	710	235	330	380	290	605	115	150	300	450	520	35	27	36	100	885
KNV3-280	620	795	265	360	410	325	675	120	170	340	510	590	40	27	36	115	975
KNV3-315	700	885	295	410	470	360	750	140	190	380	570	660	45	33	45	130	1060
KNV3-355	785	980	335	460	530	400	830	145	215	430	645	735	45	33	45	140	1165
KNV3-400	880	1095	375	490	570	455	940	175	240	480	720	830	55	39	55	155	1275
KNV3-450	990	1230	420	560	640	500	1035	185	275	550	825	935	55	39	55	170	1395

- Key and Keyways for shaft conform to IS 2048 / DIN 6885-1 / ISO/R773.
- Shaft centering conform to DIN 332/2 Form DS (with threads)

Dimensions Vertical Unit - KNV4 (mm)

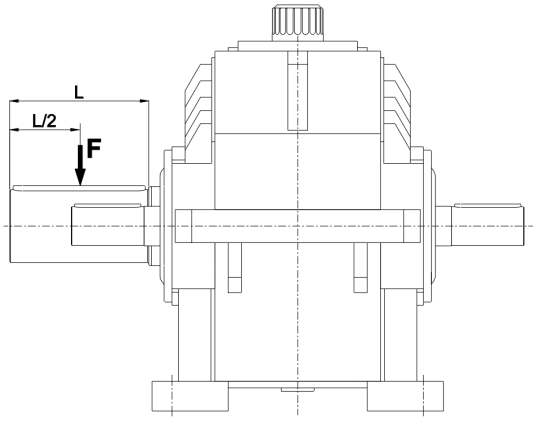


Unit	Input Shaft						Output Shaft					
	d	l	P	b1	h1	t1	D	L	Q	b2	h2	t2
KNV4-160	24	50	150	8.000 / 7.964	27.00 / 26.80	M8x19	75	105	150	20.000 / 19.948	79.5 / 79.3	M20x42
KNV4-180	24	50	160	8.000 / 7.964	27.00 / 26.80	M8x19	85	130	160	22.000 / 21.948	90.0 / 89.8	M20x42
KNV4-200	29	60	175	8.000 / 7.964	32.00 / 31.80	M10x22	100	165	175	28.000 / 27.948	106.0 / 105.8	M24x50
KNV4-225	29	60	195	8.000 / 7.964	32.00 / 31.80	M10x22	110	165	195	28.000 / 27.948	116.0 / 115.8	M24x50
KNV4-250	34	80	215	10.000 / 9.964	37.00 / 36.80	M12x28	110	165	215	28.000 / 27.948	116.0 / 115.8	M24x50
KNV4-280	39	80	230	12.000 / 11.957	42.00 / 41.80	M16x36	120	165	230	32.000 / 31.938	127.0 / 126.8	M24x50
KNV4-315	48	110	265	14.000 / 13.957	51.50 / 51.30	M16x36	140	200	265	36.000 / 35.938	148.0 / 147.8	M30x60
KNV4-355	52	110	295	16.000 / 15.957	56.00 / 55.80	M20x42	160	240	295	40.000 / 39.938	169.0 / 168.7	M30x60
KNV4-400	58	110	325	16.000 / 15.957	62.00 / 61.80	M20x42	180	280	325	45.000 / 44.938	190.0 / 189.7	M30x60
KNV4-450	62	140	360	18.000 / 17.957	66.00 / 65.80	M20x42	210	280	360	50.000 / 49.938	221.0 / 220.7	M30x60

