ELECON

PLANETARY GEAR BOX

ELECON
GEARING THE FUTURE

www.elecon.com

Catalogue No.: 209/EECL/01/14 - R1

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"

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. 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 fully 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, sugar plants, sponge iron plants and port mechanization in India and abroad.

Modern Infrastructure

- 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's machinery is computer controlled (CNC) ensuring high degree of precision in manufacture, design and quality testing of gear components to DIN/AGMA international specifications.
- Elecon's expertise in providing customized gear boxes for all Steel mill, High speed turbine, Sugar mill, Rubber mixing mill, Marine, Coast guard and navy ship, Plastic extrusions, antenna drives and satellite for the Indian space program.
- Elecon is prepared to deliver within deadlines. It is made possible through highly online computerized system of advance planning and schedule software.

Advantages

- Planetary gearboxes have much higher mechanical rating compared to parallel shaft gearboxes as the power being transmitted gets equally distributed among four streams in each stage thus reducing the induced stresses, which very much optimizes the sizes as well allows to accommodate higher ratio to eliminate open pair.
- The reduction in floor space as compared to conventional drive i.e. with open gearing, almost to the tone of 50% reduction in floor space.
- Heaviest gear internals such as annuli are stationary thus requires no bearing and automatically improves the stability and reduces the vibration level and in turn noise. Low noise level 80-85 db as well as low vibration level going up to 4.5 mm/sec can be achieved.
- Planetary gearbox has an advantage the planet bearings are only loaded where as in case of bearing supporting sun or carrier loads are more or less nullified by virtue of higher number of planets and their equal and opposite forces.
- Lubrication of planetary gearbox is quiet simple as the rotating gear train partially acts as pump thus allowing splash lubrication.
- We are proposing two to four stage planetary gearboxes; in each stage sun is input and carrier is the output keeping annuli stationary as well acting as casing.
- Elecon's machine capability cuts the internal teeth of annulus to the accuracy of DIN-7 or Grinds if required to the accuracy class DIN-6.

General Description

The range of series Medium Planetary units has 16 sizes with ratio coverage 16: 1 to 1120: 1 providing an efficient and compact drive solution to get 17,900 Nm to 5400,000 Nm torque capacity.

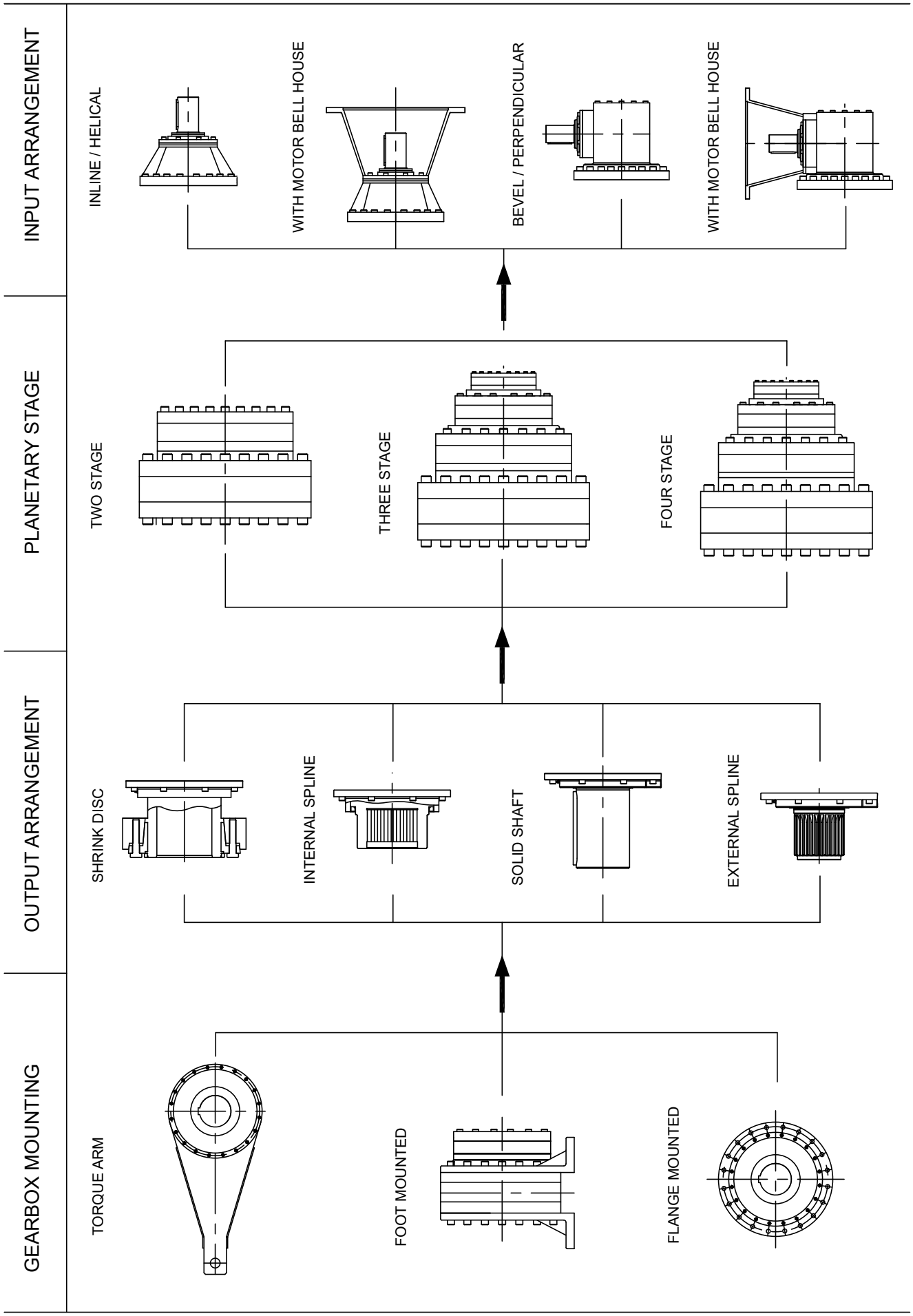
The range takes advantage of many years of accumulated design expertise, together with the use of high quality materials and components; the end result is a high quality series of planetary gear reducers offering a high load carrying capacity, high efficiency, quiet running and reliable drive solution.

Standard unit versions available :

- Co-axial, parallel and right angle drive options:
  - Base mounted
  - Flange mounted
  - Torque arm mounted
- Input options :
  - Input shaft with keyway
  - Input shaft with motor adaptor for flange motor
- Output options :
  - Solid output shaft with keyway
  - Output shaft with square end
  - Hollow output shaft to suit connection with shrink disc
  - Output shaft with external spline
  - Output shaft with internal spline
  - Flange output shaft
  - Output shaft with hollow flange

Design features:

- Gears are manufactured from high quality materials, heat treated and profile ground providing a high level of surface finish to ensure efficient high load carrying capacity and quiet operation.
- Motor connections are designed to suit standard IEC or NEMA C motors, other motor connections can be provided on request.
- All units are designed with ability to fit double oil seals to both input and output shaft assemblies.
- Units are modular in design allowing many possible unit combinations to be built from a limited inventory.
- Units are designed so that they can be easily customized to suit more exacting customer requirements.


INPUT ARRANGEMENT
INLINE / HELICAL
WITH MOTOR BELL HOUSE
BEVEL / PERPENDICULAR
WITH MOTOR BELL HOUSE
PLANETARY STAGE
TWO STAGE
THREE STAGE
FOUR STAGE
OUTPUT ARRANGEMENT
SHRINK DISC
INTERNAL SPLINE
SOLID SHAFT
EXTERNAL SPLINE
GEARBOX MOUNTING
TORQUE ARM
FOOT MOUNTED
FLANGE MOUNTED

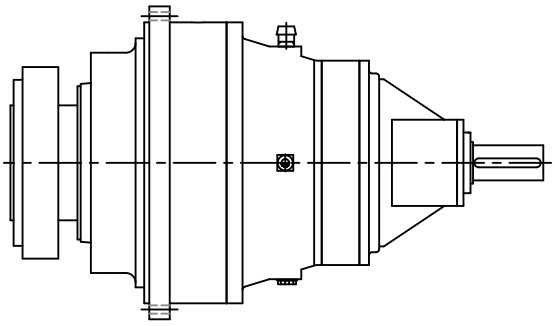
Planetary Gear Units

P	2	C	N	B

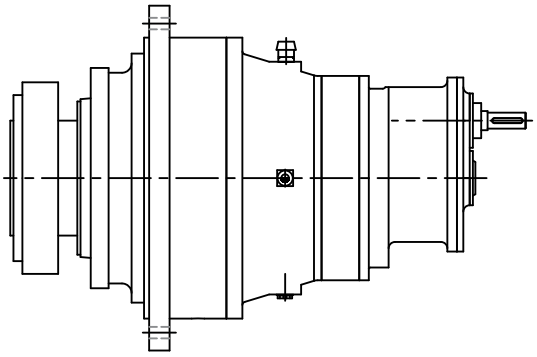
P	2	H	S	F

P	2	B	H	T
P	2	K	H	T

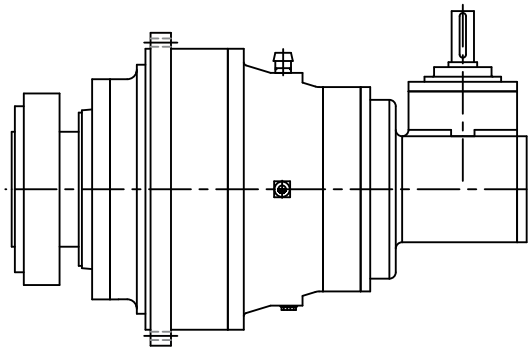
Basic Types - Two Planetary Gear Stages



P2C RATIO: 16-36



P2H RATIO:40-160



P2B RATIO:31.5-100
P2K RATIO:112-450

P - Planetary Gear Unit

2 - Two Stage Planetary Gear

C - Co-axial
H - Helical Gear Stage
B - Bevel Gear Stage
K - Bevel Helical Gear Stage

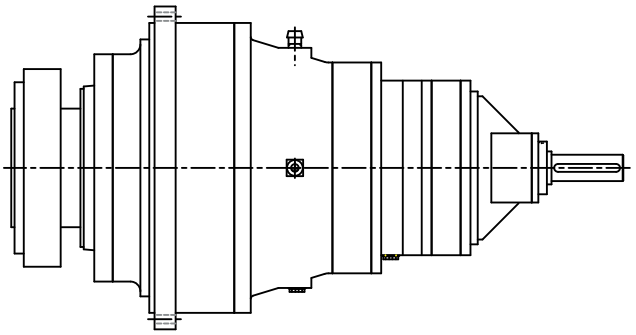
N - Output Shaft - Solid / External Spline
S - Output Shaft - Square
H - Output Shaft - Hollow / Internal Spline

B - Base Mounted
F - Flange Mounted
T - Torque Arm Mounted

Planetary Gear Units

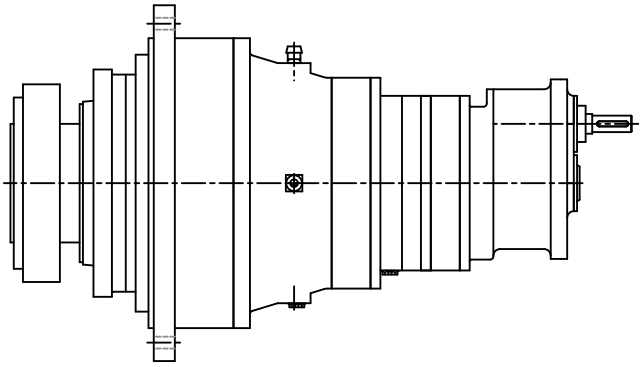
Basic Types - Three Planetary Gear Stages

P	3	C	N	B



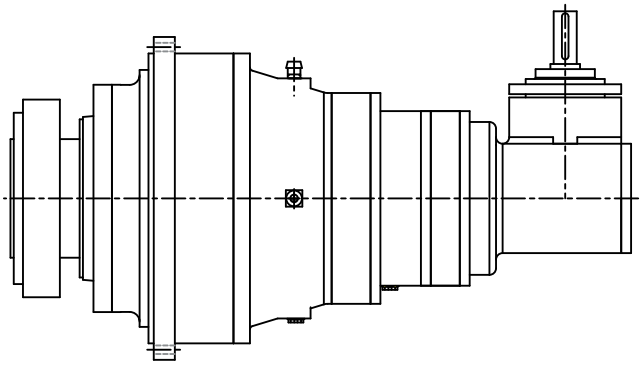
P3C RATIO: 112-220

P	3	H	S	F



P3H RATIO:225-900

P	3	K	H	T



P3K RATIO: 560-1120

P - Planetary Gear Unit

3 - Three Stage Planetary Gear

C - Input Stage Co-axial
H - Input Stage Helical
K - Bevel Helical Gear Stage

N - Output Shaft - Solid / External Spline
S - Output Shaft - Square
H - Output Shaft - Hollow / Internal Spline

B - Base Mounted

Selection Procedure

- Gear unit selection :
  - Symbols and units

f – Service factor ($f = f_m \times f_s$)
f_s – Starting frequency factor
f_{r2} – Output shaft radial load capacity (N)
n_1 – Input speed (RPM)
i – Actual gear ratio = n_1/n_2
P_e – Absorbed power (kW)
P – Required power rating
M_2 – Output torque (Nm)= $(P_e \times 9550)/n_2$
h – Life time (hours)
f_w – Thermal rating modifying factor
$P_{equi.}$ – Power equivalent

f_m – Mechanical service factor
f_{r1} – Input shaft radial load capacity (N)
f_s – Starting frequency factor
n_2 – Output speed (RPM)
i_N – Nominal transmission ratio
T_2 – Rated output torque (Nm)
P_N – Nominal power rating
T_{2a} – Required rated torque(Nm)=$M_2 \times f$
P_t – Thermal rating (when t=20° C)
t – Ambient temperature (°C)

