

ELECON

CRANE DUTY GEAR BOX





WORLD'S MOST TECHNOLOGICALLY ADVANCED GEAR MANUFACTURING FACILITY

BHANUBHAI MEMORIAL CENTRE OF EXCELLENCE (BMCE)

In the last six decades, Elecon have conducted intensive research in gear technology and manufacturing techniques. We have developed a variety of products in the transmission industry from worm gears to helical, from planetary to variable speed fluid couplings. This development has demanded a significant investment in manufacturing capability from gear cutting right through to heat treatment and profile grinding. This new plant has the capacity to manufacture sufficient helical gears to produce 1000 assembled gear units per month.

This plant is a tribute to our founding Chairman, Lt. Shri Bhanubhai Patel, who wanted to remain "Always a step ahead in technology"



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Overview

Keeping in line with its strategy of “Gearing the Future” Elecon presents the “Abhyuddharati-Series” answer to special industry needs.

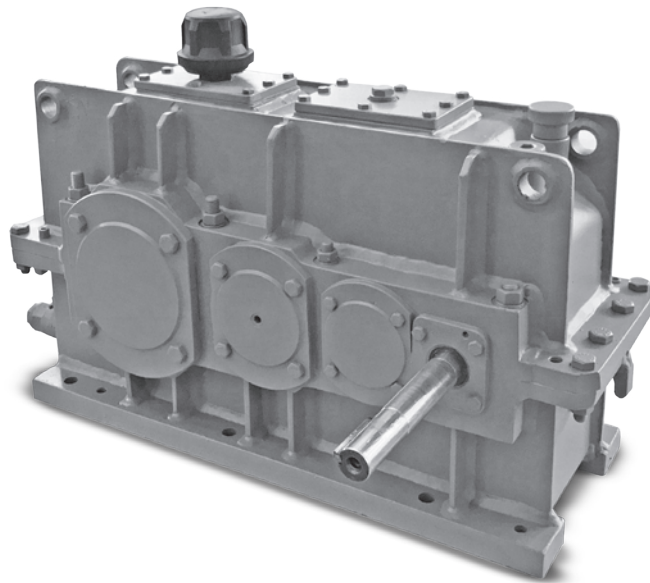
“A- Series” has been developed keeping in mind the industry requirements and offers the greater flexibility and advantages and presents wide range of features:-

- Specially Design for drives of transporting equipment, lifting gears, cranes and elevators
- Higher torque ratings.
- Three and four stages with transmission ratio range between 14 to 280.
- There are different mounting positions like Horizontal, over driven and Torque mounting.
- Two keys at output shaft for better safety, and there is Key fitted flanged hub on output shaft for direct mounting to the rope drum.
- Elecon’s “A” series range is designed to balance Thermal & Mechanical ratings with bearing life to ensure the unit has the best optimal performance.
- Gear housing has been optimized to optimize weight & increase stiffness ensures superior power to weight ratio. The horizontal split case design makes for simple inspection & maintenance. We are also offering 3-piece gear housing for over driven mounting position and Saddle mounting type torque arm.
- Allowable noise level is 85dB. At one meter away from gearbox.
- Allowable vibration limits is as per ISO: 10816.

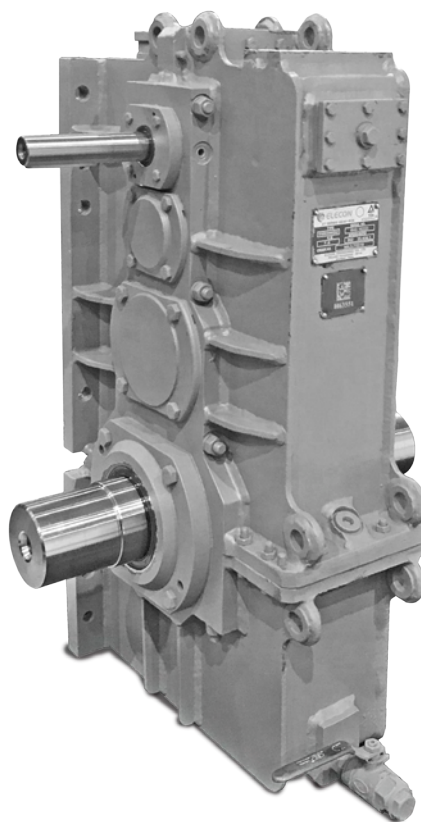


Mounting Position of Gear Unit:-

1. Horizontal & Torque Arm Mounting



2. Over Driven Mounting



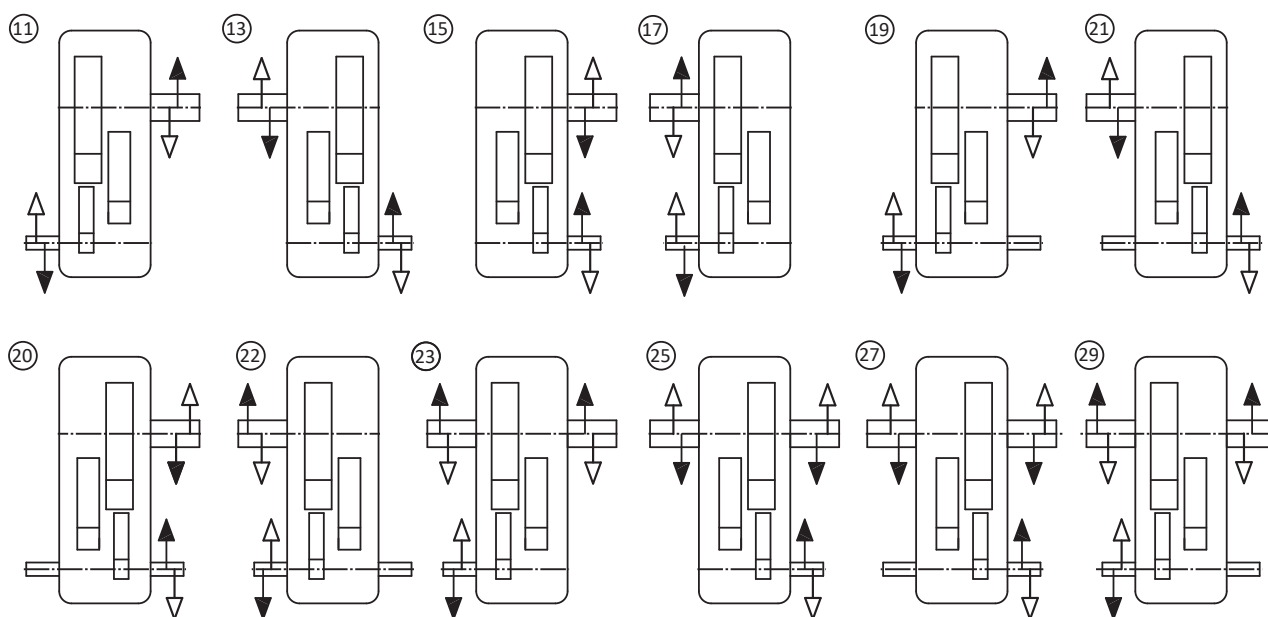
Nomenclature

Gear Unit Type	Number Of Stages	Size	Gear Unit Mounting	Type of Output Shaft	Type of Gear-Case	Type of Lubrication	Attachments	**Motor Adaptor Position	Motor Frame Size	Shaft Attangement (Handing)	
										Nominal Ratio * 10	
Helical Gear Unit A	 Helical 3 -Stage	16	H orizontal O ver Driven T orque Arm	N -Solid Shaft (Carbon Steel) R einforced Shaft (Alloy Steel)	1 -Fabricated Steel	0 -Splash Lubrication	A - None	L - Left Side	0-None 1-63, 2-71 3-80, 4-90S 5-90L 6-100L 7-112M 8-132S 9-132M 10-160M 11-160L 12-180M 13-180L 14-200L 15-225S 16-225M 17-250M 18-280S 19-280M	N - None	
		2 -SG Iron Casting			1 -Forced Lub. with BOP	B - Motor Adaptor	R - Right Side				
		3 -Special Requirement			2 -Forced Lub. with MDP	C - Output Flange Hub	B - Both Side				
						D - Motor Adaptor + Output Flange Hub					
	 Helical 4 -Stage						E - Other Attachments				