Unit	Foundation																
	A	~ B	~C	E	F	h	~ H	R	S	K	J	M	N	O	T	U	~Z
KNV4-160	413	525	150	220	260	190	400	75	140	-	280	330	25	18	24	60	-
KNV4-180	466	580	170	240	280	210	440	80	160	-	320	370	25	18	24	65	-
KNV4-200	511	635	185	270	310	235	490	90	180	-	360	420	30	22	30	70	-
KNV4-225	575	720	210	300	340	260	540	95	135	270	405	465	30	22	30	85	895
KNV4-250	645	800	235	330	380	290	605	115	150	300	450	520	35	27	36	100	975
KNV4-280	720	895	265	360	410	325	675	120	170	340	510	590	40	27	36	115	1075
KNV4-315	810	995	295	410	470	360	750	140	190	380	570	660	45	33	45	130	1170
KNV4-355	910	1105	335	460	530	400	830	145	215	430	645	735	45	33	45	140	1290
KNV4-400	1020	1235	375	490	570	455	940	175	240	480	720	830	55	39	55	155	1415
KNV4-450	1150	1390	420	560	640	500	1035	185	275	550	825	935	55	39	55	170	1555

Permissible Overhung Loads (kN): Low Speed Shafts

- The Maximum Overhung Load not to be exceeded as per below Table if any External Drum or Pulley is mounted on the Low Speed Shaft
- If the Overhung Load is exceeded, the External Drum or Pulley to be mounted on a Separate Shaft and should have support on its own bearings.



GearboxType	Output Shaft	Gear Units												
		125	140	160	180	200	225	250	280	315	355	400	450	500
Triple Reduction	Reinforced	16	17	24	32	47	58	66	70	87	115	155	185	210
	Standard	10	11	14	19	27	36	41	33	41	58	98	110	135
Quadruple Reduction	Reinforced	-	-	22	30	42	54	56	72	99	96	123	125	118
	Standard	-	-	12	16	23	31	29	32	58	36	36	40	38

Actual (Exact) Ratio

Type	Nom. Ratio iN	125	140	160	180	200	225	250	280	315	355	400	450	500
KNH3 / KNV3	14	13.817	14.375	14.333	14.284	14.323	13.918	13.947	14.260	13.889	14.019	14.029	14.360	14.063
	16	15.659	15.882	15.938	15.882	15.729	15.658	15.621	15.770	15.625	15.588	15.599	16.348	15.820
	18	17.225	18.137	18.457	18.338	17.791	18.015	17.972	18.115	18.095	17.998	18.170	17.432	18.428
	20	19.991	19.723	20.566	20.219	19.788	19.688	19.513	19.699	19.775	19.972	19.758	20.039	20.039
	22.4	22.343	22.318	22.412	22.335	22.044	22.132	22.080	22.290	21.973	21.921	22.098	22.412	22.676
	25	24.844	24.816	25.214	25.313	24.355	24.609	24.551	24.479	24.719	24.551	24.438	25.214	25.214
	28	27.337	27.918	28.477	28.059	27.399	27.891	27.853	27.495	27.344	27.215	27.696	28.015	27.949
	31.5	30.694	31.347	32.273	30.874	30.824	31.500	30.874	30.931	30.990	30.874	31.108	30.990	30.982