Mechanical Service Factor f_m

Prime Mover	Operating Duty Hours/ Day	Load Classification Driven Machine		
		U Uniform	M Moderate	H Heavy
Electric Motor Hydraulic Motor	< 3	0.80	1.00	1.50
	3 to 10	1.00	1.25	1.75
	>10	1.25	1.50	2.00
Piston Engine >3 Cylinder	< 3	1.00	1.25	1.75
	3 to 10	1.25	1.50	2.00
	>10	1.50	1.75	2.25
Piston Engine 1-3 Cylinder	< 3	1.25	1.50	2.00
	3 to 10	1.50	1.75	2.25
	>10	1.75	2.00	2.50

Starting Frequency Factor f_s

Starts or Stops Per Hour	f_s
1	1.00
2 - 5	1.06
6 – 10	1.10
11 – 40	1.16
41 – 80	1.20
>80	1.25

Peak torque factor f_3

	Load peaks per hour			
	1-5	6-30	31–100	>100
Steady direction of load	0.50	0.65	0.70	0.85
Alternating direction of load	0.70	0.95	1.10	1.25

Utilization Factor f_{14}							
30%	40%	50%	60%	70%	80%	90%	100%
0.66	0.77	0.83	0.90	0.90	0.95	1.0	1.0

Thermal Modifying Factor f_4

Ambient Temperature	Duration of Operation per Hour				
	100 %	80 %	60 %	40 %	20 %
-20° C	1.50	1.61	1.78	2.06	2.65
-10° C	1.35	1.45	1.60	1.86	2.38
0° C	1.25	1.34	1.48	1.72	2.20
10° C	1.12	1.20	1.33	1.54	1.98
20° C	1.00	1.07	1.19	1.37	1.76
25° C	0.95	1.02	1.13	1.31	1.68
30° C	0.88	0.94	1.04	1.21	1.55
40° C	0.75	0.80	0.89	1.03	1.32
50° C	0.63	0.67	0.75	0.87	1.11

Load Classification by Application :

U – Uniform Load M – Moderate Shock Load H – Heavy Shock Load # - Consult our Engineer

Agitators		Bucket- Heavy load	M	Small waste conveyor (belt)	U	Double acting 2 + cylinders	M
Pure liquids	U	Bucket- Continuous	U	Small waste conveyour (chain)	M	Single acting 1 & 2 cylinder	#
Liquids and Solids	M	Centrifugal discharge	U	**Machine tools**		Double acting 1 cylinder	#
Liquids variable density	M	Escalators	U	Bending roll	M	Rotary – gear type	U
Blowers		Freight	M	Punch press	H	Rotary – lobe type/ vane	U
Centrifugal	U	Gravity discharge	U	Notching press	H	**Sand Muller**	M
Lobe	M	Passenger lifts	#	Plate planer	H	**Sewage treatment**	
Vane	U	**Fans**		Other machine tools		Bar screen	U
Brewing & distilling		Centrifugal	U	Main drive	M	Chemical feeder	U
Bolting machinery	M	Cooling towers		Aux. drive	U	Collector	U
Brew kettles	M	Induced draft	#	**Metal mills**		Dewatering screw	M
Cookers	M	Forced draft	#	Carriage / Main drive	M	Mixers	M
Mash tubes	M	Fan large dia. induced shaft	M	Draw bench	M	Scum breaker	M
Scale hopper	M	Fan light small diameter	M	Dryer	M	Thickeners	M
Can filling machine	M	**Feeders**		Flattening machine	M	Vacuum filters	M
Crane Knife	M	Apron	M	Pinch drive	M	**Screens**	
Car dumper	M	Belt	M	Reversing slitters	M	Air washing	U
Car puller	M	Disc	U	Scrubber rolls	M	Rotary, stone or gravel	M
Clarifier	U	Reciprocating	H	Table conveyors	M	Travelling water intake	U
Classifier	M	Screw	M	Group drives	M	**Slab pushers**	M
Clay working machinery		**Food industry**		Individual drives	H	**Slewing**	H
Brick press	H	Cereal cooker	U	Table conveyors - reversing	H	**Steering gear**	#
Briquette machine	H	Dough mixer	M	Wire draw	M	**Stokers**	U
Clay working machine	M	Meat grinder	M	Wire roll	M	**Sugar Industry**	
Plug mill	M	Meat slicer	M	**Mills**		Cane knife	M
Compressors		**Generator-not welding**		Concrete	M	Crusher	H
Centrifugal	U	**Hammer mills**	U	Cons density	M	Mills	H
Lobe	M	**Hoists**	H	**Oil industry**		**Textile Industry**	
Reciprocating		Heavy duty	H	Chillers	M	Batchers	M
Multi cylinder	M	Medium duty	M	Oil well pump	M	Calenders	M
Single cylinder	H	Skip hoist	M	Filter press	M	Cards	M
Conveyors light duty uniform load		**Laundry**		Rotary klin	M	Dry cans	M
Apron	U	Tumbler	M	**Paper**		Dryers	M
Assembly	U	Washer	M	Agitator (mixer)	M	Dyeing machinery	M
Belt	U	**Line shafts**		Barker (hydraulic)	M	Knitting machines	M
Bucket	U	Heavy duty	M	Barker (mechanical)	H	Looms	M
Chain	U	Light duty	U	Barking drum	H	Mangles	M
Flight	U	**Lumber industry**		Beater & pulper	M	Nappers	M
Oven	U	Barkers	M	Bleacher	U	Pads	M
Screw	U	Burner conveyor	M	Calendars	M	Range drive	M
Conveyors heavy duty non uniform load		Chain/ Drag show	H	Calendars – super	H	Slashers	M
Apron	M	Chain transfer	H	Converting machine	M	Soapers	M
Assembly	M	Chain way transfer	H	Conveyors	U	Spinnres	M
Belt	M	De-braking drum	H	Couch	M	Tenter frame	M
Bucket	M	Edger feed	M	Cutters – plates	H	Washers	M
Chain	M	Gang feed	M	Cylinders	M	Winders	M
Flight	M	Green chain	M	Dryers	M	**Windlass**	#
Oven	M	Live roll	H	Felt stretcher	M		
Screw	M	Log deck	H	Felt whipper	H		
Live roll	M	Log Haul	H	Jordans	M		
Reciprocating	M	Log turning	H	Log haul	H		
Shaker	M	Log conveyor	H	Machine reel	M		
Cranes	#	of bearing roll	M	Presses	M		
Crusher		Planer feed chains	M	Stock chest	M		
Ore	H	Planer hoist		Suction roll	M		
Stone	H	Re-saw conveyor	M	Washers & thickness	M		
Sugar	H	Roll cases	H	Winders	M		
Dredgers		Slab conveyor	H	**Printing presses**	#		
Conveyors	H	Sorting table triple hoist		**Pullers**			
Cutter head drive	H	Triple hoist-drive/ conveyor	M	Barge haul	H		
Pumps	M	Transfer conveyor	M	**Pumps**			
Screen drive	H	Transfer roll	M	Centrifugal	U		
Stackers	M	Tray drive	M	Proportioning	M		
Winches	M	Trimmer feed	M	Reciprocating			
Elevators		Waste conveyor	M	Single acting 3 + cylinders	M		
Bucket - Uniform load	U	Small	U				

Selection Example - 1 :

1. Data from client :

Absorbed power P_e = 300 kW n_1= 1000 rpm n_2= 4 rpm

Required ratio (i) = n_2/n_1 Ambient temperature = 40° C

= 1000/4 Heavy shock loading – 1 start / hour

= 250 : 1 10 hours / day – continuous operation

2. Determine service factor – f :

Refer to Mechanical service factor – $\mathbf{f_m}$ from table & Starting frequency factor – $\mathbf{f_s}$ from table on Pg. No. 7

$f = f_m \times f_s$ = 2.00 x 1.00 = 2.00

3. Determine Gearbox Power rating :

$P = P_e \times f$ = 300 x 2

= 600 kW

P/n1 = 600/1000

= 0.6

4. Selection the Gear Unit : Refering Graph of P3H

- Gear Unit Selection :
  P3H-125 Ratio (i) = 250 :1
- Check the exact ratio (i) (256.51:1) is within ± 3 % of the required ratio.

5. Determination of thermal capacity :

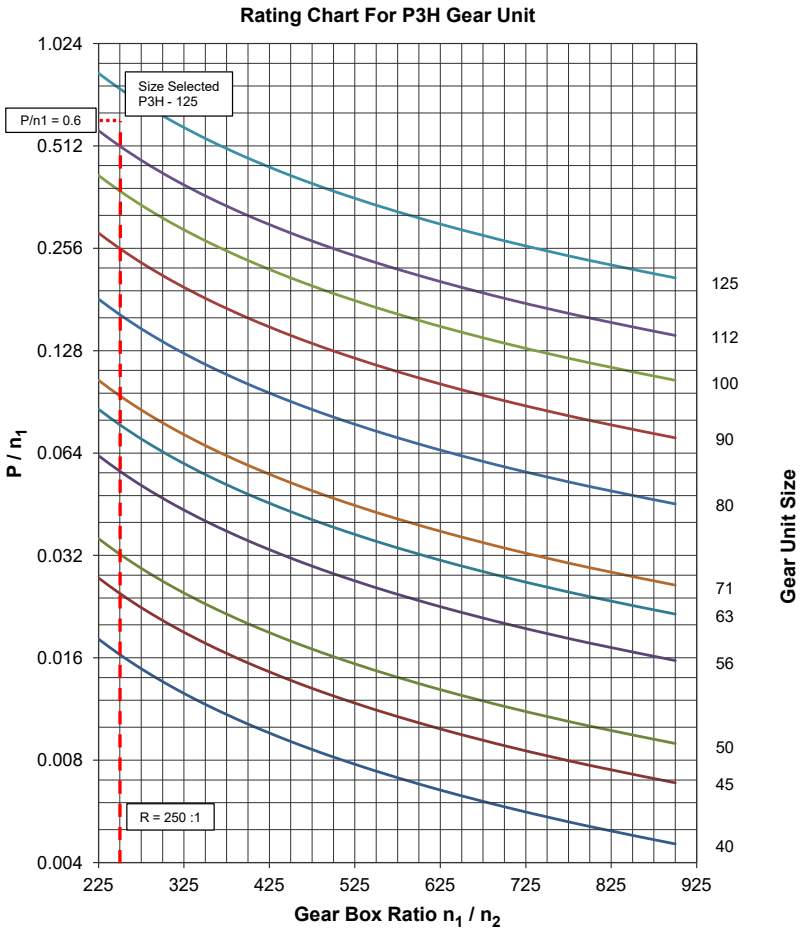
Thermal capacity according to table for type P3H-125 (See page no. 38)

$P_2 \leqslant P_G = P_{G1} \times f_4 \times f_{14}$

= 363 x 0.75 x 0.83

= 225.96 kW

So cooling systems required, please refer to Elecon.



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Guideline for variable power rating.

For constant speed and load spectrum, the gearbox can be designed using equivalent torque rating. Output torque T_{2i}, T_{2ii}....T_{2n} for respective time bin t_I, t_{II}...t_N is to be considered and equivalent torque can be calculated using following formula:

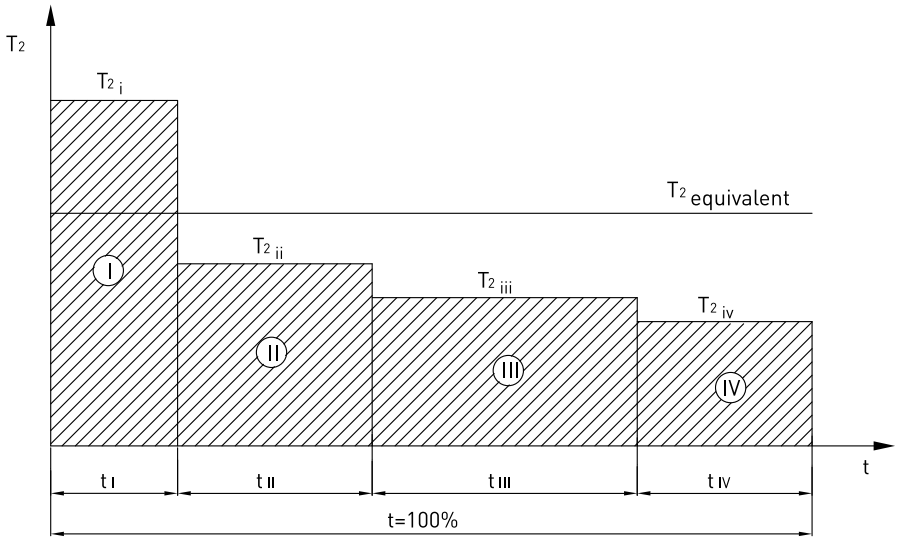
$$T_2 \text{ equivalent} = \sqrt[6.6]{(T_{2i})^{6.6} \times \frac{t_I}{100} + (T_{2ii})^{6.6} \times \frac{t_{II}}{100} + ... + (T_{2n})^{6.6} \times \frac{t_N}{100}}$$

T_{2i}, T_{2ii}....T_{2n} = Operating torque on LSS [Nm]

t_I, t_{II}...t_N = Time bin of load

$t_I + t_{II} + ... + t_N = 100$

The following figure shows a load example:



Selection Example - 2 :

Input Data :

Prime mover:

Prime mover – Electric motor P_1 = 132 kW — Motor speed n_1 = 1000 rpm

Max. starting torque T_A = 2000 Nm

Driven Machine:

Mixture — Speed n_2 = 12.5 rpm — Ambient Temp. = 40° C

Duty : 10h/day — Operating Cycle ED = 60% — Installation in open space

Equivalent torque with load spectrum and constant speed n_2

T_{2i} - 42000 Nm at 20% of time

T_{2ii} - 51000 Nm at 40% of time

T_{2iii} - 73000 Nm at 30% of time

T_{2iv} - 110000 Nm at 10% of time

Selection of gearbox type :

1. Calculate gear ratio $i = n_1 / n_2$ = 1000/12.5 = 80 i_N = 80
2. Determination of Gearbox type and size from ratio.
   Gearbox type P2H
3. Determination of equivalent torque from the given load spectrum.

$$T_2 \text{ equivalent} = \sqrt[6.6]{(T_{2_i})^{6.6} \times \frac{t_I}{100} + (T_{2_{ii}})^{6.6} \times \frac{t_{II}}{100} + \ldots\ldots + (T_{2_n})^{6.6} \times \frac{t_N}{100}}$$

T_2 equivalent = 80065 Nm

Observe the condition as shown above for guideline for variable power rating.