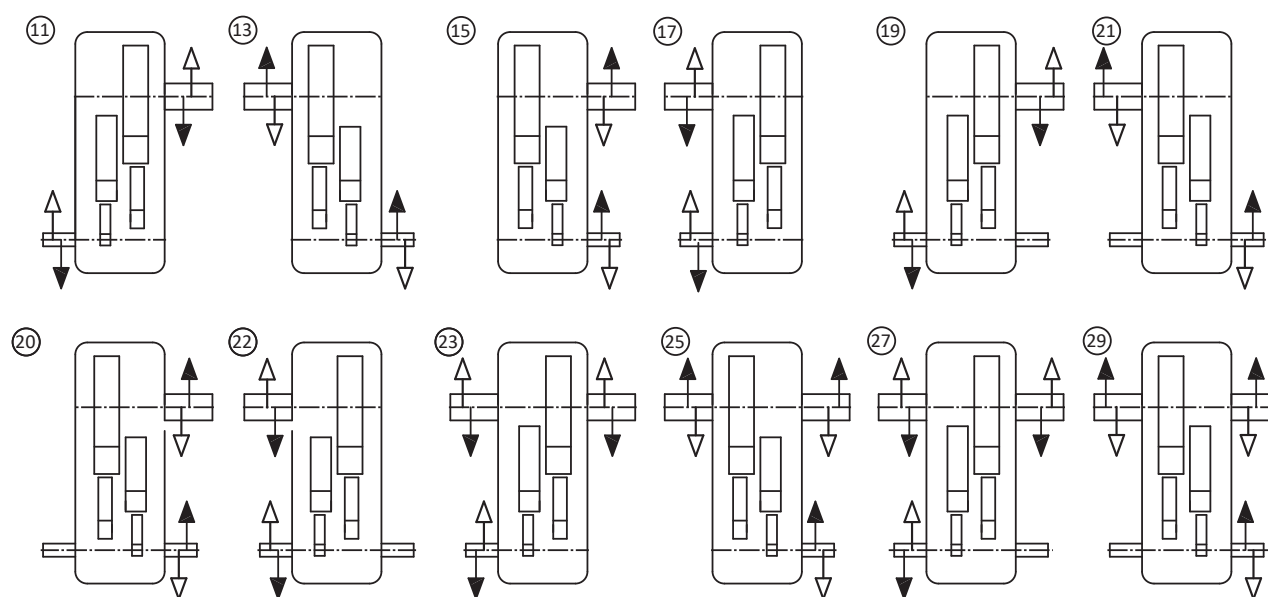
* On Request

** Motor Adaptor Position viewed From Output Shaft

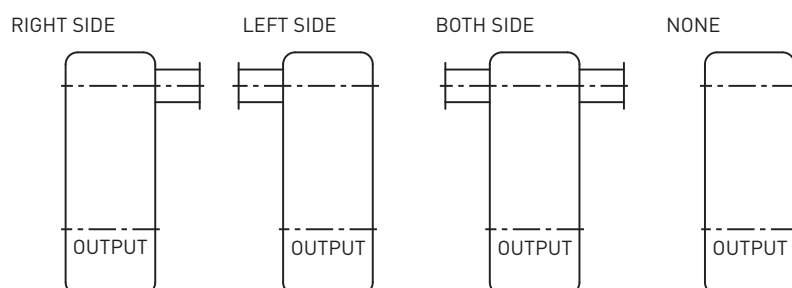
Shaft Arrangement for 3-Stage



Shaft Arrangement for 4-Stage



Motor Adaptor Position



Note: Shaft Arrangement 19, 20, 21, 27, 29 BOP option is Not Available

General Information:-

The following items are absolutely to be followed!

1. The weight of gearbox is mean values and not strictly binding.
2. Prior to commissioning, the operating instructions must be followed. The gear units are delivered ready for operation but without oil filling.
3. Oil quantities given are guide value only. The exact quantity of oil depends on the marks on the oil level dipstick/Name plate.
4. The oil viscosity has to correspond to the data given on the name plate.
5. Only Approved lubricants may be used. (Refer operating instruction manual)
6. The Gear housing is protected against corrosion resist paint.
7. Rating calculations are as per DIN: 3990
8. Foundation bolts are minimum property class - 8.8.
9. Keys & keyways are as per DIN : 6885
10. Wherever splined solid shaft is given, spline detail is as per DIN : 5480
11. Shaft end center holes as per DIN : 332
12. During installation, instruction given in manual to be followed.

Standard Gearbox includes:

1. Oil dipstick
2. Breather plug
3. Lifting provision
4. Oil filling and drain plug with ball valve
5. Shaft end key

Symbols used:

1. Oil dipstick 
2. Breather 
3. Drain plug 
4. Oil filling 

Gear unit Selection:-

1. Determination of gear unit type and size:-

1.1 Find the transmission ratio

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

Check whether the actual ratio i_N as per tables is acceptable!

1.2 Determine nominal power rating of the gear unit

$$P_N \geq P_e \times f$$

1.3 Checking starting torque

$$P_N \geq \frac{T_A \times n_1}{9550} \times f_3$$

Gear unit sizes and number of reduction stages are given in rating tables depending on i_N and P_N

2. Determination of Required thermal capacity:-

2.1. Gear unit without any auxiliary cooling

$$P_e \leq P_{T1} \times f_4 \times f_5$$

For any auxiliary cooling contact ELECON

Where,

i_N = Nominal transmission ratio

n_1 = Input speed (rpm);

n_2 = Output speed (rpm);

P_N = Nominal gear box rating (kW) (see Power table)

P_e = Absorbed power of the connected machine (kW)

f = Service factor = $f_1 \times f_2$

f_3 = Service factor

T_A = Starting torque or max. Input torque, Nm

P_{T1} = Thermal Capacity of Gear Unit without additional cooling (see Thermal Rating)

f_4 = Thermal Factor

f_5 = Velocity Factor

Gear unit selection example

Input data

Stage of gearbox	= 3 Stage	Duration of operation/hour	= 40%
Motor power	$P_1 = 18.6 \text{ kW}$	Ambient temperature	= 30 °C
Consumed power	$P_e = 16 \text{ kW}$	Installation of gearbox	= Outdoor
Input speed	$n_1 = 1000 \text{ rpm}$	Mounting of gearbox	= Horizontal
Max. starting torque	$T_A = 244.5 \text{ Nm}$	Direction of rotation	= Alternating
Output speed	$n_2 = 20.1 \text{ rpm}$		load direction
Classification of loading	= L3/T7/M8	Input & output shaft arrangement on one side	

1. Determination of gear unit type and size:-

1.1. Find the transmission ratio

$$i_N = \frac{n_1}{n_2} = \frac{1000}{20.1} = 49.75 \quad i_N = 49.75$$

Check whether the actual ratio i_N as per tables is acceptable!

1.2. Determine nominal power rating of the gear unit

$$P_N \geq P_e \times f = 16 \times 1.3 \times 1 = 20.8 \text{ kW}$$

Selected from power table: A3-20 with $P_N = 31.7 \text{ kW}$

1.3. Checking starting torque

$$P_N \geq \frac{T_A \times n_1}{9550} \times f_3 = \frac{244.5 \times 1000}{9550} \times 1 = 25.6 \quad P_N = 31.7 \text{ kW} > 25.6 \text{ kW}$$

2. Determination of Required thermal capacity:-

2.1. Gear unit without any auxiliary cooling

$$P_e \leq P_{T1} \times f_4 \times f_5 = 54 \times 1.41 \times 1.9 = 144.6 \text{ kW}, \quad P_e = 16 < 144.6 \text{ kW}$$

A gear unit without additional cooling is OK.

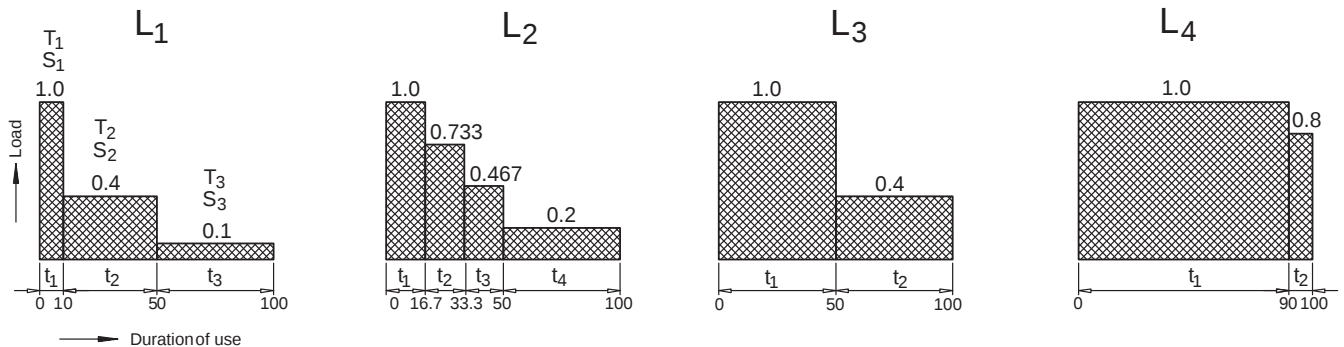
So Product nomenclature as per above selection is **A320HN10AN0050015**

Service Factor for Crane installations

For finding State of loading of mechanism in case of alternating loads within representative periods of time t , Factor K_m is calculated by:

$$K_m = (S_1/S_{\max})^3 (t_1/T) + (S_2/S_{\max})^3 (t_2/T) + \dots + (S_i/S_{\max})^3 (t_i/T)$$

Here, $S_1, \dots, S_i$ is the operating cycle within the cycle $t_1, \dots, t_n$.



Load Classification

Sr. No.	Type of Crane	Particulars concerning nature of use	Type of mechanism			
	Designation		Hoisting	Luffing	Traverse	Travel
1	Hand operated application		M1	-	M1	M1
2	Assembling cranes		M2 - M3	M1 - M2	M1 - M2	M2 - M3
3	Erection and dismantling cranes for power stations, machine shops, etc.		M2-M3	-	M2	M2
4	Stocking and reclaiming transporters	Hook duty	M5-M6	-	M4-M5	M5-M6
5	Stocking and reclaiming transporters	Grab or magnet	M6	-	M6-M7	M7-M8
6	Workshop cranes		M8	-	M4	M5
7	Overhead travelling cranes, pigbreaking cranes, scrapyards cranes	Grab or magnet	M7-M8	-	M6-M7	M7-M8
8	Ladle cranes		M8	-	M4-M5	M6-M7
9	Soaking-pit cranes		M8	-	M7	M8
10	Stripper cranes, open-hearth furnace-charging cranes		M8	-	M7	M8
11	Forge cranes		M8	-	M5	M6
12a	Bridge cranes for unloading, bridge cranes for containers	a - Hook or spreader duty	M6-M7	M3-M4	M6-M7	M4-M5
12b	Other bridge cranes (with crab and/or slewing jib crane)	b - Hook duty	M4-M5	-	M4-M5	M4-M5
13	Bridge cranes for unloading, bridge cranes (with crab and/or slewing jib crane)	Grab or magnet	M8	M3-M4	M7-M8	M4-M5
14	Drydock cranes, shipyard jib cranes, jib cranes for dismantling	Hook duty	M5-M6	M4-M5	M4-M5	M5-M6
15	Dockside cranes (slewing, on gantry, etc.), floating cranes and pontoon derricks	Hook duty	M6-M7	M5-M6	-	M3-M4
16	Dockside cranes (slewing, on gantry, etc.), floating cranes and pontoon derricks	Grab or magnet	M7-M8	M6-M7	-	M4-M5
17	Floating cranes and pontoon derricks for very heavy loads (usually greater than 100 t).		M3-M4	M3-M4	-	-
18	Deck cranes	Hook duty	M4-M5	M3-M4	M2	M3
19	Deck cranes	Grab or magnet	M5-M6	M3-M4	M4-M5	M3-M4
20	Tower cranes for building		M4-M5	M4	M3	M3
21	Derricks		M2-M3	M1-M2	-	
22	Railway cranes allowed to run in train		M3-M4	M2-M3	-	