	35.5	34.786	35.443	36.450	34.991	35.035	36.070	34.991	34.820	35.039	34.991	35.350	34.635	34.627
	40	39.381	39.381	40.464	39.656	39.612	40.738	39.656	39.576	40.123	39.656	39.794	39.161	39.243
	45	44.340	44.014	44.805	44.894	44.014	45.225	44.944	44.747	45.315	44.944	45.230	44.843	44.476
	50	49.624	49.149	50.076	50.029	50.657	51.088	50.770	49.968	51.628	50.085	51.261	49.920	51.189
	56	55.129	54.832	55.965	55.991	56.567	57.098	56.578	57.510	58.321	56.578	57.241	56.874	57.045
	63	62.805	61.737	63.482	63.990	63.465	63.182	62.606	63.841	64.660	63.223	63.340	65.068	63.123
	71	69.989	71.055	71.712	72.285	70.869	71.984	69.768	72.353	71.980	72.766	72.208	71.917	69.768
	80	79.988	79.719	79.353	79.988	78.670	79.809	77.963	80.063	82.350	80.520	79.809	82.191	79.734
Type	Nom. Ratio iN	125	140	160	180	200	225	250	280	315	355	400	450	500
KNH4 / KNV4	50	-	-	50.481	50.506	49.319	49.583	49.516	50.137	48.931	48.701	49.562	49.805	49.688
	56	-	-	55.529	57.676	56.321	57.422	57.171	56.707	56.296	56.031	56.932	57.678	57.369
	63	-	-	62.933	63.464	63.361	64.853	63.374	63.796	63.802	63.565	63.944	63.802	63.594
	71	-	-	73.040	69.013	68.901	72.265	69.874	70.960	69.727	69.013	69.536	69.727	70.569
	80	-	-	81.084	78.215	77.904	81.617	79.190	80.653	79.843	78.215	78.278	78.838	79.978
	90	-	-	90.624	88.507	88.155	88.941	87.478	89.844	89.758	88.507	88.578	87.597	87.781
	100	-	-	102.351	100.308	100.196	101.846	99.141	101.139	101.487	100.308	100.656	97.903	98.108
	112	-	-	113.806	111.534	111.410	114.576	112.360	111.744	112.845	111.534	110.540	110.141	109.881
	125	-	-	126.014	126.265	123.789	127.195	127.341	126.346	127.448	126.405	125.638	126.121	124.532
	140	-	-	141.489	141.771	138.991	144.155	140.120	142.139	143.942	140.120	141.343	142.937	141.276
	160	-	-	158.135	157.988	159.971	162.841	158.283	158.722	163.996	156.147	160.189	159.119	162.601
	180	-	-	178.048	176.574	178.791	180.309	179.188	176.357	182.057	176.967	181.120	179.710	184.281
	200	-	-	201.129	199.464	199.650	205.429	199.685	199.872	202.668	203.679	206.477	198.627	203.679
	224	-	-	224.780	223.233	222.942	229.597	222.527	230.041	228.939	230.082	230.566	226.300	226.977
	250	-	-	249.717	249.044	248.720	256.596	249.044	256.879	255.874	256.400	265.369	255.635	256.400
	280	-	-	284.888	283.721	280.042	291.065	284.622	288.199	283.139	283.721	294.579	283.421	286.517
	315	-	-	323.156	324.253	314.187	322.080	314.951	319.923	313.915	317.048	325.969	324.253	317.048