4. Determination of Power rating of driven machine.

$P_{equi.}$ = T_2 equivalent x n_2 / 9550

= 80065 x 12.5 /9550

= 105 kW

5. Determination of Nominal Power rating of Gear unit.

$P = P_{equi.} \times f_m \times f_s$

= 105 x 1.5 x 1

= 158 kW

6. Selection of gear unit : Refer graph of P2H

- Gear Unit Selection : P2H-56 Ratio (i) = 80 :1
- Check the exact ratio (i) (78.545) is within ± 3 % of the required ratio.

7. Checking of starting torque

$P \geqslant P_S = (T_A \times n_1/9550) \times f_3$

= (2000 x 1000/9550)x0.5

= 105 kW

P = 158 kW > P_S = 105kW

8. Determination of thermal capacity

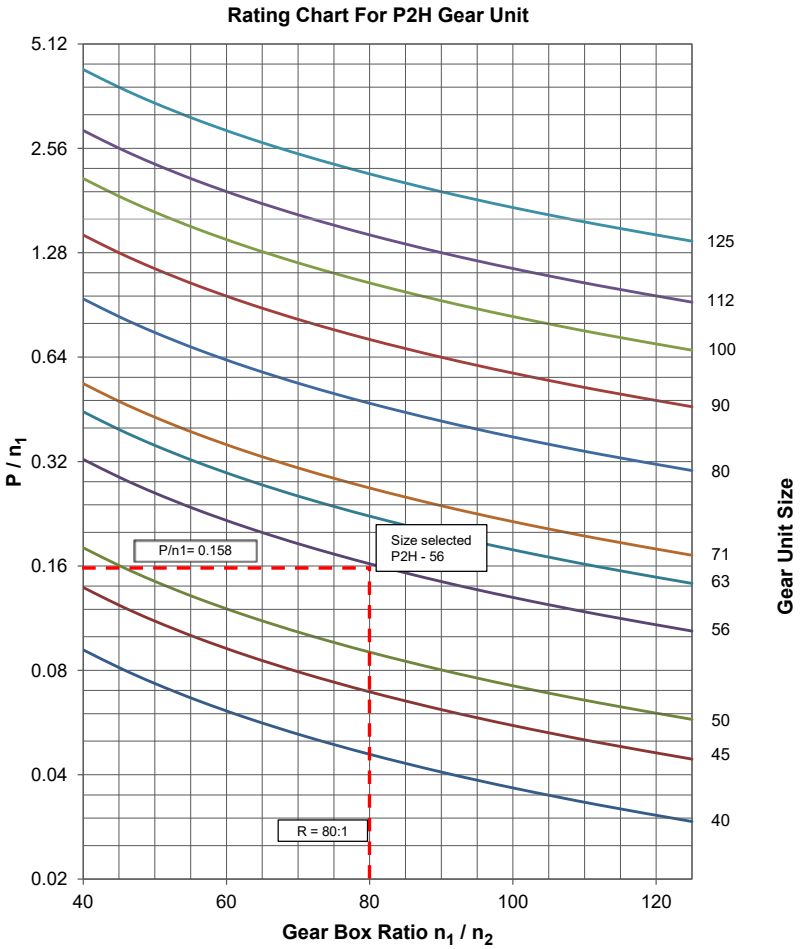
Thermal capacity according to table for type P2H-56 (See page no. 37)

$P_{equi.} < P_G = P_{G1} \times f_4 \times f_{14}$

= 86 x 0.89 x 0.9

$P_{equi.}$ = 105 kW < P_G = 68.88 kW

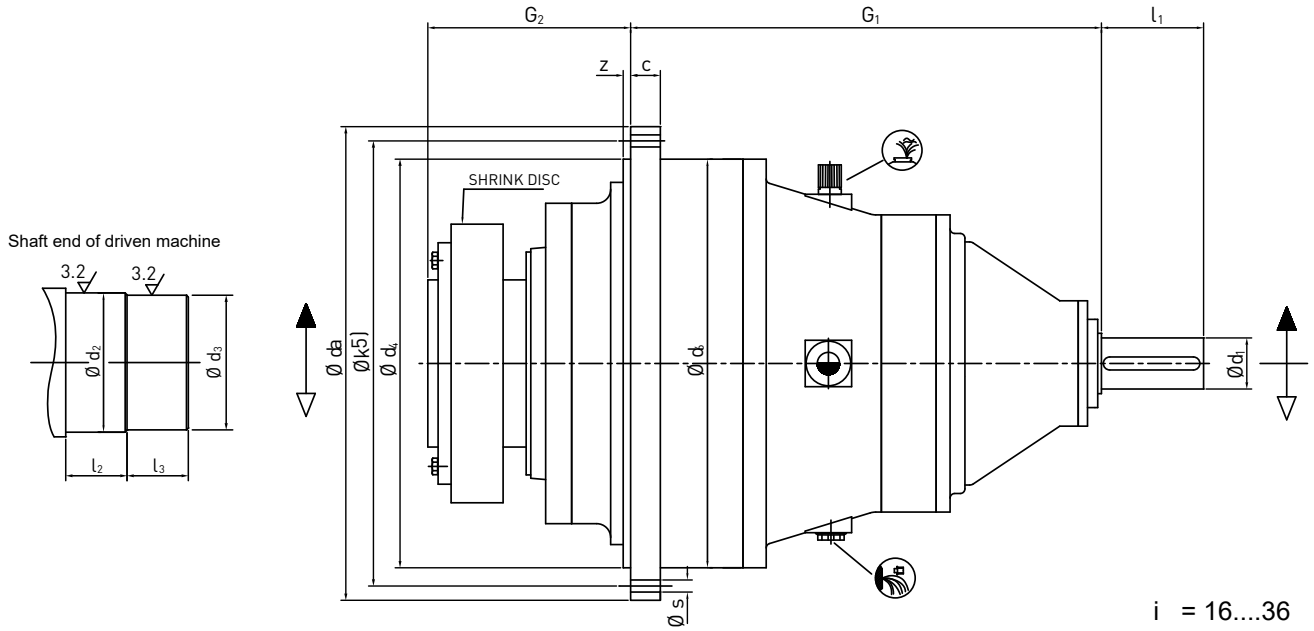
So, auxiliary cooling required refer to Elecon



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque, Dimension and weight Type P2C

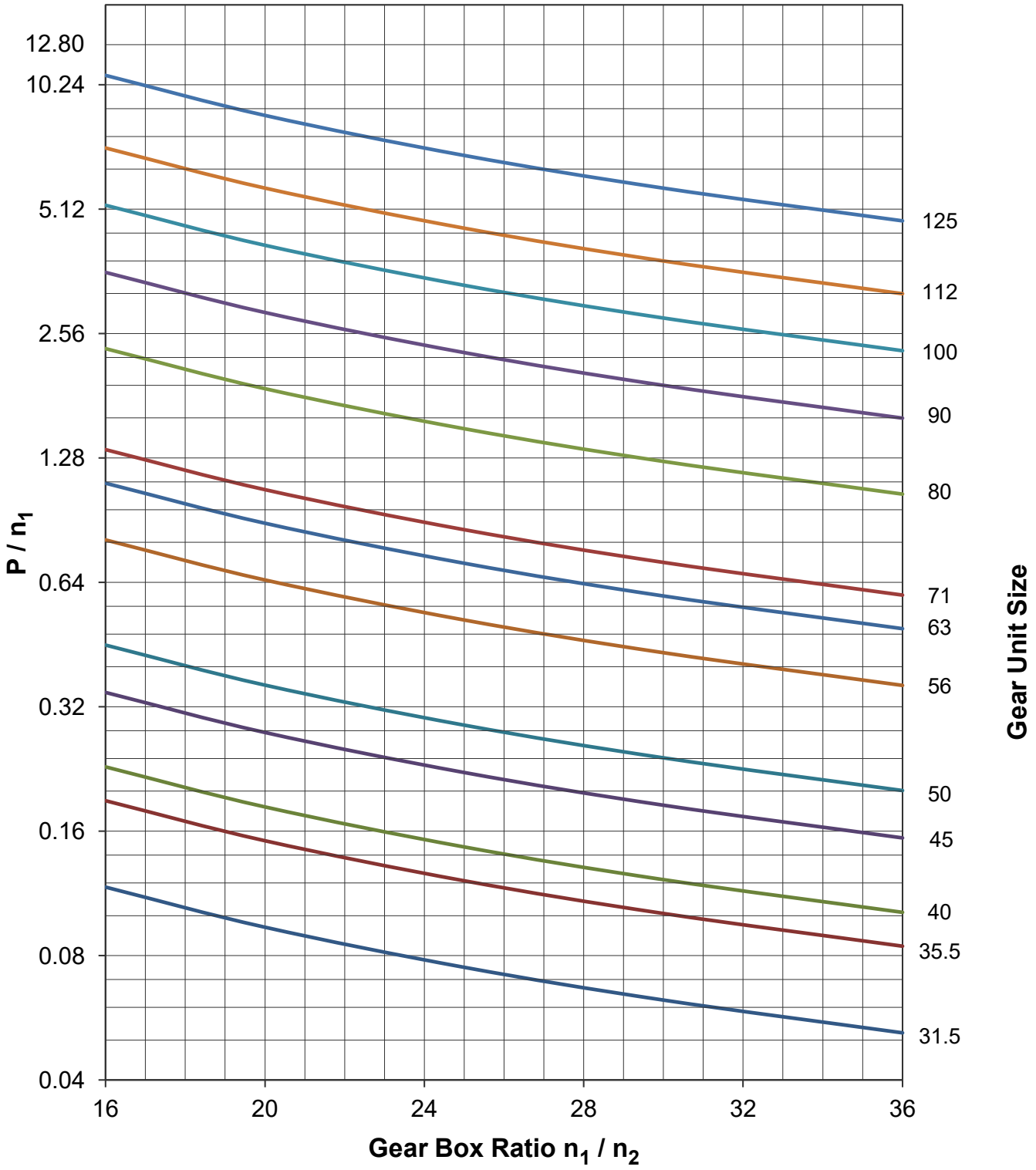


PLANETARY GEAR UNITS - TYPE : P2C																		
Torque Capacity, Dimensions, Weight & Oil Quantity																		
P2C Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h7	d_6	G_1	G_2	k	z	Flange 5 Details 5)		Weight 2) kg	Oil Qty.
	d_1 1) 3)	l_1	d_2 h6 4)	d_3 h6 4)	l_2	l_3									s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
31.5	50	110	115	110	69	45	24	460	380	380	437	179	420	6	13	16	283	13
35.5	50	110	135	130	83	45	32	480	400	400	461	203	440	8	13	20	293	18
40	55	110	145	140	83	45	32	540	440	440	507	213	490	8	18	20	346	20
45	60	140	155	150	97	50	35	580	480	480	567	232	530	8	18	20	453	30
50	70	140	180	175	122	65	40	620	520	520	669	265	570	10	18	20	592	50
56	80	170	220	215	141	75	45	740	620	620	693	306	680	10	22	20	878	55
63	90	170	240	230	153	80	50	810	670	670	790	318	740	10	26	24	1186	70
71	115	210	270	260	165	85	55	900	760	760	851	340	830	10	26	24	1608	95
80	115	210	300	290	185	95	65	1030	850	850	856	372	940	10	33	24	2060	105
90	130	250	350	340	219	110	70	1130	950	950	986	435	1040	10	33	24	2989	115
100	150	250	390	380	231	120	80	1280	1100	1100	1055	454	1190	20	33	30	4056	140
112	170	250	430	420	251	125	90	1450	1250	1250	1244	483	1350	20	39	30	6403	170
125	190	350	460	450	281	140	100	1610	1410	1410	1389	516	1510	20	39	30	9212	195
140	*																	
150																		
160																		