Service Factor for crane installations

State of loading	Spectrum Factor K_m	Mechanism Class									
		T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
		Service life in Hours									
		≤ 200	$> 200 \leq 400$	$> 400 \leq 800$	$> 800 \leq 1600$	$> 1600 \leq 3200$	$> 3200 \leq 6400$	$> 6400 \leq 12500$	$> 12500 \leq 25000$	$> 25000 \leq 50000$	$> 50000 \leq 100000$
LIGHT L1	$K_m \leq 0.125$	M1	M1	M1	M2	M3	M4	M5	M6	M7	M8
MEDIUM L2	$0.125 < K_m \leq 0.25$	M1	M1	M2	M3	M4	M5	M6	M7	M8	M8
HEAVY L3	$0.25 < K_m \leq 0.5$	M1	M2	M3	M4	M5	M6	M7	M8	M8	M8
VERY HEAVY L4	$0.5 < K_m \leq 1.00$	M2	M3	M4	M5	M6	M7	M8	M8	M8	M8

State of loading	Factor f_1									
	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
LIGHT L1	0.8	0.8	0.8	0.8	0.8	0.9	1	1	1.1	1.2
MEDIUM L2	0.8	0.8	0.8	0.9	0.9	1	1.1	1.2	1.3	1.4
HEAVY L3	0.8	0.8	0.9	1	1	1.1	1.2	1.3	1.4	1.6
VERY HEAVY L4	0.9	0.9	1	1.1	1.2	1.3	1.4	1.6	1.8	2

Factor $f_2 = 1$ when drive is electric motor

Factor f_3										
State of loading	Constant load direction									
	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
LIGHT L1	0.5	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8
MEDIUM L2	0.5	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8
HEAVY L3	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8	0.9
VERY HEAVY L4	0.5	0.5	0.5	0.5	0.5	0.56	0.63	0.71	0.8	0.9

Factor f_3										
State of loading	Alternating load direction									
	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
LIGHT L1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1	1.12
MEDIUM L2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1	1.12
HEAVY L3	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1	1.12	1.25
VERY HEAVY L4	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1	1.12	1.25

For Amb.temperatures.						
Factor f_4						
Type of cooling	Amb. temperature	Duration of operation per hour				
		100%	80%	60%	40%	20%
Gearbox without additional cooling	10 °C	1.12	1.34	1.57	1.79	2.05
	20 °C	1	1.2	1.4	1.6	1.8
	30 °C	0.8	1.06	1.23	1.41	1.58
	40 °C	0.75	0.9	1.05	1.2	1.35
	50 °C	0.63	0.76	0.88	1.01	1.13

For Amb. Air velocity factor		
Factor f_5		
Condition	Air velocity (m/s)	f_5
Small confined space	≤ 0.5	0.75
Large space	$> 0.5 \leq 1.4$	1
Large space	$> 1.4 < 4$	1.4
Outdoor	≥ 4	1.9

Recommended Cyclic Duration Factor and Starting Class		
Mechanism Class	Recommended cyclic Duration Factor (ED) in %	Starting class Equivalent Starts/Hour
M1	25	90
M2	25	90
M3	25	150
M4	25	150
M5	25/40	150/300
M6	40	300
M7	60	300
M8	60	300/600

Nominal Power Rating

Type A3

size 16.....27

Power Rating P _N (kW)														
i _N	n ₁	n ₂	GEAR UNIT SIZE											
			16	17	18	19	20	21	22	23	24	25	26	27
14	1500	107.1	20.5	42.4	61.2	93.9	141	185	244	368	552	778	1038	1271
	1000	71.4	13.7	28.3	40.8	62.6	94.0	123	163	245	368	519	692	848
	750	53.6	10.3	21.2	30.6	47	70.5	92.5	122	184	276	389	519	636
16	1500	93.8	20.5	42.4	58.7	93.9	146	171	244	368	551	778	981	1132
	1000	62.5	13.7	28.3	39.1	62.6	97.5	114	163	245	367	519	654	755
	750	46.9	10.3	21.2	29.4	47	73	85.5	122	184	275	389	491	566
18	1500	83.3	20.5	38.0	60.8	81.3	132.9	153.5	244	368	550	685	881	1021
	1000	55.6	13.7	25.3	40.6	54.2	88.6	102.5	163	245	367	457	587	681
	750	41.7	10.3	19.0	30.4	40.6	66.4	77	122	184	275	342	441	511
20	1500	75.0	20.5	33.5	54.1	74	119.8	142.5	226	323	484	604	766	906
	1000	50.0	13.7	22.3	36.1	49.3	79.8	95	150	215	322	403	511	604
	750	37.5	10.3	16.8	27.0	37.0	59.9	71	113	162	242	302	383	453
22.4	1500	67.0	20.5	29.6	48.7	63.9	105.6	123	206	296	441	555	701	799
	1000	44.6	13.7	19.7	32.4	42.6	70.4	82	137	197	294	370	467	533
	750	33.5	10.3	14.8	24.3	32	52.8	61.5	103	148	221	278	351	400
25	1500	60.0	20.1	26	43	58.4	93.3	132.6	182	257	388	503	732	815
	1000	40.0	13.4	17.3	28.6	38.9	62.2	88.4	122	171	258	335	488	543
	750	30.0	10	13	21.5	29.2	46.7	66.3	91.2	128	194	252	366	408
28	1500	53.6	17.7	23.2	38.8	50.5	82.7	119.1	158	229	344	443	656	736
	1000	35.7	11.8	15.5	25.9	33.7	55.1	79.4	105	153	230	295	438	490
	750	26.8	8.9	11.6	19.4	25.3	41.3	59.5	79.0	114	172	221	328	368
31.5	1500	47.6	15.4	20.5	34.5	46.0	74.5	110.2	140	201	303	391	571	653
	1000	31.7	10.3	13.7	23.0	30.7	49.7	73.5	93.1	134	202	260	381	435
	750	23.8	7.7	10.2	17.2	23.0	37.3	55.1	69.8	100	151	195	285	326
35.5	1500	42.3	14.1	18.1	31.0	39.7	65.7	94.9	127	184	276	359	522	575
	1000	28.2	9.4	12.1	20.7	26.5	43.8	63.3	85.0	122	184	239	348	384
	750	21.1	7	9.1	15.5	19.9	32.9	47.5	63.7	91.9	138	179	261	288
40	1500	37.5	13	16.6	27.0	36.7	59.5	83.9	116	162	244	316	454	506
	1000	25.0	8.7	11.1	18.0	24.5	39.7	55.9	77.2	108	163	210	303	337
	750	18.8	6.5	8.3	13.5	18.4	29.7	42	57.9	80.8	122.2	158	227	253
45	1500	33.3	11.5	14.9	24.4	31.8	52.7	75.3	100	144	217	278	407	456
	1000	22.2	7.7	9.9	16.3	21.2	35.1	50.2	66.8	96	145	185	272	304
	750	16.7	5.8	7.4	12.2	15.9	26.4	37.7	50.1	72	108.6	139	204	228
50	1500	30.0	10.0	13.1	21.7	29.0	47.5	69.8	88.6	126	191	245	354	405
	1000	20.0	6.7	8.8	14.5	19.3	31.7	46.5	59.1	84.3	127.3	163.3	236.1	270
	750	15.0	5.0	6.6	10.9	14.5	23.8	34.9	44.3	63.2	95.5	122	177	202
56	1500	26.8	9.2	11.6	19.5	25.0	41.9	60.1	80.9	116	174	225	324	357
	1000	17.9	6.1	7.7	13	16.7	27.9	40.1	54.0	77.1	116	150	216	238
	750	13.4	4.6	5.8	9.8	12.5	20.9	30	40.5	57.8	87.1	113	162	179
63	1500	23.8	7.8	10.4	17	23	37	55.8	69.7	100	152	198	284	325
	1000	15.9	5.2	6.9	11.3	15.3	24.7	37.2	46.5	67	102	132	190	217
	750	11.9	3.9	5.2	8.5	11.5	18.5	27.9	34.8	50.2	76.1	98.9	142	163
71	1500	21.1	7.1	9.2	15.3	19.9	32.6	48.1	63.6	91.9	139	182	260	287
	1000	14.1	4.8	6.1	10.2	13.2	21.8	32.0	42.4	61.3	92.6	121.2	173	191
	750	10.6	3.6	4.6	7.7	9.9	16.3	24.0	31.8	46.0	69.4	90.9	130	143
80	1500	18.8	6.4	8.4	13.6	18.1	28.9	42.3	56.6	81.6	122	156	234	247
	1000	12.5	4.2	5.6	9.1	12.1	19.2	28.2	37.7	54.4	81.6	104.2	156	165
	750	9.4	3.2	4.2	6.8	9.1	14.4	21.2	28.3	40.8	61.3	78.1	117	124