GD^2 value kg-m^2

Type	Nom. Ratio iN	125	140	160	180	200	225	250	280	315	355	400	450	500
KNH3 /KNV3	14	0.0065	0.0108	0.0204	0.0368	0.0614	0.1167	0.2099	0.3540	0.6609	1.1321	2.0877	3.5634	6.3707
	16	0.0058	0.0098	0.0186	0.0335	0.0561	0.1049	0.1899	0.3201	0.5962	1.0312	1.9051	3.1986	5.7149
	18	0.0050	0.0080	0.0150	0.0265	0.0464	0.0847	0.1536	0.2596	0.4801	0.8152	1.5117	2.8695	4.5189
	20	0.0040	0.0071	0.0127	0.0226	0.0391	0.0744	0.1366	0.2291	0.4213	0.6962	1.3418	2.3506	4.0011
	22.4	0.0034	0.0058	0.0113	0.0196	0.0330	0.0625	0.1138	0.1901	0.3567	0.6052	1.1483	1.9878	3.3306
	25	0.0030	0.0050	0.0095	0.0162	0.0285	0.0540	0.0984	0.1654	0.3027	0.5136	0.9929	1.6929	2.8771
	28	0.0028	0.0046	0.0087	0.0150	0.0264	0.0495	0.0902	0.1519	0.2824	0.4775	0.9162	1.5798	2.6877
	31.5	0.0023	0.0039	0.0074	0.0132	0.0223	0.0420	0.0785	0.1300	0.2380	0.3960	0.7850	1.3767	2.3333
	35.5	0.0023	0.0038	0.0072	0.0129	0.0218	0.0411	0.0770	0.1272	0.2334	0.3876	0.7682	1.3499	2.2885
	40	0.0021	0.0036	0.0068	0.0121	0.0205	0.0387	0.0724	0.1191	0.2184	0.3632	0.7241	1.2721	2.1501
	45	0.0019	0.0031	0.0060	0.0102	0.0178	0.0340	0.0628	0.1029	0.1892	0.3097	0.6284	1.0887	1.8565
	50	0.0018	0.0030	0.0058	0.0097	0.0168	0.0322	0.0597	0.0980	0.1792	0.2948	0.6004	1.0423	1.7521
	56	0.0016	0.0026	0.0051	0.0084	0.0146	0.0287	0.0530	0.0834	0.1558	0.2529	0.5342	0.9009	1.5475
	63	0.0015	0.0025	0.0049	0.0080	0.0141	0.0277	0.0512	0.0806	0.1510	0.2434	0.5179	0.8641	1.4987
	71	0.0015	0.0025	0.0048	0.0079	0.0139	0.0274	0.0508	0.0799	0.1498	0.2408	0.5132	0.8582	1.4881
	80	0.0015	0.0024	0.0048	0.0079	0.0138	0.0273	0.0505	0.0794	0.1486	0.2392	0.5102	0.8514	1.4759
Type	Nom. Ratio iN	125	140	160	180	200	225	250	280	315	355	400	450	500
KNH4 / KNV4	50	-	-	0.0050	0.0083	0.0126	0.0214	0.0394	0.0647	0.1281	0.2208	0.3755	0.6932	1.2115
	56	-	-	0.0044	0.0068	0.0104	0.0172	0.0313	0.0536	0.1048	0.1786	0.3044	0.5564	0.9623
	63	-	-	0.0041	0.0064	0.0095	0.0154	0.0286	0.0484	0.0944	0.1594	0.2734	0.5086	0.8784
	71	-	-	0.0034	0.0057	0.0085	0.0131	0.0247	0.0411	0.0842	0.1425	0.2426	0.4480	0.7565
	80	-	-	0.0033	0.0055	0.0082	0.0126	0.0237	0.0394	0.0810	0.1373	0.2331	0.4315	0.7279
	90	-	-	0.0029	0.0046	0.0070	0.0112	0.0207	0.0336	0.0698	0.1158	0.1957	0.3684	0.6395
	100	-	-	0.0029	0.0046	0.0069	0.0111	0.0206	0.0333	0.0693	0.1148	0.1936	0.3650	0.6339
	112	-	-	0.0026	0.0040	0.0061	0.0095	0.0174	0.0291	0.0615	0.1005	0.1702	0.3129	0.5465
	125	-	-	0.0025	0.0038	0.0058	0.0089	0.0162	0.0271	0.0578	0.0937	0.1578	0.2898	0.5092
	140	-	-	0.0022	0.0032	0.0050	0.0075	0.0144	0.0233	0.0508	0.0827	0.1371	0.2477	0.4310
	160	-	-	0.0022	0.0031	0.0049	0.0073	0.0141	0.0228	0.0498	0.0811	0.1342	0.2431	0.4206
	180	-	-	0.0019	0.0028	0.0044	0.0066	0.0122	0.0201	0.0449	0.0711	0.1172	0.2123	0.3649
	200	-	-	0.0019	0.0028	0.0044	0.0065	0.0122	0.0200	0.0448	0.0707	0.1167	0.2116	0.3637
	224	-	-	0.0019	0.0027	0.0042	0.0062	0.0116	0.0189	0.0430	0.0675	0.1115	0.2009	0.3482
	250	-	-	0.0017	0.0024	0.0039	0.0055	0.0103	0.0167	0.0394	0.0605	0.0964	0.1766	0.3049
	280	-	-	0.0017	0.0023	0.0038	0.0053	0.0099	0.0161	0.0384	0.0587	0.0934	0.1714	0.2951
	315	-	-	0.0017	0.0023	0.0037	0.0053	0.0098	0.0160	0.0381	0.0582	0.0927	0.1697	0.2929