* = on request

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39

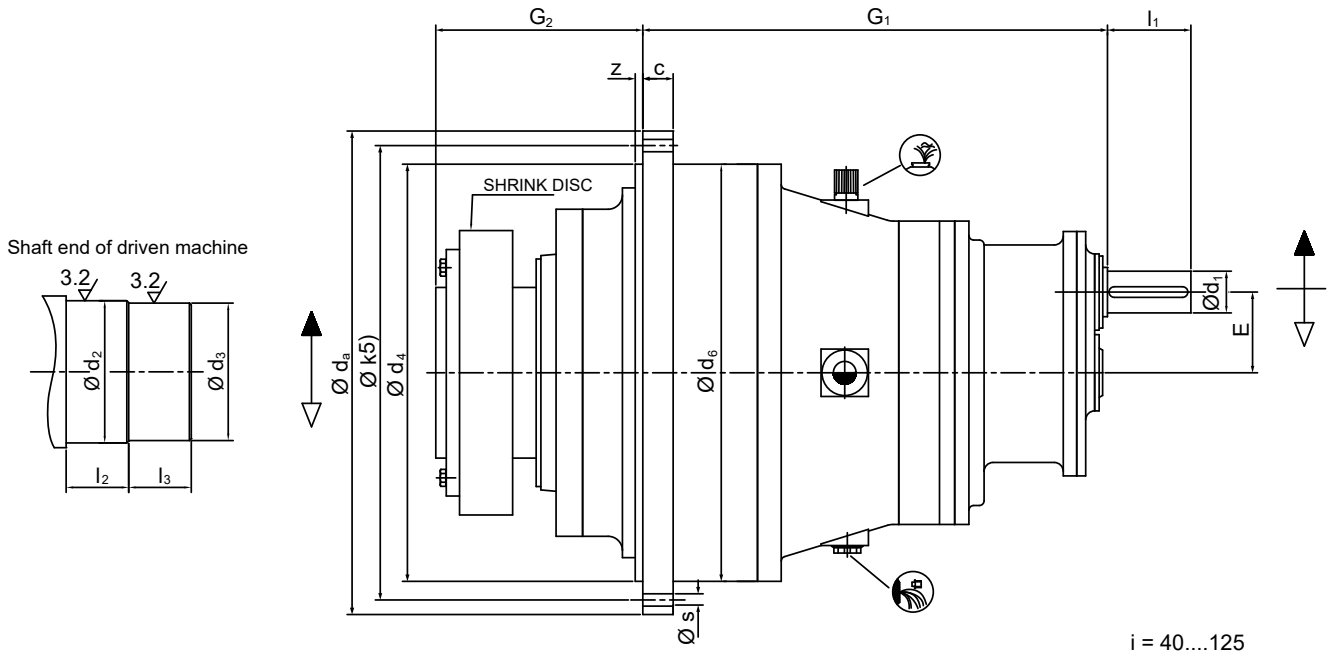
Rating Chart For P2C Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque, Dimension and weight Type P2H

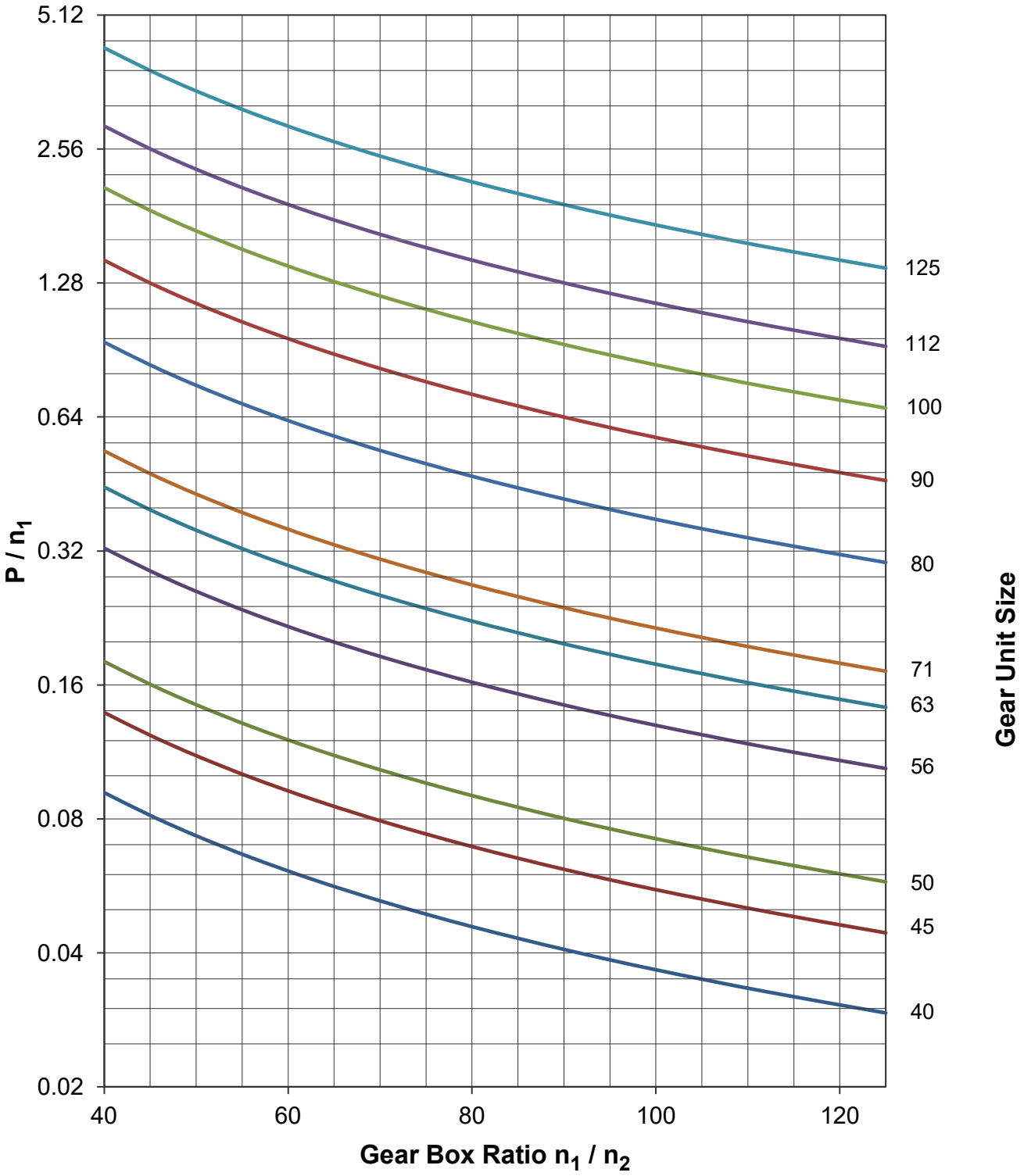


PLANETARY GEAR UNITS - TYPE : P2H																			
Torque Capacity, Dimensions, Weight & Oil Quantity																			
P2H Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h_7	d6	E	G_1	G_2	k	z	Flange Details 5)		Wei-ght 2) Kg.	Oil Qty.
	d_1 1) 3)	l_1	d_2 h_6 4)	d_3 h_6 4)	l_2	l_3										s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
40	40	110	145	140	83	45	32	540	440	440	125	604	213	490	8	18	20	440	28
45	45	110	155	150	97	50	35	580	480	480	140	710	232	530	8	18	20	558	42
50	50	110	180	175	122	65	40	620	520	520	160	805	265	570	10	18	20	859	70
56	60	140	220	215	141	75	45	740	620	620	180	846	306	680	10	22	20	1204	80
63	70	140	240	230	153	80	50	810	670	670	200	984	318	740	10	26	24	1642	100
71	75	140	270	260	165	85	55	900	760	760	225	1045	340	830	10	26	24	2049	135
80	85	170	300	290	185	95	65	1030	850	850	250	1108	372	940	10	33	24	2578	150
90	100	210	350	340	219	110	70	1130	950	950	280	1254	435	1040	10	33	24	3630	165
100	110	210	390	380	231	120	80	1280	1100	1100	315	1415	454	1190	20	33	30	4857	200
112	125	250	430	420	251	125	90	1450	1250	1250	355	1581	483	1350	20	39	30	7168	230
125	140	250	460	450	281	140	100	1610	1410	1410	400	1769	516	1510	20	39	30	10028	260
140	*																		
150																			
160																			

* = on request

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39

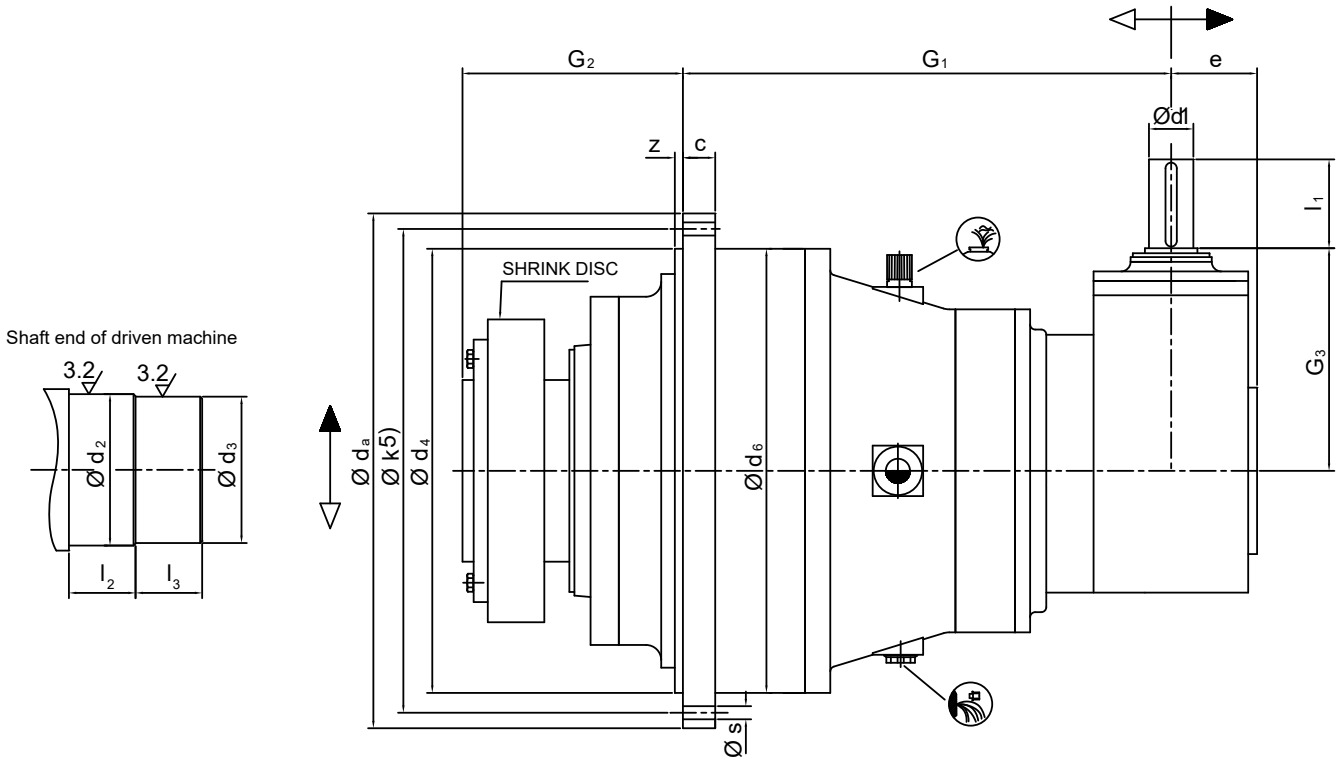
Rating Chart For P2H Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque , Dimension and weight Type P2B