Nominal Power Rating

Type A4

size 18.....27

Power Rating P _N (kW)												
i _N	n ₁	n ₂	GEAR UNIT SIZE									
			18	19	20	21	22	23	24	25	26	27
50	1500	30.0	20.2	28.8	44.5	61.2	86	126.7	183	237.9	315.5	363
	1000	20.0	13.5	19.2	29.7	40.8	57.3	84.5	122	158.6	210.3	242
	750	15.0	10.1	14.4	22.2	30.6	43.0	63.4	91.5	119	157.8	182
56	1500	26.8	19.4	26.4	39.6	53.8	77.5	111.2	163.7	212.8	279	318
	1000	17.9	13	17.6	26.4	35.9	51.7	74.1	109.1	141.9	186	212
	750	13.4	9.7	13.2	19.8	26.9	38.8	55.6	81.9	106.4	139.5	159
63	1500	23.8	17.8	22.9	35.1	48.3	67.1	99.2	145.5	187.2	250.3	287
	1000	15.9	11.9	15.2	23.4	32.2	44.7	66.1	97	124.8	166.9	191
	750	11.9	8.9	11.4	17.5	24.2	33.6	49.6	72.8	93.6	125.2	143
71	1500	21.1	15.6	20.8	31.6	44.7	59.3	87.1	128	165.2	217.7	254
	1000	14.1	10.4	13.9	21.1	29.9	39.5	58.1	85.3	110.1	145.1	170
	750	10.6	7.8	10.4	15.8	22.4	29.7	43.6	64	82.6	108.9	127
80	1500	18.8	14.0	18	29.9	42.4	58.6	82.6	124	160	233	253
	1000	12.5	9.4	12	19.9	28.3	39.1	55.1	82.9	106	155	169
	750	9.4	7.0	9	14.9	21.2	29.3	41.3	62.2	79.9	116	127
90	1500	16.7	12.1	16.4	26.3	37.8	52.1	71.8	109	139	203	230
	1000	11.1	8.1	10.9	17.5	25.2	34.8	47.9	72.4	92.4	135	153
	750	8.3	6	8.2	13.1	18.9	26.1	35.9	54.3	69.3	101	115
100	1500	15.0	11.1	14.2	23.3	33.9	45.1	64	96.6	122	182	207
	1000	10.0	7.4	9.5	15.5	22.6	30.1	42.7	64.4	81.3	121	138
	750	7.5	5.5	7.1	11.6	17	22.6	32.0	48.3	60.9	91	104
112	1500	13.4	9.7	12.9	21	31.4	39.9	56.2	84.9	108	158	184
	1000	8.9	6.5	8.6	14	20.9	26.6	37.5	56.6	71.7	106	123
	750	6.7	4.8	6.5	10.5	15.7	19.9	28.1	42.4	53.8	79.1	92.0
125	1500	12.0	8.7	11.2	18.3	27	36.4	51.4	77.4	98.8	145	162
	1000	8.0	5.8	7.5	12.2	18	24.3	34.3	51.6	65.9	96.5	108
	750	6.0	4.4	5.6	9.1	13.5	18.2	25.7	38.7	49.4	72.4	81.2
140	1500	10.7	7.9	10.7	16.9	23.8	32.8	45.8	68.7	87.9	128	143
	1000	7.1	5.2	7.1	11.2	15.8	21.9	30.5	45.8	58.6	85.1	95.6
	750	5.4	3.9	5.3	8.4	11.9	16.4	22.9	34.4	44.0	63.8	71.7
160	1500	9.4	7.2	9.2	14.9	21.3	28.4	40.8	61.1	77.4	115	129
	1000	6.3	4.8	6.2	10	14.2	18.9	27.2	40.7	51.6	76.4	86.3
	750	4.7	3.6	4.6	7.5	10.7	14.2	20.4	30.5	38.7	57.3	64.7
180	1500	8.3	6.3	8.4	13.5	19.8	25.1	35.8	53.7	68.3	99.6	115
	1000	5.6	4.2	5.6	9	13.2	16.7	23.9	35.8	45.5	66.4	76.6
	750	4.2	3.2	4.2	6.7	9.9	12.6	17.9	26.9	34.1	49.8	57.4
200	1500	7.5	5.7	7.3	11.7	17	22.9	32.8	49	62.7	91.1	101
	1000	5.0	3.8	4.8	7.8	11.3	15.3	21.8	32.7	41.8	60.7	67.5
	750	3.8	2.8	3.6	5.9	8.5	11.5	16.4	24.5	31.4	45.6	50.6
225	1500	6.7	4.9	6.6	10.6	15.5	19.9	27.9	43	53.7	79.2	90
	1000	4.4	3.3	4.4	7.1	10.3	13.3	18.6	28.6	35.8	52.8	60
	750	3.3	2.5	3.3	5.3	7.8	10.0	14.0	21.5	26.8	39.6	45.0
250	1500	6.0	4.4	5.7	9.2	13.4	18.2	25.5	39.2	49.3	72.4	79.4
	1000	4.0	3	3.8	6.2	8.9	12.1	17.0	26.1	32.9	48.3	52.9
	750	3.0	2.2	2.8	4.6	6.7	9.1	12.8	19.6	24.7	36.2	39.7
280	1500	5.4	3.9	5.2	8.4	11.7	16.2	22.7	34.6	42.4	65.0	68.3
	1000	3.6	2.6	3.4	5.6	7.8	10.8	15.1	23.1	28.3	43.4	45.6
	750	2.7	2.0	2.6	4.2	5.9	8.1	11.3	17.3	21.2	32.5	34.2

Thermal Rating

Type A3 & A4

Thermal Rating (kW), P _{T1}													
TYPE	i _N	GEAR UNIT SIZE											
		16	17	18	19	20	21	22	23	24	25	26	27
A3	14	44	53	72	89	102	140	152	191	224	284	384	409
	16												
	18												
	20												
	22.4												
	25	33	39	53	66	76	104	113	142	167	212	286	305
	28												
	31.5												
	35.5												
	40	26	32	43	53	61	84	91	114	134	170	230	245
	45												
	50												
	56												
	63	20	24	33	41	46	64	69	87	102	130	175	187
	71												
	80												

Thermal Rating (kW), P _{T1}													
TYPE	i _N	GEAR UNIT SIZE											
		16	17	18	19	20	21	22	23	24	25	26	27
A4	50			47	58	67	92	100	126	147	187	253	269
	56												
	63												
	71												
	80												
	90			37	45	52	72	77	98	114	145	196	209
	100												
	112												
	125												
	140			35	43	49	68	73	92	108	137	185	198
	160												
	180												
	200												
	225			31	38	44	60	65	82	96	123	165	176
	250												
	280												

Torque Rating

Type A3 & A4

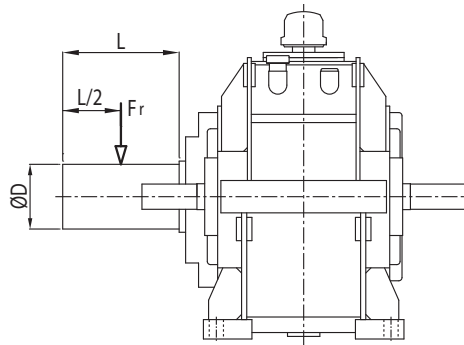
Output Torque (kNm)													
Size	i_N	GEAR UNIT SIZE											
		16	17	18	19	20	21	22	23	24	25	26	27
A3	14	1.80	3.7	5.5	8.4	12.5	16.6	21.6	32.1	49.8	70.7	93.6	113
	16	2.03	4.2	6.1	9.2	14.6	17.5	24.0	36.6	55.5	79	100	115
	18	2.30	4.2	7	9.2	15	17.5	27.7	41	62.4	79	100	115
	20	2.65	4.2	7	9.2	15	17.5	29	41	62.4	79	100	115
	22.4	2.9	4.2	7	9.2	15	17.6	29	41	62.4	79	100	115
	25	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	28	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	31.5	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	35.5	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	40	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	45	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	50	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	56	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	63	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	71	3.2	4.2	7	9.2	15	21.8	29	41	62.4	79	117	130
	80	3.2	4.2	7	9.2	15	20.8	29	41	61.9	79	117	125
A4	50			6.3	9.2	13.8	19.8	26.8	39.5	58.5	75	100	115
	56			7	9.2	13.8	19.8	26.8	39.5	58.5	75	100	115
	63			7	9.2	13.8	19.8	26.8	39.5	58.5	75	100	115
	71			7	9.2	13.8	19.8	26.8	39.5	58.5	75	100	115
	80			7	9.2	15	21.8	29	41	62.4	79	117	130
	90			7	9.2	15	21.8	29	41	62.4	79	117	130
	100			7	9.2	15	21.8	29	41	62.4	79	117	130
	112			7	9.2	15	21.8	29	41	62.4	79	117	130
	125			7	9.2	15	21.8	29	41	62.4	79	117	130
	140			7	9.2	15	21.8	29	41	62.4	79	117	130
	160			7	9.2	15	21.8	29	41	62.4	79	117	130
	180			7	9.2	15	21.8	29	41	62.4	79	117	130
	200			7	9.2	15	21.8	29	41	62.4	79	117	130
	225			7	9.2	15	21.8	29	41	62.4	79	117	130
	250			7	9.2	15	21.8	29	41	62.4	79	117	130
	280			7	9.2	15	20.7	29	41	62.0	79	117	125