- GD^2 Values referred to High Speed (Input) Shaft. For Values other than High Speed Shafts, Refer ICIL

Oil Capacity approx. (litres)

Unit Type	Oil Capacity - Horizontal Units												
	125	140	160	180	200	225	250	280	315	355	400	450	500
KNH3	4.5	5.5	7.5	11.5	16	21	31	43	64	85	117	168	245
KNH4	-	-	9.0	13.5	18	25	35	48	70	96	134	191	275
Unit Type	**Oil Capacity - Vertical Units**												
	125	140	160	180	200	*225	*250	*280	*315	*355	*400	*450	500
KNV3	6	7.5	10.5	15	21	11	14	21	31	43	60	82	-
KNV4	-	-	12.5	18	24	11	14	21	31	43	60	82	-

*** Units with In-built Motorised Pumps**

Lubricant specification

Viscosity Grade ISO-VG at 40 °C in mm2/s (cSt)	Recommended Lubricants							
	Indian Oil	Bharat Petroleum	Hindustan Petroleum	Mobilgear	Castrol	Klüber	Shell	BP Energol
Recommended Mineral Oil								
VG 220	Servomesh SP 220	MAK Amocam 220	Parthan EP 220	Mobilgear™ SHC 630	Alpha SP 220	Klüberoil GEM 1N 220	Omala S2G 220	GR-XP 220
VG 320	Servomesh SP 320	MAK Amocam 320	Parthan EP 320	Mobilgear™ SHC 632	Alpha SP 320	Klüberoil GEM 1N 320	Omala S2G 320	GR-XP 320
VG 460	Servomesh SP 460	MAK Amocam 460	Parthan EP 460	Mobilgear™ SHC 634	Alpha SP 460	Klüberoil GEM 1N 460	Omala S2G 460	GR-XP 460
Recommended Synthetic Oil PAO (Polyalphaolefin) type								
VG 220	ServoSynGear Plus 220	MAK Syngear 220	Parthan EP SA 220	-	Alphasyn EP 220	Klübersynth GH6 220	Omala S4 GX 220	-
VG 320	ServoSynGear Plus 320	MAK Syngear 320	Parthan EP SA 320	Mobilgear™ SHC XM 320	Alphasyn EP 320	Klübersynth GH6 320	Omala S4 GX 320	-
VG 460	ServoSynGear Plus 460	MAK Syngear 460	Parthan EP SA 460	Mobilgear™ SHC XM 320	Alphasyn EP 460	Klübersynth GH6 460	Omala S4 GX 460	-

Proper lubricant maintenance is vital to gear drive performance throughout its design life. Under normal operating conditions, the lubricants should be changed every 2500 operating hours or six months, whichever occurs first.

Extending the change period may be acceptable based on the type of lubricant, amount of lubricant, system down time, or environmental consideration of the used lubricant. In the absence of more specific limits, General guidelines for Oil change are as under:

- water content greater than 0.05% (500 ppm);
- iron content exceeds 150 ppm;
- silicon (dust/dirt) exceeds 25 ppm;
- viscosity changes more than 15%

Net Weight approx. (kg)

Unit Type	Net Weight - Horizontal Units (Without Oil)												
	125	140	160	180	200	225	250	280	315	355	400	450	500
KNH3	90	115	165	215	295	410	560	735	1090	1485	2095	2875	3840
KNH4	-	-	175	225	310	430	590	760	1150	1550	2180	2995	3990
Unit Type	**Net Weight - Vertical Units (Without Oil)**												
	125	140	160	180	200	225	250	280	315	355	400	450	500
KNV3	85	110	155	205	300	410	550	725	1045	1475	2025	2795	-
KNV4	-	-	165	220	315	430	580	755	1100	1540	2115	2915	-

As improvement in design are being made, this specification is not to be regarded as binding in details and drawings and capacities are subject to alterations without notice. Get Certified Principal dimensions and specifications while Ordering.

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