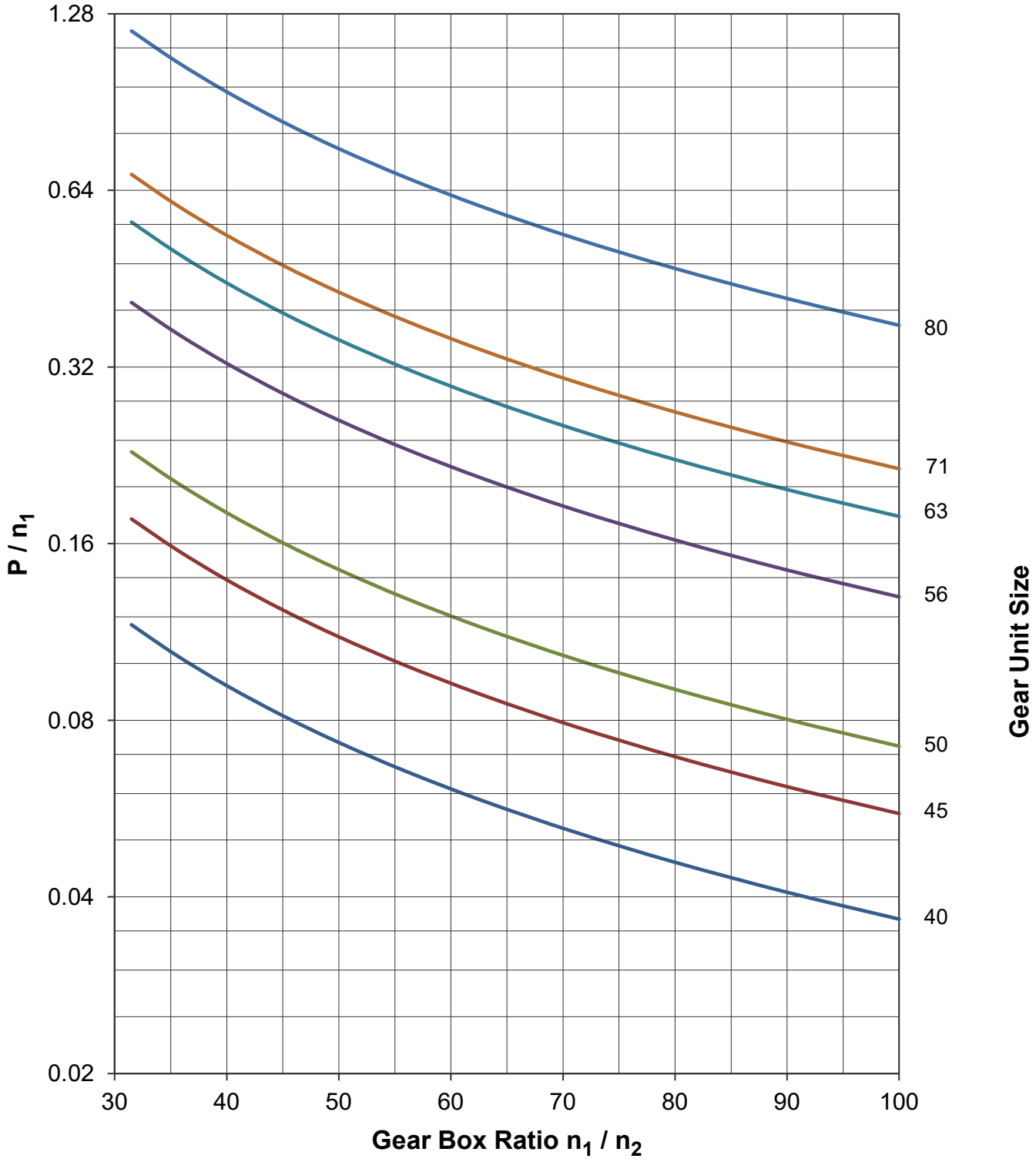
i = 31.5....100

PLANETARY GEAR UNITS - TYPE : P2B																				
Torque Capacity, Dimensions, Weight & Oil Quantity																				
P2B Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h7	d_6	E	G_1	G_2	G_3	k	z	Flange Details 5)		Weight 2) Kg.	Oil Qty.
	d_1 1) 3)	l_1	d_2 h6 4)	d_3 h6 4)	l_2	l_3											s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
40	70	140	145	140	83	45	32	540	440	440	160	571	213	353	490	8	18	20	340	40
45	80	140	155	150	97	50	35	580	480	480	175	656	232	414	530	8	18	20	482	58
50	90	170	180	175	122	65	40	620	520	520	198	775	265	430	570	10	18	20	646	83
56	110	210	220	215	141	75	45	740	620	620	230	820	306	551	680	10	22	20	1045	92
63	120	210	240	230	153	80	50	810	670	670	240	943	318	590	740	10	26	24	1532	106
71	120	210	270	260	165	85	55	900	760	760	245	973	340	590	830	10	26	24	2043	135
80	140	250	300	290	185	95	65	1030	850	850	275	1014	372	701	940	10	33	24	2554	145
90	*																			
100																				
112																				
125																				
140																				
150																				
160																				

* = on request

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39

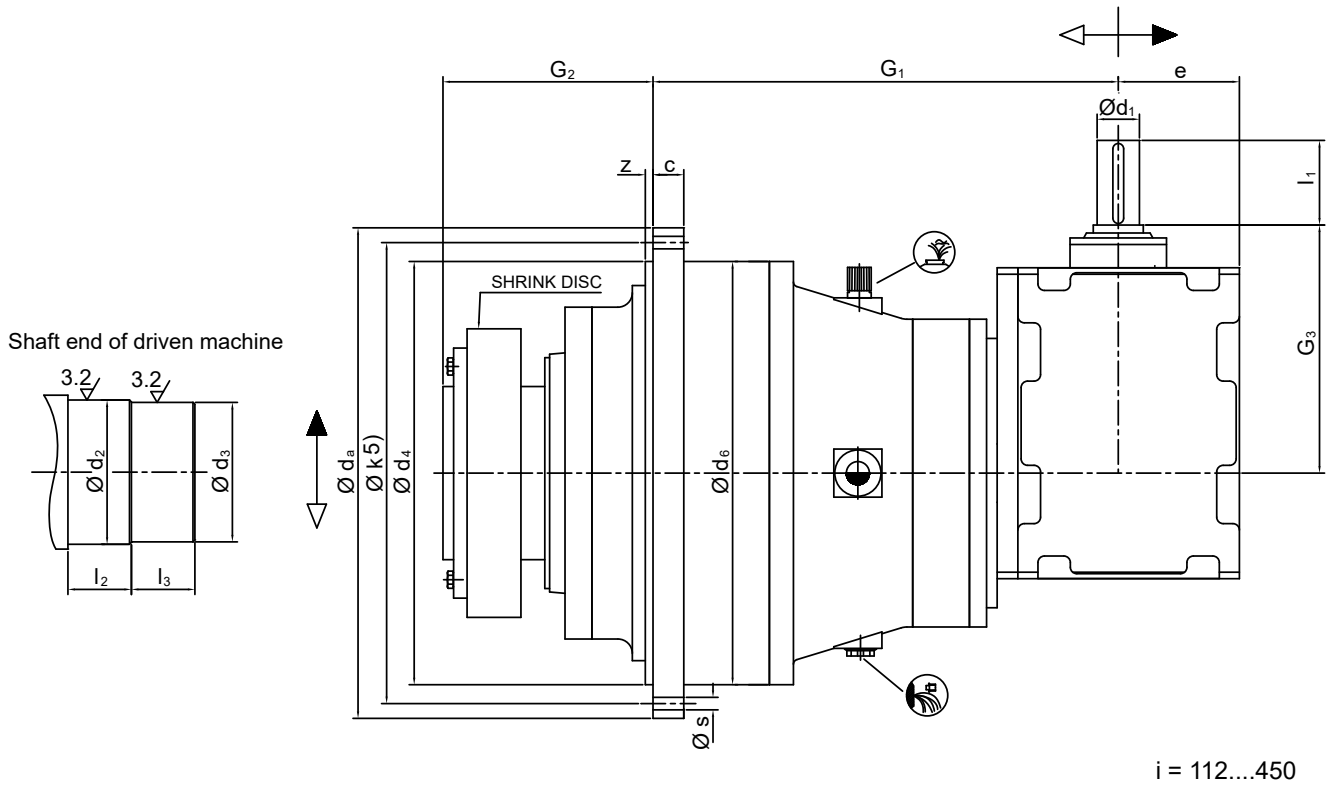
Rating Chart For P2B Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

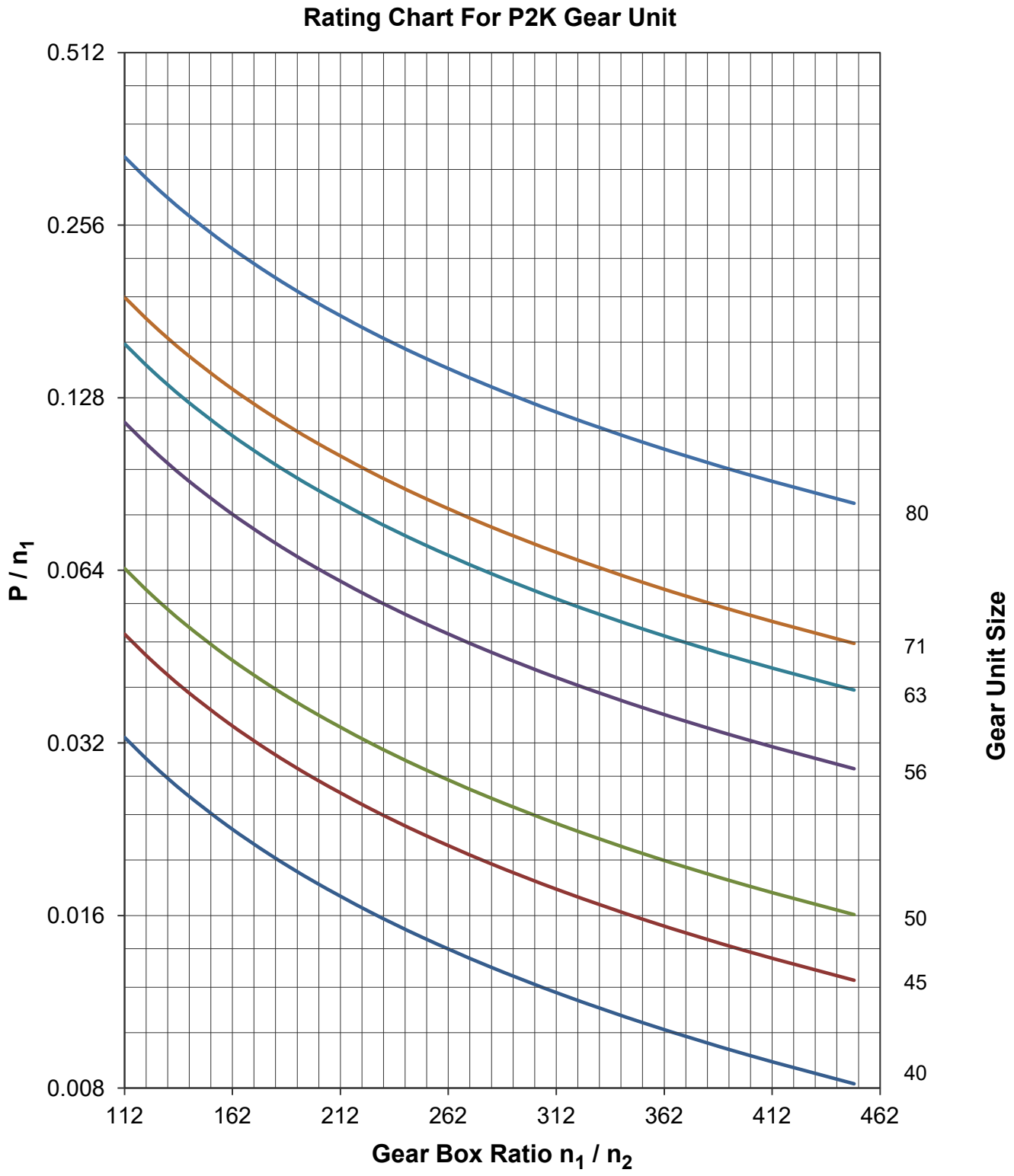
Torque, Dimension and weight Type P2K



PLANETARY GEAR UNITS - TYPE : P2K																				
Torque Capacity, Dimensions, Weight & Oil Quantity																				
P2K Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h7	d_6	E	G_1	G_2	G_3	k	z	Flange Details 5)		Wei-ght 2) Kg.	Oil Qty.
	d_1 1) 3)	l_1	d_2 h_6 4)	d_3 h_6 4)	l_2	l_3											s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
40	40	120	145	140	83	45	32	540	440	440	147	575	213	413	490	8	18	20	500	30
45	50	120	155	150	97	50	35	580	480	480	179	680	232	491	530	8	18	20	805	50
50	50	120	180	175	122	65	40	620	520	520	179	753	265	491	570	10	18	20	918	75
56	60	145	220	215	141	75	45	740	620	620	210	811	306	578	680	10	22	20	1427	83
63	75	160	240	230	153	80	50	810	670	670	225	913	318	731	740	10	26	24	2182	103
71	75	160	270	260	165	85	55	900	760	760	225	942	340	731	830	10	26	24	2492	128
80	85	180	300	290	185	95	65	1030	850	850	265	987	372	884	940	10	33	24	3485	138
90	*																			
100																				
112																				
125																				
140																				
150																				
160																				

* = on request

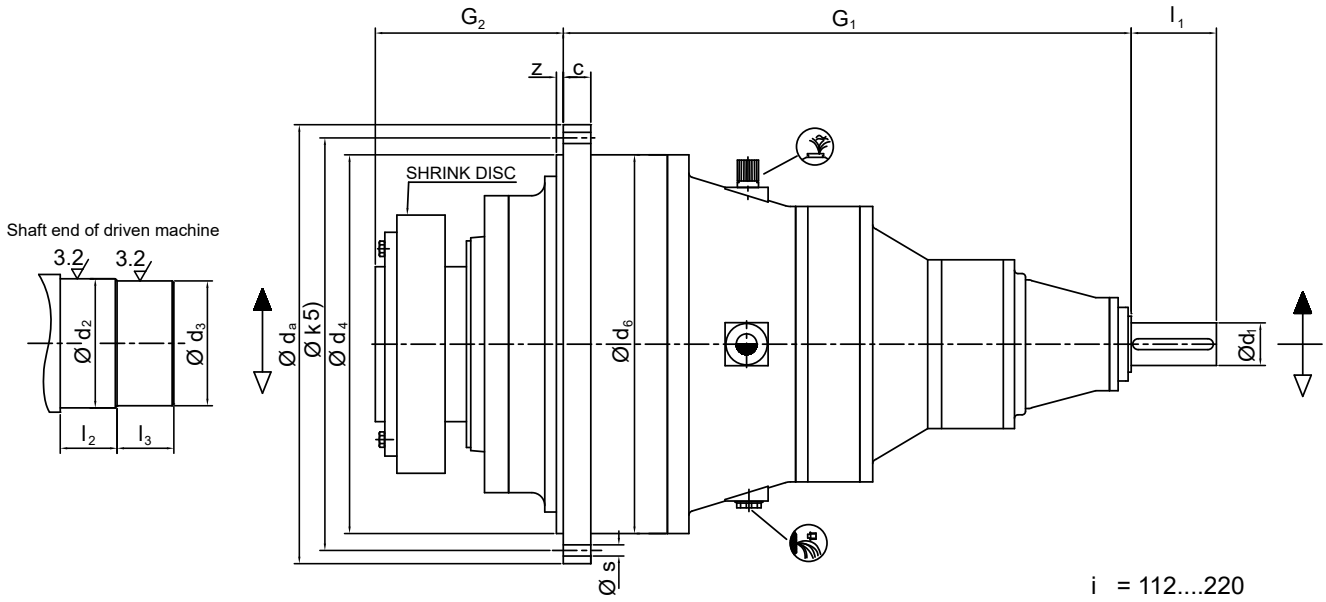
1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque , Dimension and weight Type P3C