Actual Ratio

Type	i _N	GEAR UNIT SIZE											
		16	17	18	19	20	21	22	23	24	25	26	27
A3	14	13.802	13.785	14.120	14.122	13.965	14.131	13.925	13.698	14.167	14.260	14.157	13.965
	16	15.564	15.547	16.320	15.387	15.711	16.071	15.443	15.598	15.833	15.941	16.011	15.967
	18	17.620	17.376	18.074	17.780	17.733	17.896	17.845	17.494	17.813	18.119	17.845	17.697
	20	20.263	19.692	20.333	19.529	19.673	19.327	20.186	19.931	20.263	20.535	20.522	19.944
	22.4	22.188	22.299	22.593	22.608	22.313	22.444	22.103	21.790	22.222	22.347	22.437	22.620
	25	25.037	25.411	25.600	24.761	25.249	25.828	24.964	25.091	25.294	24.659	25.118	25.048
	28	28.344	28.400	28.351	28.612	28.500	28.762	28.847	28.141	28.456	28.028	27.995	27.762
	31.5	32.596	32.187	31.895	31.426	31.617	31.061	32.630	32.061	32.371	31.765	32.194	31.287
	35.5	35.692	36.447	35.439	36.381	35.859	36.070	35.730	35.053	35.501	34.567	35.198	35.485
	40	38.532	39.628	40.659	39.326	39.607	40.815	39.326	39.862	40.104	39.326	40.480	40.368
	45	43.622	44.291	45.029	45.443	44.706	45.451	45.443	44.706	45.117	44.698	45.117	44.741
	50	50.165	50.196	50.657	49.912	49.596	49.083	51.402	50.934	51.324	50.657	51.884	50.422
	56	54.931	56.840	56.286	57.781	56.250	57.000	56.286	55.686	56.286	55.127	56.725	57.188
	63	64.253	63.626	64.588	62.853	63.648	61.354	65.359	64.087	64.365	62.745	64.628	62.807
	71	70.358	72.047	71.765	72.761	72.188	71.250	71.569	70.066	70.588	68.281	70.657	71.234
	80	79.152	78.538	80.735	79.739	81.629	77.188	80.515	78.947	79.412	79.412	78.677	79.614
A4	50			48.944	50.217	48.747	50.843	48.969	49.007	50.235	49.570	49.798	49.749
	56			56.569	54.715	54.840	57.821	54.308	55.806	56.145	55.414	56.320	56.882
	63			62.649	63.225	61.900	64.389	62.754	62.588	63.163	62.983	62.771	63.044
	71			70.480	69.443	68.671	69.535	70.984	71.308	71.854	71.381	72.187	71.049
	80			78.311	80.391	77.885	80.750	77.728	77.961	78.800	77.679	78.922	80.582
	90			90.999	88.016	89.636	90.700	87.391	89.689	90.234	89.576	90.598	88.809
	100			100.779	101.705	101.176	101.002	100.984	100.588	101.513	101.812	100.976	98.430
	112			113.376	111.709	112.243	109.074	114.228	114.602	115.479	115.386	116.122	110.929
	125			125.974	129.320	127.303	126.667	125.080	125.294	126.644	125.568	126.956	125.813
	140			140.049	135.457	139.788	144.052	138.798	140.688	142.591	141.112	143.928	142.349
	160			155.099	156.525	157.785	160.415	160.386	157.785	160.415	160.386	160.415	157.770
	180			174.487	171.921	175.043	173.235	181.420	179.768	182.485	181.771	184.478	177.805
	200			193.874	199.024	198.529	201.176	198.657	196.540	200.128	197.809	201.689	201.661
	225			223.489	220.202	221.875	220.875	228.455	230.702	228.107	231.125	232.114	226.900
	250			248.321	254.917	251.645	256.500	250.160	252.226	250.160	251.518	253.770	257.344
	280			279.361	279.361	284.559	277.875	281.430	284.198	281.430	292.517	282.574	287.619

Permissible Overhung Load (F_r)

When a Drum, etc. is mounted on the shaft, The table shown Permissible Overhung load taken by shaft. Overhung loads can be reduced by increasing the diameter Drum etc. If the maximum permissible overhung load is exceeded. the Drum, etc. should be mounted on a separate shaft, flexibly coupled and supported in its own bearings.

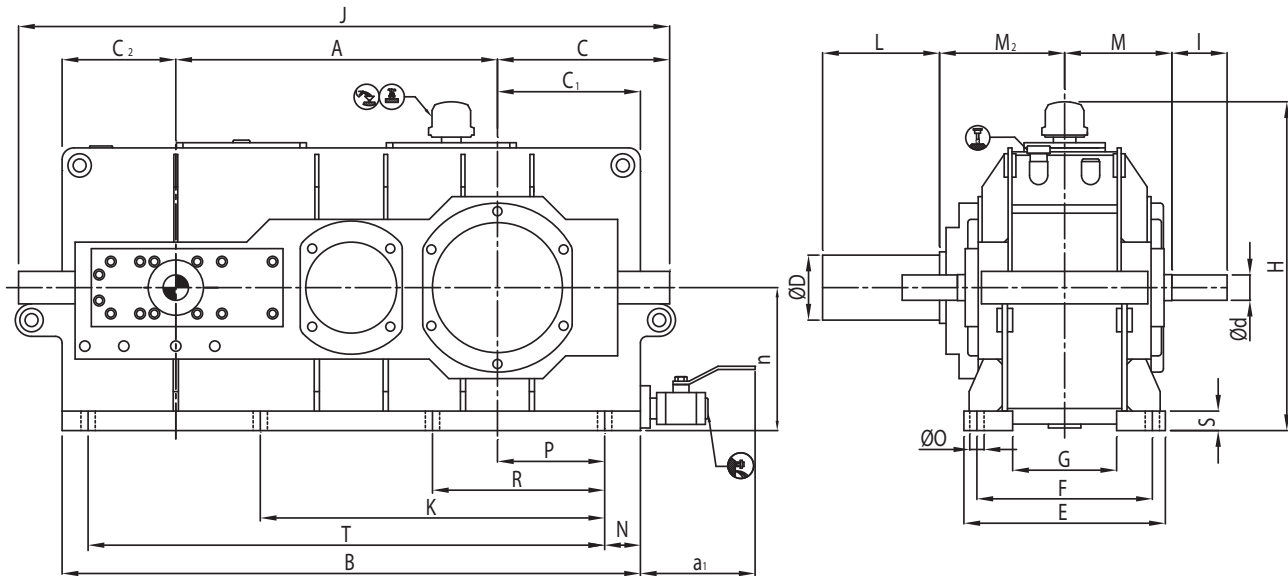


Overhung Load F_r (kN)													
Type	Shaft Arrangement	GEAR UNIT SIZE											
		16	17	18	19	20	21	22	23	24	25	26	27
A3 HN	11, 13, 19, 21	10	16	17.5	26	28	29	40	50	80	85	115	160
	15, 17	8.5	14	15.5	24	25	26	30	42	70	75	100	130
A4 HN	11, 13, 19, 21	8.5	14	15.5	24	25	26	30	42	70	75	100	130
	15, 17	10	16	17.5	26	28	29	40	50	80	85	115	160
A3 HR	11, 13, 19, 21	15	18.5	22	27	43	55	70	85	125	140	165	185
	15, 17	13	15.5	19	25	43	55	75	90	130	140	170	190
A4 HR	11, 13, 19, 21	13	15.5	19	25	43	55	75	90	130	140	170	190
	15, 17	15	18.5	22	27	43	55	70	85	125	140	165	185

Gear unit dimensions

Type – A3HN

Size – 16 to 27



Size	Input shaft					Output Shaft			Approx Weight (kg)	Approx Oil Quantity (Litres)
	i = 14 - 56		i = 63 - 80		M					
	d	l	d	l		D	L	M ₂		
A3..16	24	55	24	55	125	65	130	135	132	6
A3..17	29	60	24	60	130	78	138	140	147	8.5
A3..18	29	75	29	75	135	85	138	170	207	12
A3..19	34	85	29	85	145	100	178	180	290	14
A3..20	39	85	34	85	165	100	180	192.5	399	20
A3..21	49	90	39	90	190	110	180	230	634	37
A3..22	54	90	44	90	190	130	210	230	720	42
A3..23	59	110	49	110	225	140	240	278	1037	50
A3..24	65	120	58	120	235	170	270	280	1298	64
A3..25	72	120	64	120	275	180	310	325	1950	105
A3..26	85	140	72	140	315	210	350	367.5	2699	125
A3..27	86	150	72	150	335	230	360	380	3011	150

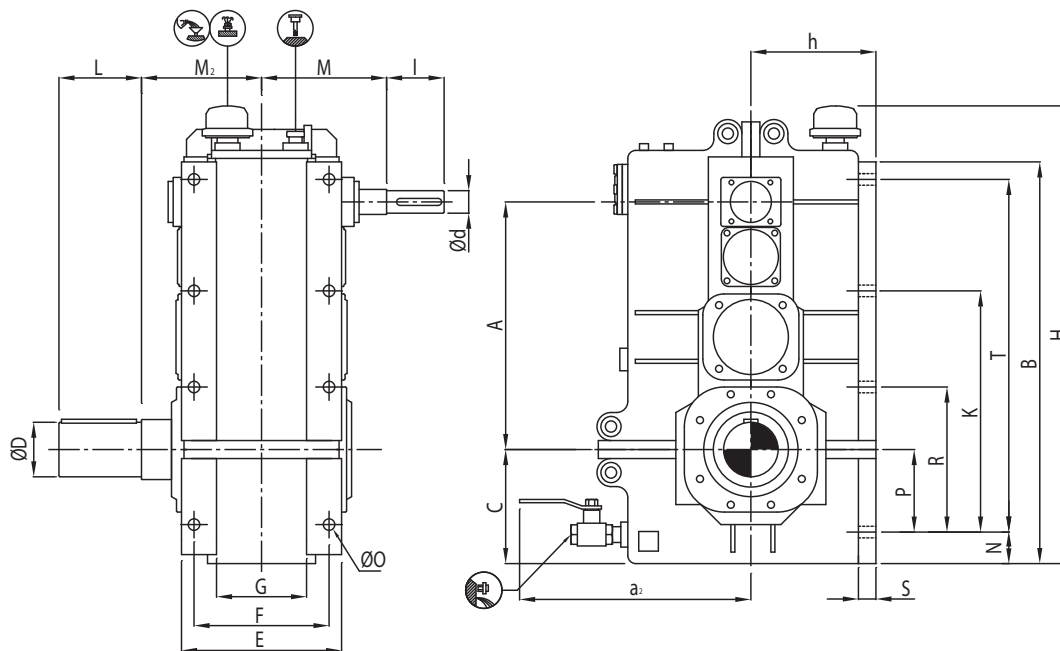
Size	Dimensions																		
	A	B	C	E	F	G	h	H ¹⁾	S	O	P	R	K	T	J	C ₁	C ₂	N	a ₁
A3..16	311	537	175	200	165	100	160	405	22	14	110	195	-	395	595	143	73	38	165
A3..17	350	590	190	225	185	116	180	430	22	18	115	210	-	495	655	160	80	45	165
A3..18	395	736	215	230	195	118	190	450	24	18	140	225	450	654	826	180	161	40	180
A3..19	440	806	244	250	205	120	210	485	30	22	140	245	490	685	905	200	166	60	180
A3..20	495	890	265	310	270	160	220	510	30	22	165	265	530	795	1002	220	175	55	180
A3..21	555	1030	315	370	320	200	280	605	35	26	140	285	570	855	1165	260	215	120	235
A3..22	620	1105	320	370	320	200	280	625	35	26	175	320	640	960	1235	260	225	85	235
A3..23	700	1240	355	460	400	270	280	665	35	33	210	365	730	1095	1380	295	245	85	235
A3..24	785	1270	370	420	358	232	320	725	40	33	162	370	650	1020	1475	325	245	113	235
A3..25	880	1510	448	504	430	280	380	820	45	39	270	450	900	1350	1718	375	307	70	235
A3..26	990	1545	490	545	465	320	500	1055	50	45	315	475	950	1425	1905	440	322	60	235
A3..27	1038	1827	520	555	470	310	500	1055	55	45	310	525	1045	1560	1990	455	334	145	235