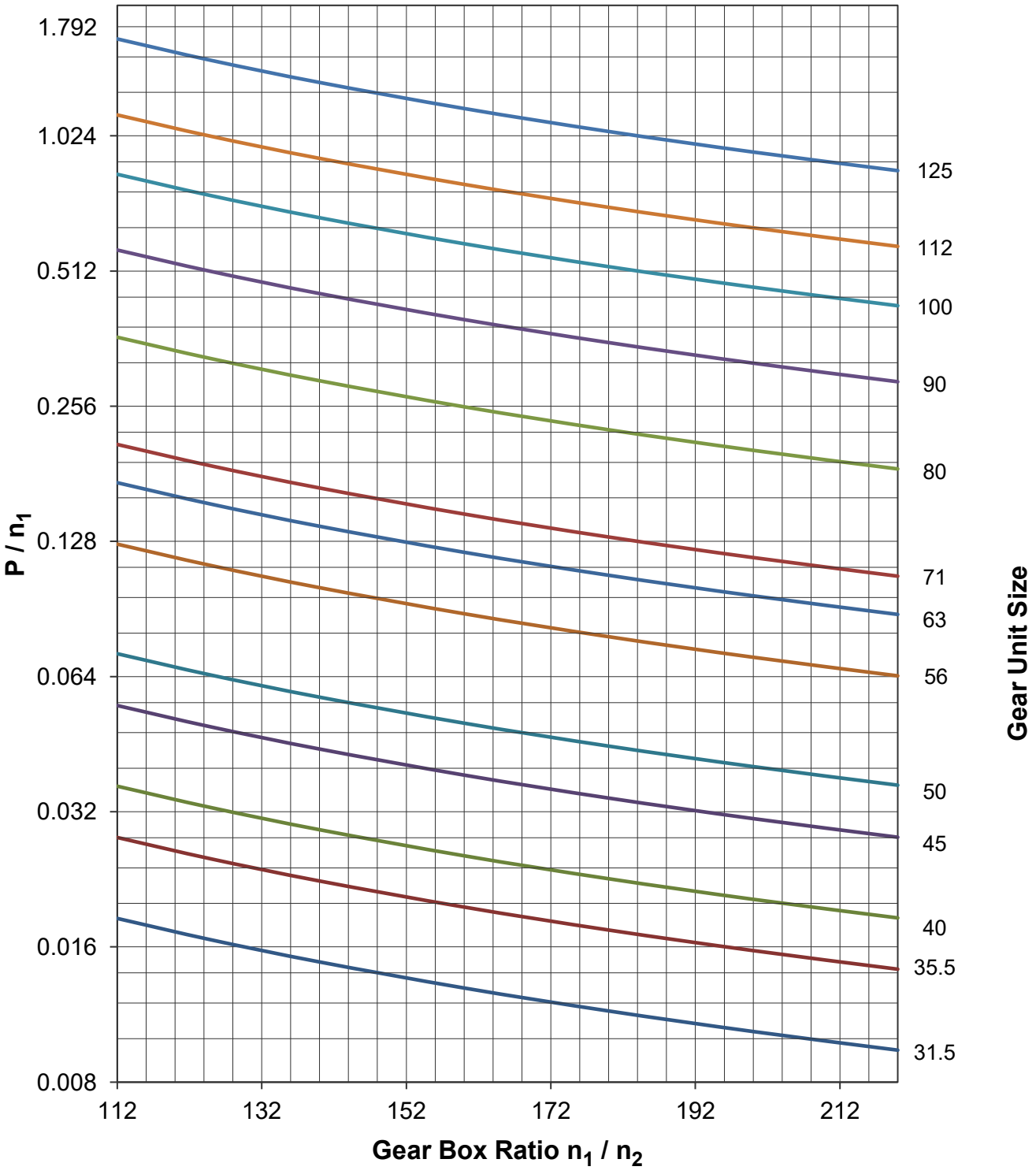


PLANETARY GEAR UNITS - TYPE : P3C																		
Torque Capacity, Dimensions, Weight & Oil Quantity																		
P3C Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h7	d_6	G_1	G_2	k	z	Flange Details 5)		Weight 2) kg	Oil Qty.
	d_1 1) 3)	l_1	d_2 h_6 4)	d_3 h_6 4)	l_2	l_3									s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
31.5	40	110	115	110	69	45	24	460	380	380	565	179	420	6	13	16	309	15
35.5	40	110	135	130	83	45	32	480	400	400	588	203	440	8	13	20	319	20
40	40	110	145	140	83	45	32	540	440	440	603	213	490	8	18	20	369	22
45	50	110	155	150	97	50	35	580	480	480	728	232	530	8	18	20	502	33
50	50	110	180	175	122	65	40	620	520	520	790	265	570	10	18	20	627	53
56	55	110	220	215	141	75	45	740	620	620	851	306	680	10	22	20	936	60
63	60	140	240	230	153	80	50	810	670	670	965	318	740	10	26	24	1290	80
71	70	140	270	260	165	85	55	900	760	760	1074	340	830	10	26	24	1696	110
80	70	140	300	290	185	95	65	1030	850	850	1080	372	940	10	33	24	2148	120
90	80	170	350	340	219	110	70	1130	950	950	1163	435	1040	10	33	24	3073	130
100	90	170	390	380	231	120	80	1280	1100	1100	1285	454	1190	20	33	30	4191	160
112	115	210	430	420	251	125	90	1450	1250	1250	1440	483	1350	20	39	30	6549	205
125	130	250	460	450	281	140	100	1610	1410	1410	1659	516	1510	20	39	30	9541	235
140	*																	
150																		
160																		

* = on request

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39

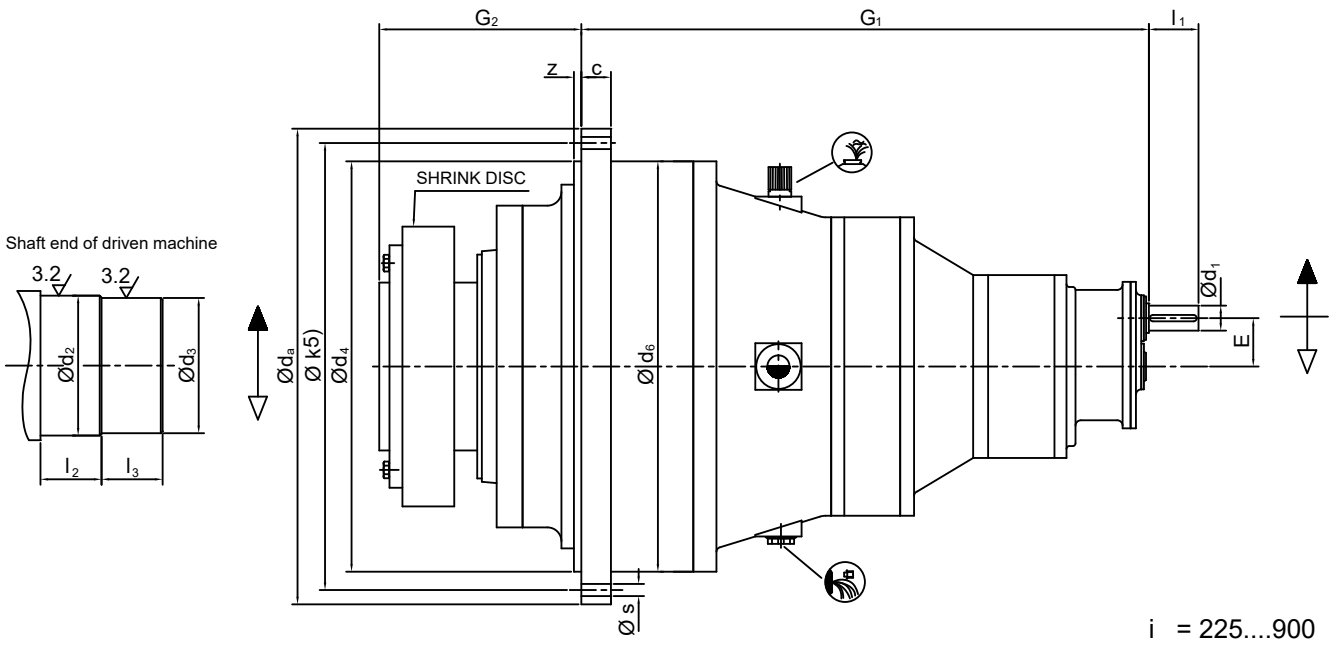
Rating Chart For P3C Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque, Dimension and weight Type P3H

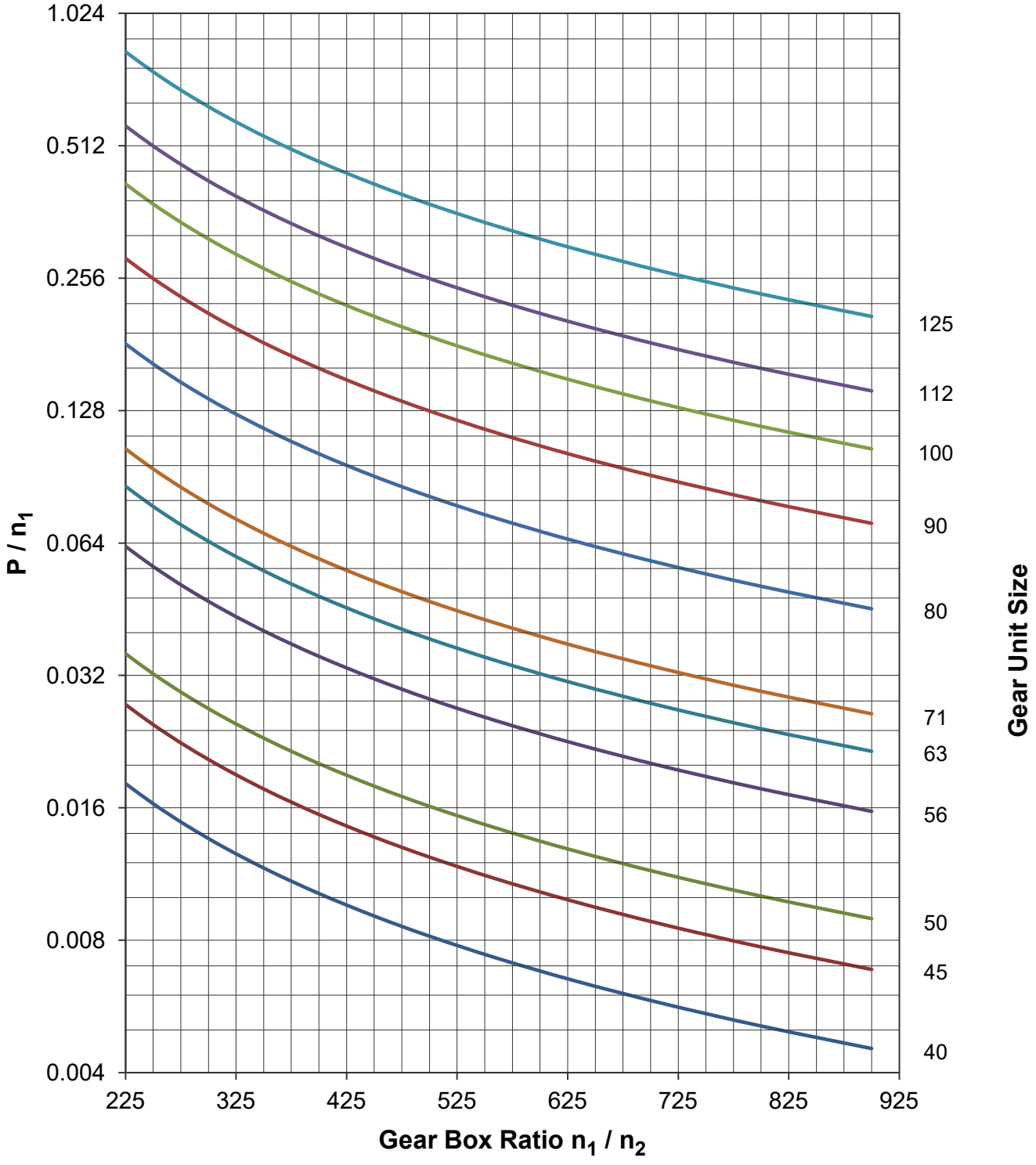


PLANETARY GEAR UNITS - TYPE : P3H																			
Torque Capacity, Dimensions, Weight & Oil Quantity																			
P3H Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h7	d_6	E	G_1	G_2	k	z	Flange Details 5)		Weight 2) Kg.	Oil Qty.
	d_1 1) 3)	l_1	d_2 h_6 4)	d_3 h_6 4)	l_2	l_3										s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
40	25	60	145	140	83	45	32	540	440	440	90	671	213	490	8	18	20	452	24
45	30	80	155	150	97	50	35	580	480	480	100	814	232	530	8	18	20	582	37
50	40	110	180	175	122	65	40	620	520	520	125	897	265	570	10	18	20	724	61
56	40	110	220	215	141	75	45	740	620	620	125	947	306	680	10	22	20	1029	68
63	45	110	240	230	153	80	50	810	670	670	90	1108	318	740	10	26	24	1345	82
71	45	110	270	260	165	85	55	900	760	760	140	1189	340	830	10	26	24	1903	126
80	50	110	300	290	185	95	65	1030	850	850	160	1216	372	940	10	33	24	2416	140
90	60	140	350	340	219	110	70	1130	950	950	180	1316	435	1040	10	33	24	3399	155
100	70	140	390	380	231	120	80	1280	1100	1100	200	1479	454	1190	20	33	30	4646	190
112	75	140	430	420	251	125	90	1450	1250	1250	225	1634	483	1350	20	39	30	6990	245
125	85	170	460	450	281	140	100	1610	1410	1410	250	1878	516	1510	20	39	30	10094	280
140	*																		
150																			
160																			