1) Max. dimensions; details acc. to order related documents

Gear unit dimensions

Type – A30N

Size – 16 to 27



Size	Input shaft					Output Shaft			Approx Weight (kg)	Approx Oil Quantity (Litres)
	i = 14 - 56		i = 63 - 80		M					
	d	l	d	l		D	L	M ₂		
A3..16	24	55	24	55	125	65	130	135	120	7
A3..17	29	60	24	60	130	78	138	140	146	10
A3..18	29	75	29	75	135	85	138	170	183	14
A3..19	34	85	29	85	145	100	178	180	262	17
A3..20	39	85	34	85	165	100	180	192.5	365	24
A3..21	49	90	39	90	190	110	180	230	548	44
A3..22	54	90	44	90	190	130	210	230	649	42
A3..23	59	110	49	110	225	140	240	278	939	50
A3..24	65	120	58	120	235	170	270	280	1237	64
A3..25	72	120	64	120	275	180	310	325	1817	105
A3..26	85	140	72	140	315	210	350	367.5	2574	125
A3..27	86	150	72	150	335	230	360	380	2832	150

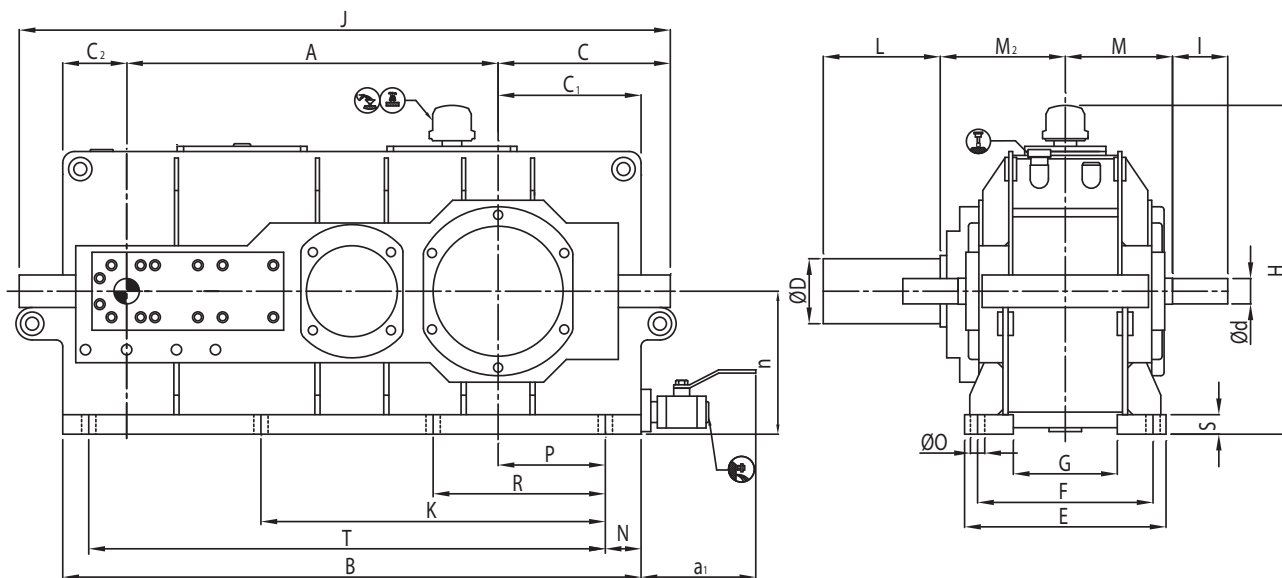
Size	Dimensions															
	A	B	C	E	F	G	h	H ¹⁾	S	O	P	R	K	T	N	a ₁
A3..16	311	634	245	200	165	100	160	700	22	14	110	195	-	395	135	335
A3..17	350	675	245	225	185	116	180	745	22	18	115	210	-	495	130	355
A3..18	395	730	250	230	195	118	190	800	24	18	140	225	450	580	110	365
A3..19	440	803	260	250	205	120	210	870	30	22	140	245	490	630	120	385
A3..20	495	902	295	285	240	145	250	970	30	22	165	265	530	730	130	395
A3..21	555	971	295	320	270	154	280	1035	35	26	140	285	570	775	155	510
A3..22	620	1090	335	350	295	178	280	1135	35	26	175	320	640	870	160	510
A3..23	700	1182	335	405	340	210	280	1245	35	33	210	365	730	995	125	535
A3..24	785	1340	390	420	358	228	350	1400	40	33	200	370	750	1050	190	550
A3..25	880	1450	400	485	410	260	380	1520	45	39	270	450	900	1235	130	605
A3..26	990	1612	435	545	465	309	500	1675	50	45	315	475	950	1395	120	725
A3..27	1038	1695	455	555	470	310	500	1750	55	45	310	525	1045	1460	145	725

1) Max. dimensions; details acc. to order related documents

Gear unit dimensions

Type – A4HN

Size – 18 to 27



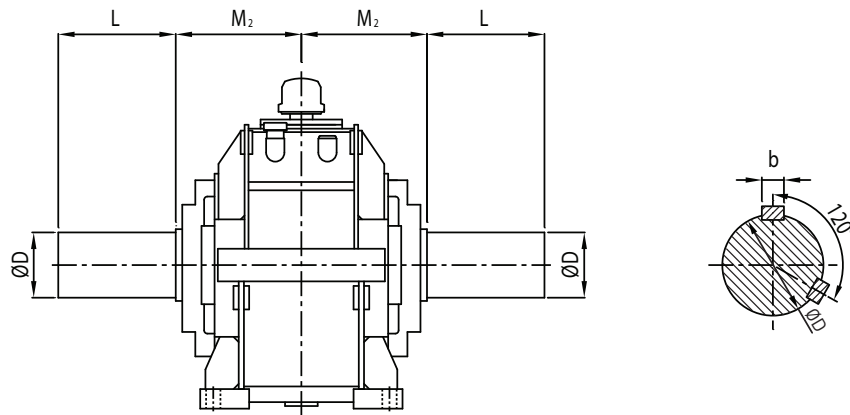
Size	Input shaft					Output Shaft			Approx Weight (kg)	Approx Oil Quantity (Litres)
	i = 50 - 200		i = 225 - 280							
	d	l	d	l	M	D	L	M ₂		
A4..18	24	55	22	55	135	85	138	170	209	12
A4..19	29	55	23	55	145	100	178	180	293	14
A4..20	29	60	24	60	165	100	180	192.5	402	20
A4..21	34	80	29	80	190	110	180	230	638	37
A4..22	39	80	34	80	190	130	210	230	727	42
A4..23	45	110	35	110	225	140	240	278	1042	50
A4..24	49	110	39	110	235	170	270	280	1301	64
A4..25	54	120	44	120	275	180	310	325	1956	105
A4..26	62	120	52	120	315	210	350	367.5	2705	125
A4..27	65	140	54	140	335	230	360	380	3019	150

Size	Dimensions																		
	A	B	C	E	F	G	h	H ¹⁾	S	O	P	R	K	T	J	C ₁	C ₂	N	a ₁
A4..18	466	736	215	230	195	118	190	450	24	18	140	225	450	654	826	180	90	40	180
A4..19	511	806	244	250	205	120	210	485	30	22	140	245	490	685	905	200	95	60	180
A4..20	575	890	265	310	270	160	220	510	30	22	165	265	530	795	1002	220	95	55	180
A4..21	645	1030	315	370	320	200	280	605	35	26	140	285	570	855	1165	260	125	120	235
A4..22	720	1105	320	370	320	200	280	625	35	26	175	320	640	960	1235	260	125	85	235
A4..23	810	1240	355	460	400	270	280	665	35	33	210	365	730	1095	1380	295	135	85	235
A4..24	910	1270	370	420	358	232	320	725	40	33	162	370	650	1020	1475	325	120	113	235
A4..25	1020	1510	448	504	430	280	380	820	45	39	270	450	900	1350	1718	375	167	70	235
A4..26	1150	1545	490	545	465	320	500	1055	50	45	315	475	950	1425	1905	440	162	60	235
A4..27	1202	1827	520	555	470	310	500	1055	55	45	310	525	1045	1560	1990	455	170	145	235

1) Max. dimensions; details acc. to order related documents

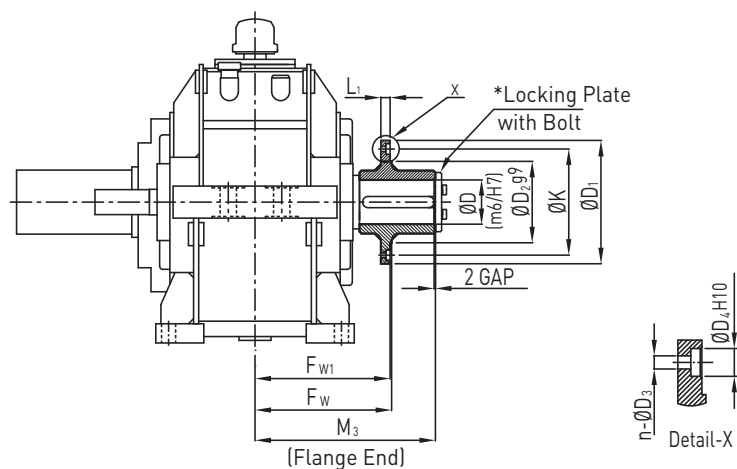
Output Shaft Types

Double Extended Output shaft



Size	Double Extension Solid Shaft		
	ØD	L	M ₂
16	65	130	135
17	78	138	140
18	85	138	170
19	100	178	180
20	100	180	192.5
21	110	180	230
22	130	210	230
23	140	240	278
24	170	270	280
25	180	310	325
26	210	350	367.5
27	230	360	380

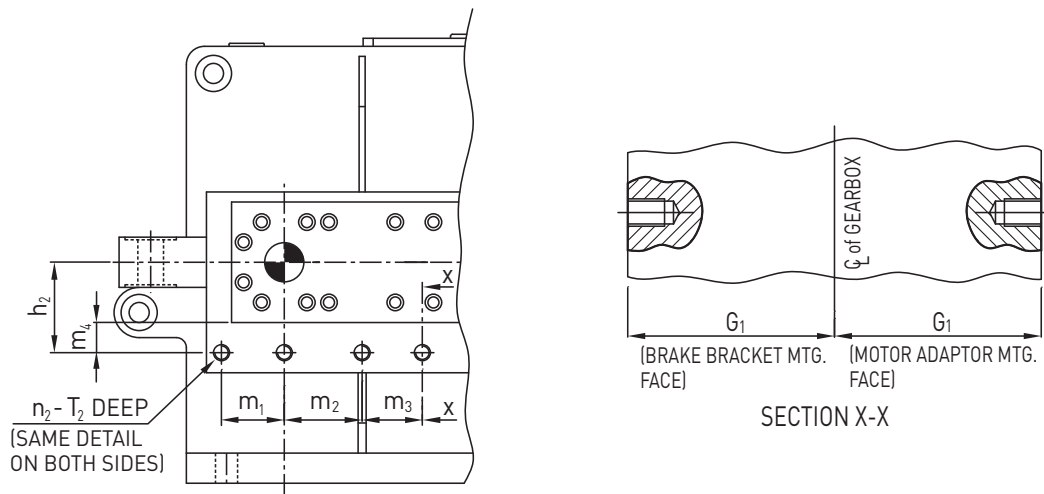
Output Shaft Flange Detail



*Locking Plate with Bolt is in ELECON scope of supply

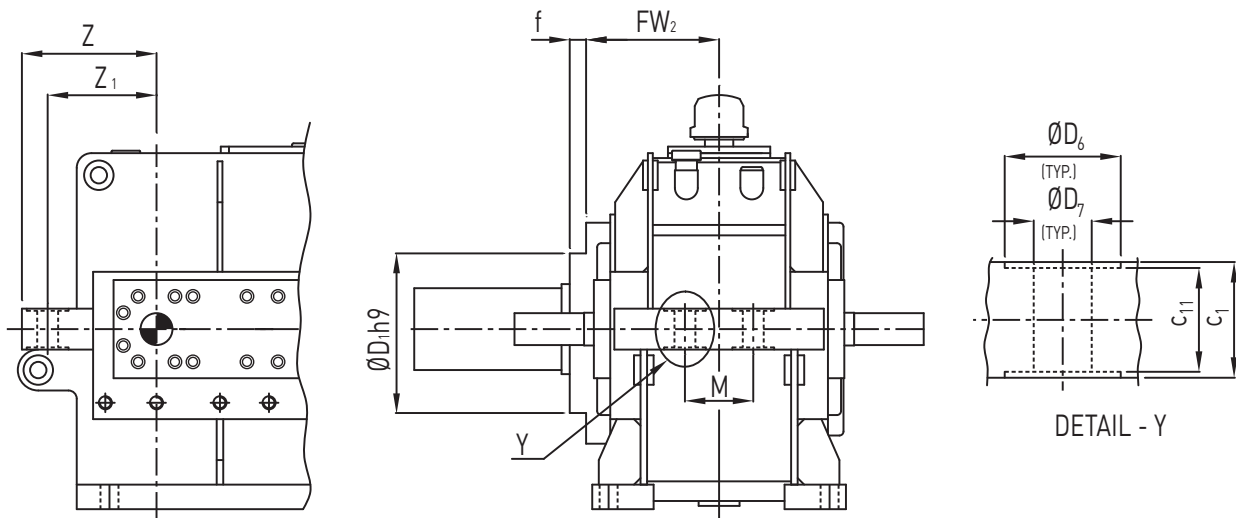
Size	Output Shaft Flange Detail												
	FW ₁	FW	M ₃	D	D ₂	K	D ₁	L ₁	D ₃	D ₄	n	S	Weight (Kg.)
16	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-
18	242.5	247.5	310	85	170	220	260	20	13.5	24	9	10	20
19	272.5	277.5	360	100	230	280	320	20	13.5	24	9	10	30
20	260	265	374.5	100	230	280	320	20	13.5	24	9	10	30
21	310	315	412	110	290	340	390	25	13.5	24	16	10	52
22	310	315	442	130	290	340	390	25	13.5	24	16	10	52
23	368	374	520	140	370	420	470	32	17.5	30	16	10	97
24	370	376	552	170	370	420	470	32	17.5	30	16	10	103
25	420	427	637	180	430	480	540	40	17.5	30	18	10	171
26	470	478	719.5	210	470	540	620	40	22	36	18	10	210
27	-	-	-	-	-	-	-	-	-	-	-	-	-

Brake Mounting Details



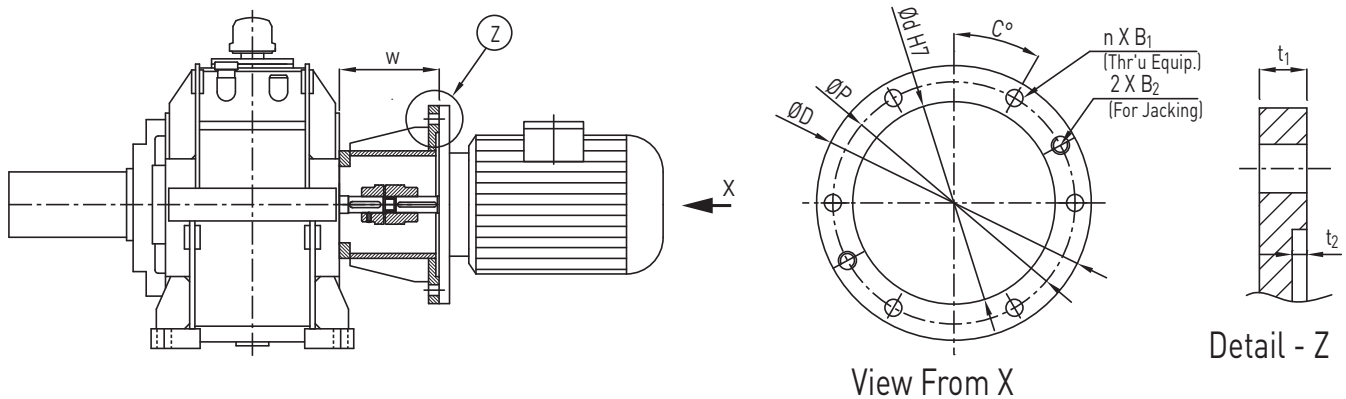
Size	Brake Mounting Dimension (in mm)							
	m_1	m_2	m_3	m_4	n_2	T_2	h_2	G_1
16	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-
18	55	71	55	30	8	M16 X 24	80	100
19	60	71	60	30	8	M16 X 24	90	110
20	60	80	60	30	8	M16 X 24	90	133
21	60	90	60	30	8	M20 X 29	105	160
22	60	100	60	30	8	M20 X 29	105	160
23	80	110	80	30	8	M20 X 29	125	195
24	80	125	80	30	8	M20 X 29	125	198
25	95	140	95	30	8	M20 X 29	140	241
26	110	160	110	30	8	M20 X 29	160	272.5
27	-	-	-	-	-	-	-	-

Torque arm Mounting Details



Size	Torque Arm Mounting Details											
	FW ₂	f	D ₁	M	D ₆	D ₇	c ₁	c ₁₁	3-Stage		4-Stage	
									Z	Z ₁	Z	Z ₁
16												
17												
18												
19												
20	162.5	20	195	100	48	26	50	48	242	210	162	130
21	195	25	210	110	61	33	60	58	295	258	205	168
22	195	25	245	110	61	33	60	58	295	258	195	158
23	238	30	260	130	61	33	70	68	325	280	215	170
24	240	30	280	130	71	39	80	78	320	280	195	155
25	275	40	330	150	71	39	80	78	390	350	250	210
26	317.5	40	365	170	71	39	90	88	425	380	265	220
27	-	-	-	-	-	-	-	-	-	-	-	-

Motor Adaptor Details



* For Input Coupling Detail Contact to ELECON

Size	Motor Adaptor Length Dimension (W)															
	Motor Frame Size for A3															
	90S	90L	100L	112M	132S	132M	160M	160L	180M	180L	200L	225S	225M	250M	280S	280M
16	156	158	168	168	189	189	222	222	224	224	-	-	-	-	-	-
17	-	-	172	172	193	193	226	226	228	228	228	-	-	-	-	-
18	-	-	-	189	210	210	243	243	245	245	245	276	-	-	-	-
19	-	-	-	-	220	220	253	253	255	255	255	286	-	-	-	-
20	-	-	-	-	215	218	248	251	251	254	254	284	-	-	-	-
21	-	-	-	-	-	-	-	-	257	257	257	287	287	287	291	296
22	-	-	-	-	-	-	-	-	257	257	257	287	287	287	291	296
23	-	-	-	-	-	-	-	-	-	-	-	307	307	307	311	316
24	-	-	-	-	-	-	-	-	-	-	-	-	324	324	328	333
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	336	336
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