* = on request

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39

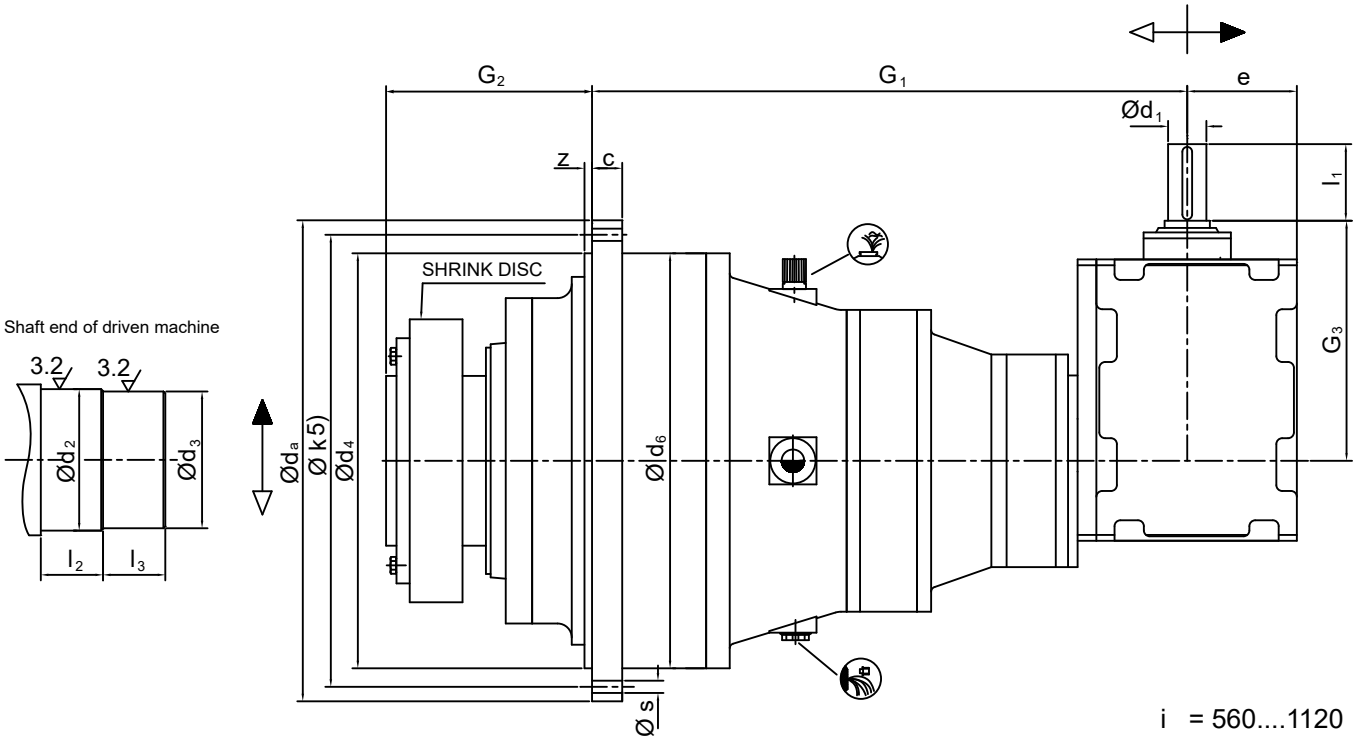
Rating Chart For P3H Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque, Dimension and weight Type P3K

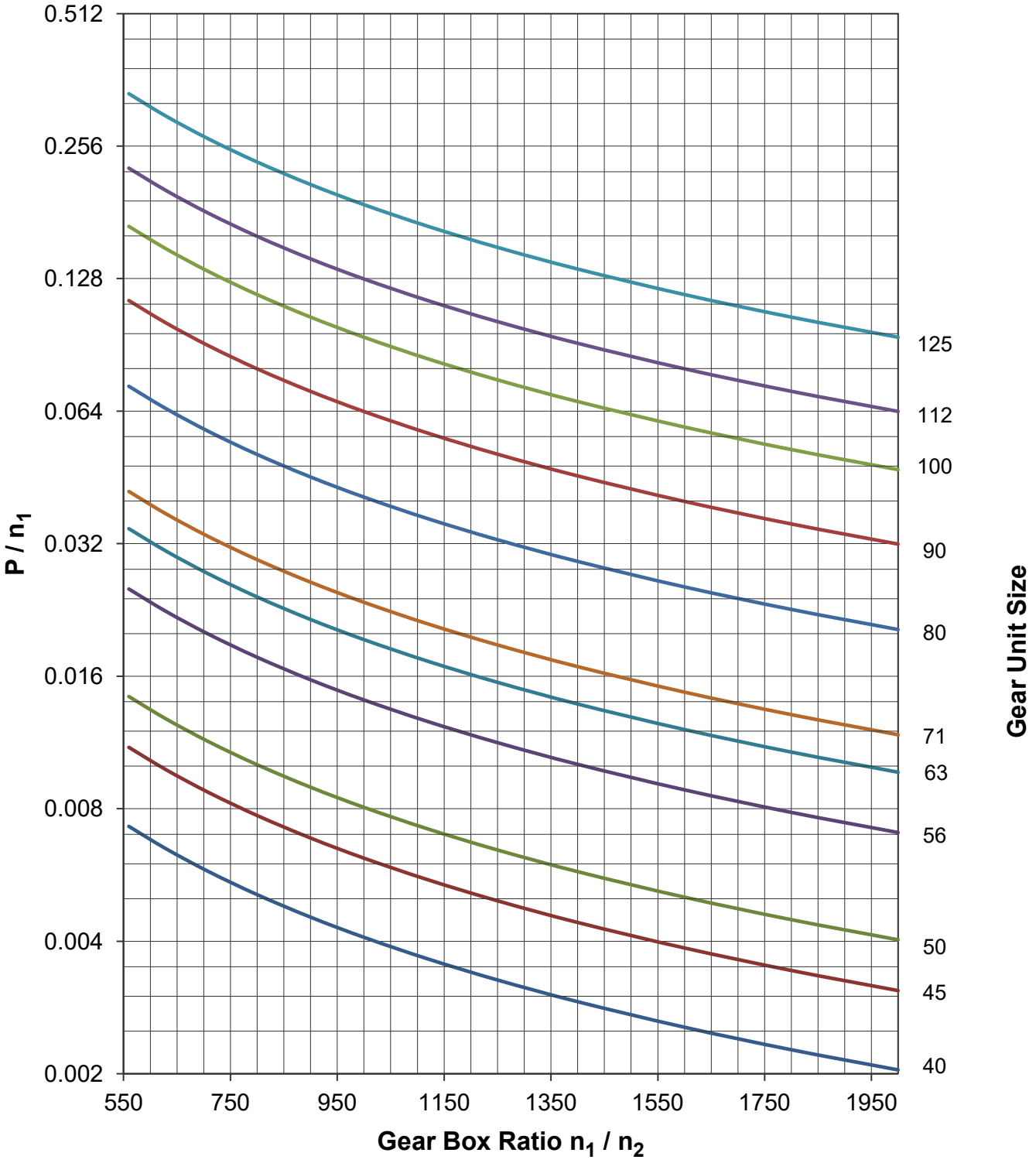


PLANETARY GEAR UNITS - TYPE : P3K																				
Torque Capacity, Dimensions, Weight & Oil Quantity																				
P3K Size	Input Side Shaft End		Output Side Shaft End				c	d_a	d_4 h7	d_6	E	G_1	G_2	G_3	k	z	Flange Details 5)		Weight 2) Kg.	Oil Qty.
	d_1 1) 3)	l_1	d_2 h_6 4)	d_3 h_6 4)	l_2	l_3											s	no		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
40	25	85	145	140	83	45	32	540	440	440	113	667	213	321	490	8	18	20	480	27
45	25	85	155	150	97	50	35	580	480	480	113	762	232	321	530	8	18	20	594	41
50	25	85	180	175	122	65	40	620	520	520	113	824	265	321	570	10	18	20	719	61
56	40	120	220	215	141	75	45	740	620	620	147	919	306	413	680	10	22	20	1140	70
63	40	120	240	230	153	80	50	810	670	670	147	1028	318	413	740	10	26	24	1492	95
71	50	120	270	260	165	85	55	900	760	760	179	1158	340	491	830	10	26	24	1994	115
80	50	120	300	290	185	95	65	1030	850	850	179	1164	372	491	940	10	33	24	2566	145
90	60	145	350	340	219	110	70	1130	950	950	210	1281	435	578	1040	10	33	24	3764	158
100	60	145	390	380	231	120	80	1280	1100	1100	210	1393	454	578	1190	20	33	30	4895	190
112	75	160	430	420	251	125	90	1450	1250	1250	225	1531	483	731	1350	20	39	30	7682	238
125	75	160	460	450	281	140	100	1610	1410	1410	225	1715	516	731	1510	20	39	30	10626	272
140	*																			
150																				
160																				

* = on request

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6
2) Weight without shrink disk and oil
3) For shaft end d_1 with parallel key according to din 6885/1 and centre hole
4) Driven machine outout shaft diameter >160 mm. Tolerance g6
5) For holes patterns, See page 39

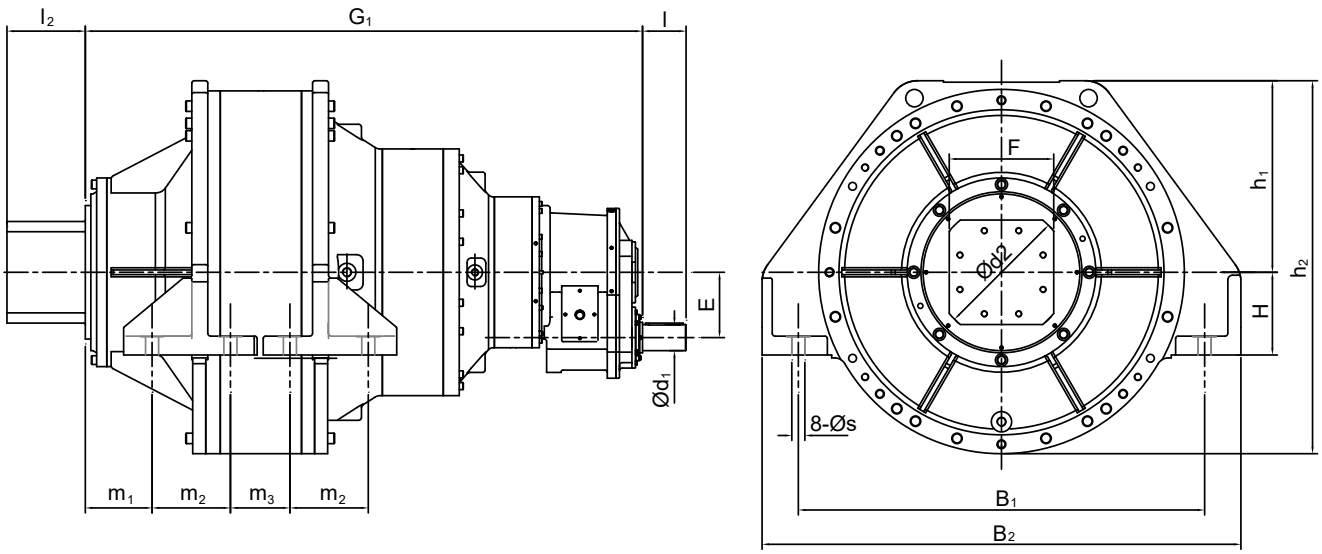
Rating Chart For P3K Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque, Dimension and weight Type P3HSB