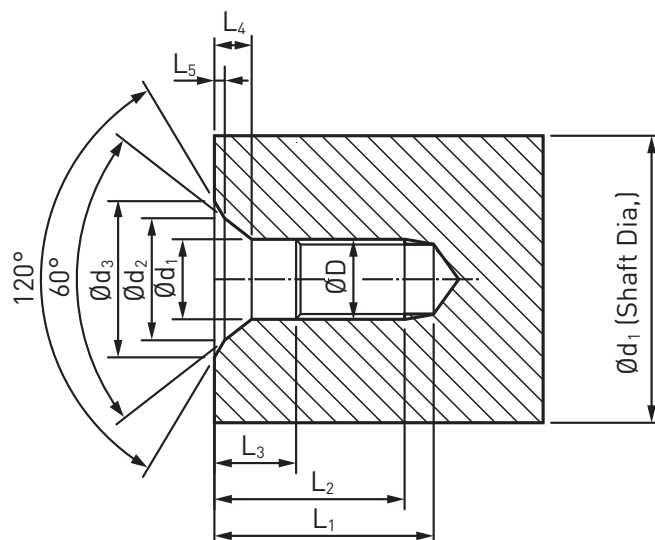
Size	Motor Frame Size for A4															
	90S	90L	100L	112M	132S	132M	160M	160L	180M	180L	200L	225S	225M	250M	280S	280M
18	157	159	169	169	190	190	223	223	225	225	-	-	-	-	-	-
19	-	-	169	169	190	190	223	223	225	225	-	-	-	-	-	-
20	-	-	-	-	190	193	223	226	226	229	-	-	-	-	-	-
21	-	-	-	-	210	211	241	244	244	247	247	277	277	277	281	-
22	-	-	-	-	210	211	241	244	244	247	247	277	277	277	281	-
23	-	-	-	-	-	-	271	274	274	277	277	307	307	307	311	316
24	-	-	-	-	-	-	280	281	281	284	284	314	314	314	318	323
25	-	-	-	-	-	-	-	-	-	290	291	321	321	321	325	330
26	-	-	-	-	-	-	-	-	-	-	-	330	330	330	334	339
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Motor Adaptor Housing Material is Cast steel/Fabricated

* From Motor Frame above 280 size use Foot Mounted Motor

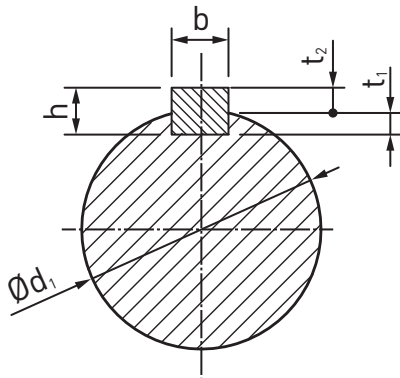
Size	Motor Adaptor Detail								
	P	D	d	n	B ₁	B ₂	t ₁	t ₂	C (deg.)
90 S/L	165	200	130	4	12	M10	12	6	45
100 L	215	250	180	4	14	M12	12	6	45
112 M	215	250	180	4	14	M12	12	6	45
132 S/M	265	300	230	4	14	M12	12	8	45
160 M/L	300	350	250	4	19	M16	13	8	45
180 M/L	300	350	250	4	19	M16	13	8	45
200 L	350	400	300	4	19	M16	15	8	45
225 S/M	400	450	350	8	19	M16	16	8	22.5
250 M	500	550	450	8	19	M16	18	8	22.5
280 S/M	500	550	450	8	19	M16	18	8	22.5

Centre Hole Detail



Diameter range as per DIN 332		Dimensions								
Nominal dimensions, d ₁		D	d ₁	d ₂	d ₃	L ₁	L ₂	L ₃	L ₄	L ₅
Above	To									
mm		mm								
16	21	M6	10.5	9.6	6.4	21	16	5.0	2.8	0.4
21	24	M8	13.2	12.2	8.4	25	19	6.0	3.3	0.4
24	30	M10	16.3	14.9	10.5	30	22	7.5	3.8	0.6
30	38	M12	19.8	18.1	13	37.5	28	9.5	4.4	0.7
38	50	M16	25.3	23	17	45	36	12.0	5.2	1.0
50	85	M20	31.3	28.4	21	53	42	15.0	6.4	1.3
85	130	M24	38	34.2	25	63	50	18.0	8	1.6
130	225	M30	44.6	40.2	31	77	60	22.0	8	1.9
225	320	M36	55	49.7	37	93	74	22.0	11	2.3
320	500	M42	66.6	60.3	43	105	84	26.0	15	2.7

Extension Shaft key/keyway Detail



Diameter (d_1)		Tolerance	
Nominal dimensions, d_1		D	d_1
Over	Included	on Shaft	tol. Zone
19	30	k6	+0.015/+0.002
30	50	k6	+0.018/+0.002
50	80	m6	+0.030/+0.011
80	120	m6	+0.035/+0.013
140	180	m6	+0.040/+0.015
180	250	m6	+0.046/+0.017

Nominal Dia. (d ₁)		b	h	Depth of keyway in shaft	Depth of keyway in Hub
Above	To			t ₁	t ₂
mm		mm			
17	22	6	6	3.5	2.8
22	30	8	7	4	3.3
30	38	10	8	5	3.3
38	44	12	8	5	3.3
44	50	14	9	5.5	3.8
50	58	16	10	6	4.3
58	65	18	11	7	4.4
65	75	20	12	7.5	4.9
75	85	22	14	9	5.4
85	95	25	14	9	5.4
95	110	28	16	10	6.4
110	130	32	18	11	7.4
130	150	36	20	12	8.4
150	170	40	22	13	9.4
170	200	45	25	15	10.4
200	230	50	28	17	11.4
230	260	56	32	20	12.4
260	290	63	32	20	12.4
290	330	70	36	22	14.4
330	380	80	40	25	15.4
380	440	90	45	28	17.4

Note:-

- Parallel key acc. to DIN 6885/1 form B and parallel keyway acc. to DIN 6885/1
- The tolerance zone for the hub keyway width b is JS9.

GD² Value

GD ² Value (kgm ²)													
Type	i _N	GEAR UNIT SIZE											
		16	17	18	19	20	21	22	23	24	25	26	27
A3	14	0.0092	0.0160	0.0276	0.0462	0.0843	0.1484	0.2497	0.5550	0.8746	1.4058	2.6833	3.1928
	16	0.0092	0.0149	0.0242	0.0434	0.0784	0.1310	0.2353	0.4909	0.8002	1.2678	2.3487	2.7872
	18	0.0083	0.0132	0.0230	0.0383	0.0690	0.1239	0.2084	0.4657	0.7040	1.1195	2.2004	2.5275
	20	0.0067	0.0121	0.0206	0.0355	0.0645	0.1167	0.1885	0.4205	0.6482	1.0153	1.9244	2.2335
	22.4	0.0063	0.0110	0.0194	0.0312	0.0581	0.1052	0.1779	0.4031	0.6163	0.9620	1.8289	2.0265
	25	0.0040	0.0075	0.0124	0.0211	0.0382	0.0676	0.1169	0.2178	0.3964	0.6923	1.2839	1.4295
	28	0.0037	0.0066	0.0119	0.0192	0.0345	0.0649	0.1066	0.2080	0.3587	0.6303	1.2237	1.3239
	31.5	0.0034	0.0062	0.0109	0.0181	0.0327	0.0621	0.0990	0.1906	0.3369	0.5867	1.1115	1.2045
	35.5	0.0033	0.0058	0.0104	0.0164	0.0303	0.0576	0.0949	0.1838	0.3244	0.5645	1.0727	1.1204
	40	0.0023	0.0040	0.0065	0.0117	0.0202	0.0379	0.0681	0.1213	0.2335	0.3799	0.7042	0.7931
	45	0.0022	0.0037	0.0063	0.0109	0.0187	0.0368	0.0640	0.1175	0.2186	0.3556	0.6809	0.7525
	50	0.0021	0.0036	0.0059	0.0105	0.0180	0.0357	0.0609	0.1105	0.2099	0.3384	0.6378	0.7065
	56	0.0020	0.0034	0.0057	0.0098	0.0170	0.0339	0.0593	0.1079	0.2049	0.3297	0.6228	0.6741
	63	0.0016	0.0026	0.0045	0.0079	0.0128	0.0278	0.0386	0.0756	0.1694	0.2187	0.4237	0.4692
	71	0.0015	0.0025	0.0043	0.0074	0.0121	0.0266	0.0376	0.0740	0.1662	0.2130	0.4141	0.4483
	80	0.0015	0.0025	0.0042	0.0073	0.0116	0.0261	0.0361	0.0711	0.1616	0.2007	0.3998	0.4318
A4	50			0.0064	0.0090	0.0157	0.0283	0.0551	0.0863	0.1510	0.2462	0.5470	0.5444
	56			0.0061	0.0088	0.0153	0.0270	0.0539	0.0814	0.1451	0.2348	0.5201	0.5126
	63			0.0060	0.0084	0.0145	0.0264	0.0517	0.0794	0.1375	0.2226	0.5082	0.4922
	71			0.0058	0.0081	0.0141	0.0259	0.0501	0.0759	0.1331	0.2140	0.4859	0.4691
	80			0.0057	0.0078	0.0136	0.0250	0.0493	0.0745	0.1305	0.2096	0.4782	0.4529
	90			0.0030	0.0042	0.0071	0.0139	0.0254	0.0419	0.0725	0.1143	0.2290	0.2738
	100			0.0030	0.0040	0.0069	0.0136	0.0246	0.0410	0.0694	0.1094	0.2232	0.2629
	112			0.0029	0.0040	0.0067	0.0134	0.0239	0.0395	0.0675	0.1057	0.2146	0.2532
	125			0.0029	0.0038	0.0065	0.0131	0.0235	0.0388	0.0662	0.1034	0.2103	0.2459
	140			0.0018	0.0024	0.0038	0.0074	0.0132	0.0231	0.0378	0.0622	0.1204	0.1486
	160			0.0018	0.0023	0.0036	0.0073	0.0128	0.0228	0.0366	0.0603	0.1186	0.1454
	180			0.0017	0.0023	0.0036	0.0072	0.0126	0.0223	0.0359	0.0590	0.1152	0.1417
	200			0.0017	0.0023	0.0035	0.0071	0.0125	0.0221	0.0356	0.0583	0.1140	0.1391
	225			0.0011	0.0015	0.0024	0.0055	0.0096	0.0172	0.0272	0.0374	0.0769	0.0885
	250			0.0011	0.0015	0.0024	0.0054	0.0095	0.0170	0.0270	0.0370	0.0762	0.0869
	280			0.0011	0.0015	0.0024	0.0054	0.0094	0.0168	0.0266	0.0361	0.0751	0.0856

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[illegible]

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