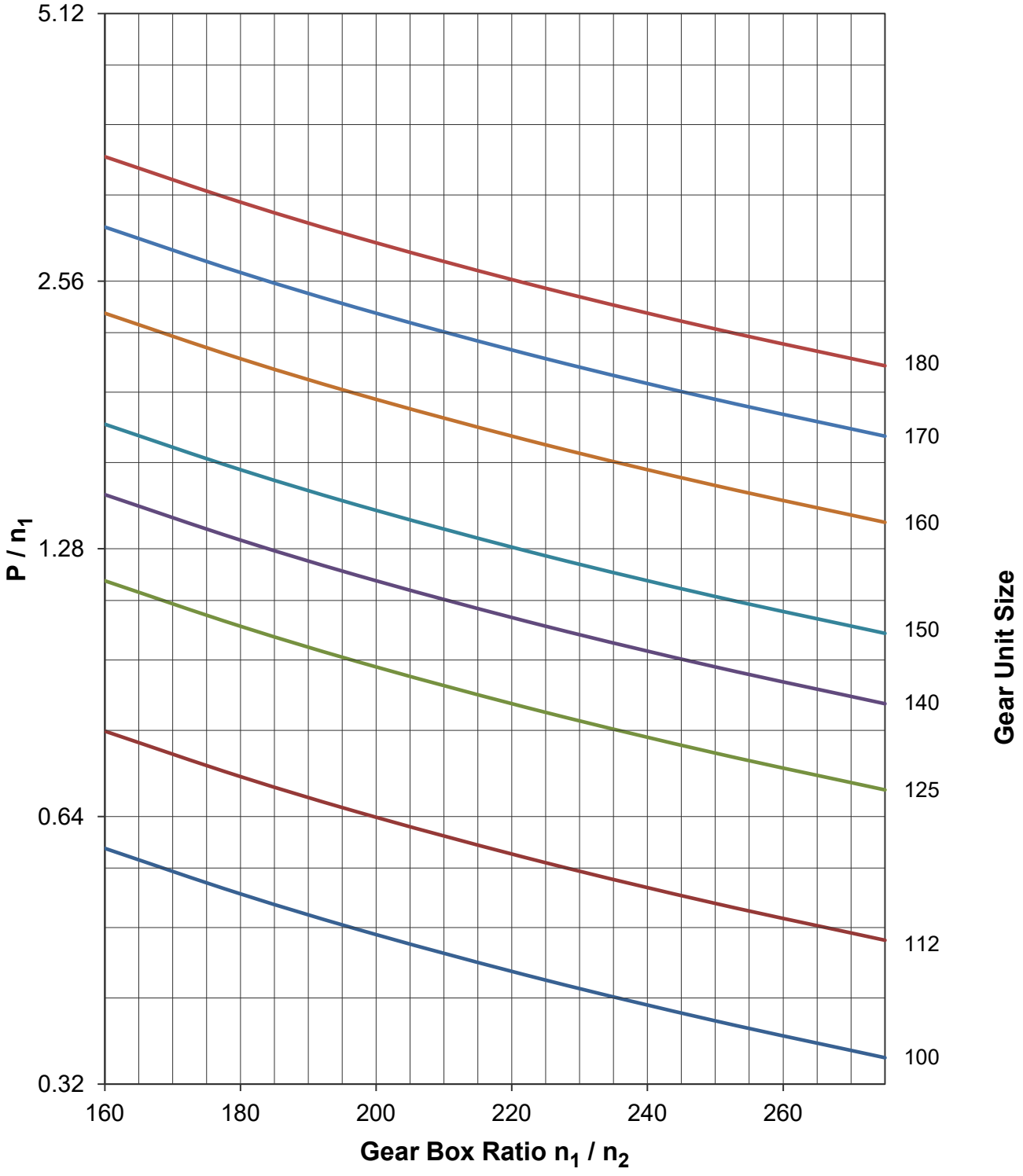


i = 160....275

PLANETARY GEAR UNITS - TYPE : P3HSB																		
Torque Capacity, Dimensions, Weight & Oil Quantity																		
P3HSB Size	Input Side Shaft End		Output Side Shaft End			G_1	H	E 4)	B_1	B_2	h_1	h_2	m_1	m_2	m_3	s	Weight 2) Kg.	Oil Qty.
	d_1 1) 3)	l_1	d_2 m6 4)	SQ.F 4)	l_2 5)													
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		ltrs.
100	65	120	360	300	250	1805	285	200	1300	1550	560	1110	255	240	185	45	5000	150
112	90	150	450	360	250	1920	285	225	1400	1650	660	1285	230	270	205	45	9000	250
125	100	180	520	420	300	2290	370	250	1640	1920	750	1455	300	310	236	62	12000	250
140	100	180	540	440	300	2210	430	250	1850	2150	840	1632	236	330	246	62	16000	375
150	100	180	550	450	350	2410	480	250	1960	2300	880	1730	280	360	236	70	20000	400
160	100	210	610	500	380	2665	510	280	2200	2520	960	1890	335	340	270	78	25000	500
170	130	250	680	520	380	2930	570	355	2200	2520	900	1800	367	380	290	86	28000	600
180	130	250	680	520	380	2975	570	355	2340	2700	1140	2250	366	380	320	86	30000	800

1) Shaft diameter $d_1 \leq 50$ tolerance k6, Shaft diameter $d_1 > 50$ tolerance m6.
2) Weight without oil.
3) For shaft end d_1 with parallel key according To din 6885/1 and centre hole.
4) Position of Input according to client's requirement.
5) Output Shaft dimension given is maximum, client can change according to requirement.

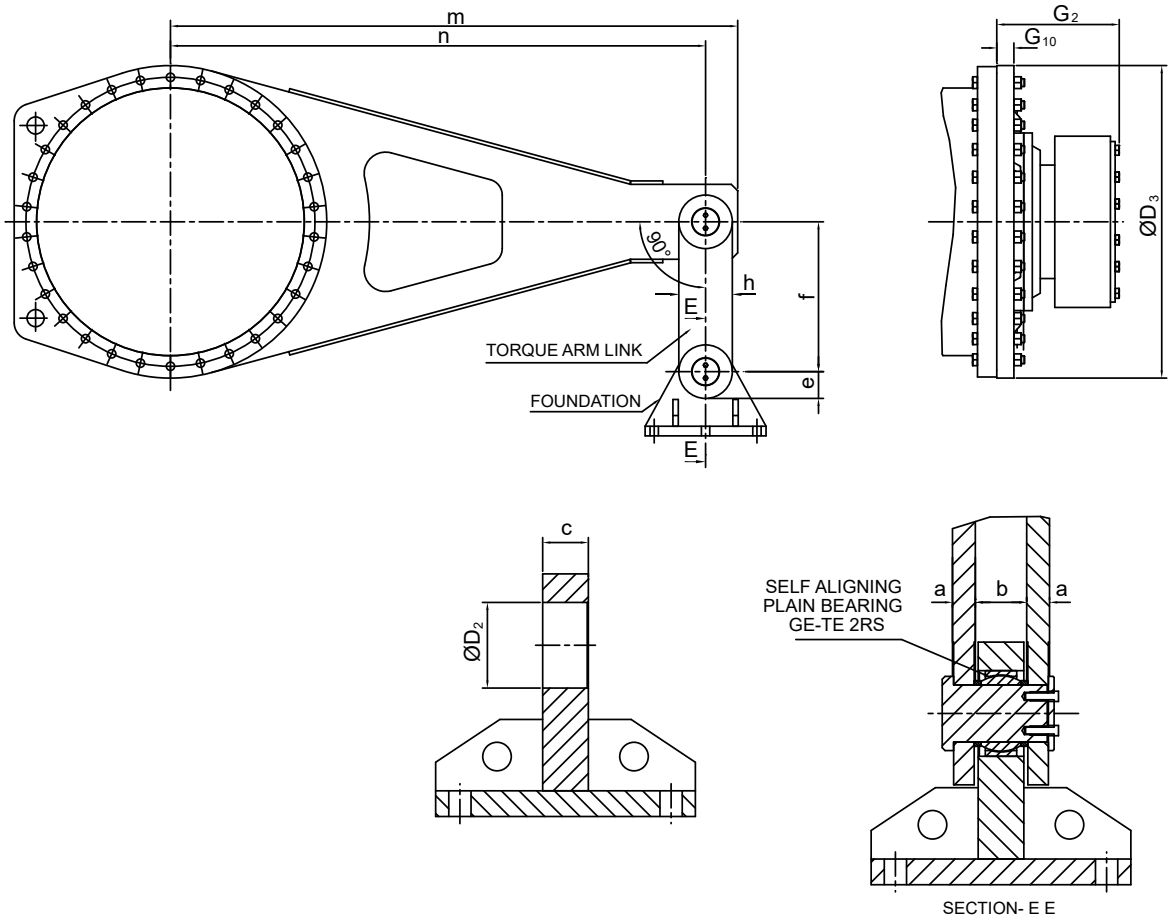
Rating Chart For P3HSB Gear Unit



Rating Charts Considering Service Factor = 1.0

P = Motor Power (kw)
n_1 = Input Speed (rpm)
n_2 = Output Speed (rpm)

Torque arm detail

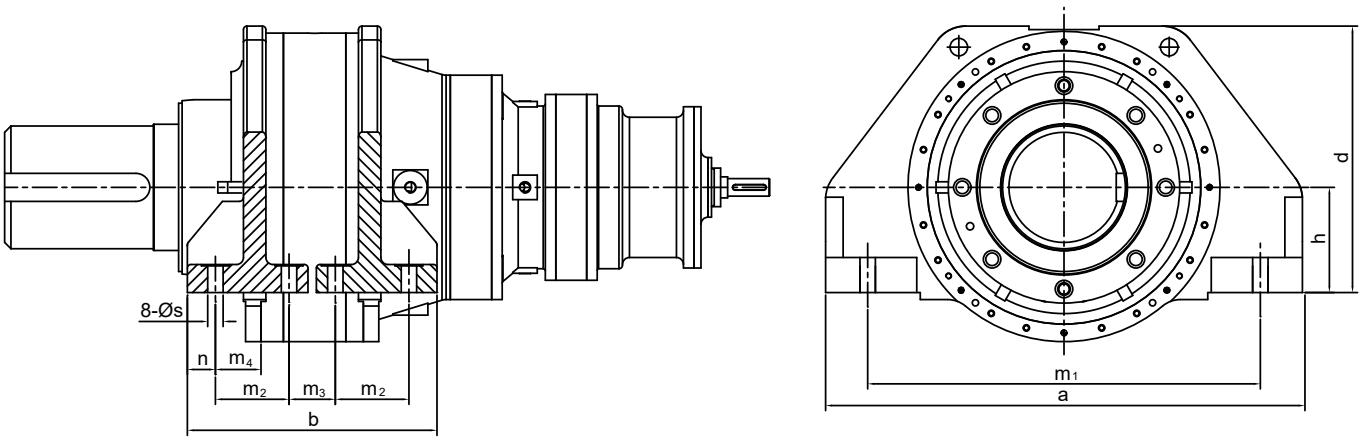


Dimensions and weight														
Planetary gear unit	D_2 H7	D_3	G_2	G_{10}	a	b	c	e	f	h	m	n	self aligning plain bearing	Weight Kg.
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
31.5	55	470	179	25	15	35	25	26	140	55	610	555	35	49
35.5	62	490	203	30	15	45	32	30	160	60	747	685	40	72
40	62	550	213	30	20	45	32	30	160	60	847	785	40	91
45	68	590	232	35	20	50	36	34	160	70	908	840	45	122
50	75	630	265	35	20	50	50	38	180	75	915	840	50	134
56	90	750	306	50	20	65	56	45	200	90	1090	1000	60	267
63	105	820	318	55	25	70	63	53	240	105	1315	1210	70	381
71	120	910	340	60	25	80	63	60	320	120	1420	1300	80	503
80	130	1040	372	60	32	80	63	68	360	135	1705	1575	90	688
90	150	1140	435	60	32	80	63	75	400	150	1870	1720	100	828
100	160	1290	454	65	40	80	63	83	440	165	2060	1900	110	1131
112	160	1460	483	75	45	95	75	83	600	165	2160	2000	110	1580
125	180	1620	516	80	45	100	80	90	700	180	2680	2500	120	2242
140	*													
150														

* = on request

Note : Other type & size of torque arm to be provided on request.

Detail of Base of Base mounted gearboxes

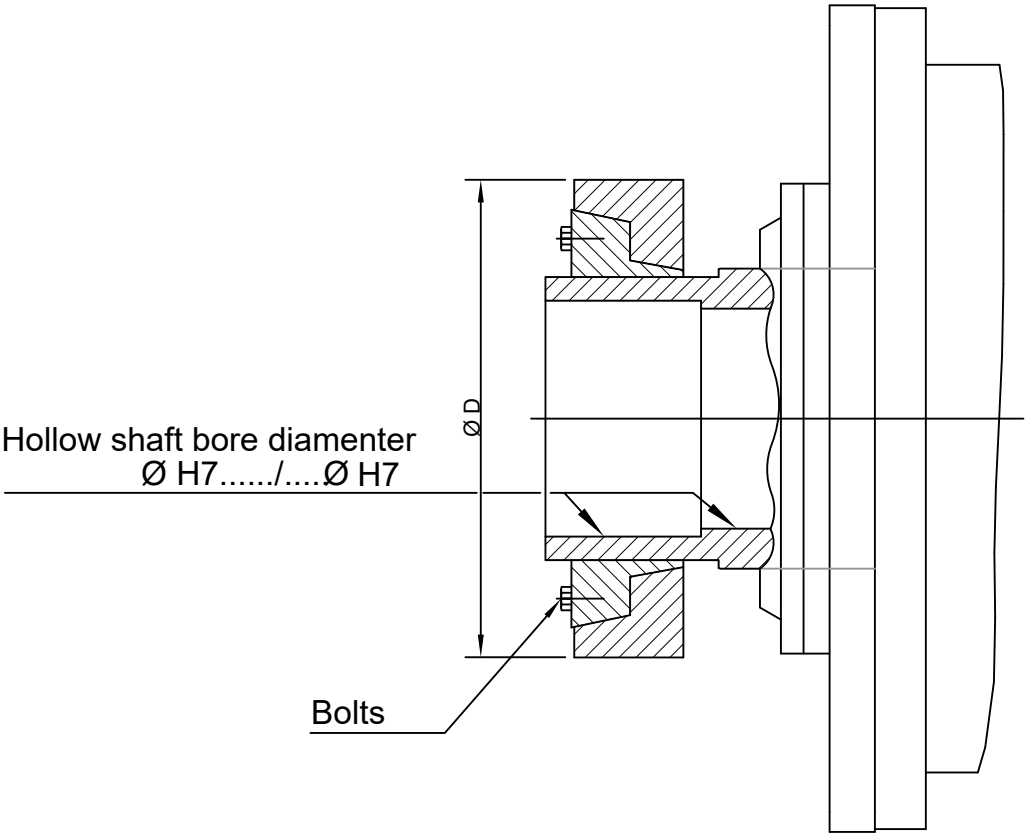


Dimensions and weight											
Planetary gear unit	**a**	**b**	**d**	**h**	**m_1**	**m_2**	**m_3**	**m_4 1)**	**n**	**s**	**Weight Kg.**
	mm	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	
31.5	530	282	200	140	470	80	48	50	37	22	64
35.5	560	316	210	140	500	90	72	55	32	22	70
40	680	351	230	150	560	105	61	65	40	22	76
45	760	385	260	160	640	115	75	68	40	27	98
50	800	456	270	175	660	135	80	80	53	33	120
56	910	501	330	205	780	140	105	80	58	33	160
63	980	576	360	205	830	165	130	105	58	39	200
71	1060	626	385	215	880	165	140	100	78	39	500
80	1340	816	440	240	1140	240	150	155	93	45	508
90	1400	846	500	265	1200	240	200	160	83	45	578
100	1550	891	560	285	1300	240	215	155	98	45	580
112	1650	981	660	285	1400	270	245	185	98	45	602
125	1920	1171	750	370	1640	310	281	208	135	62	1072
140	*										
150											

* = On request

1) m_4 dimension is distance of first hole from flange surface

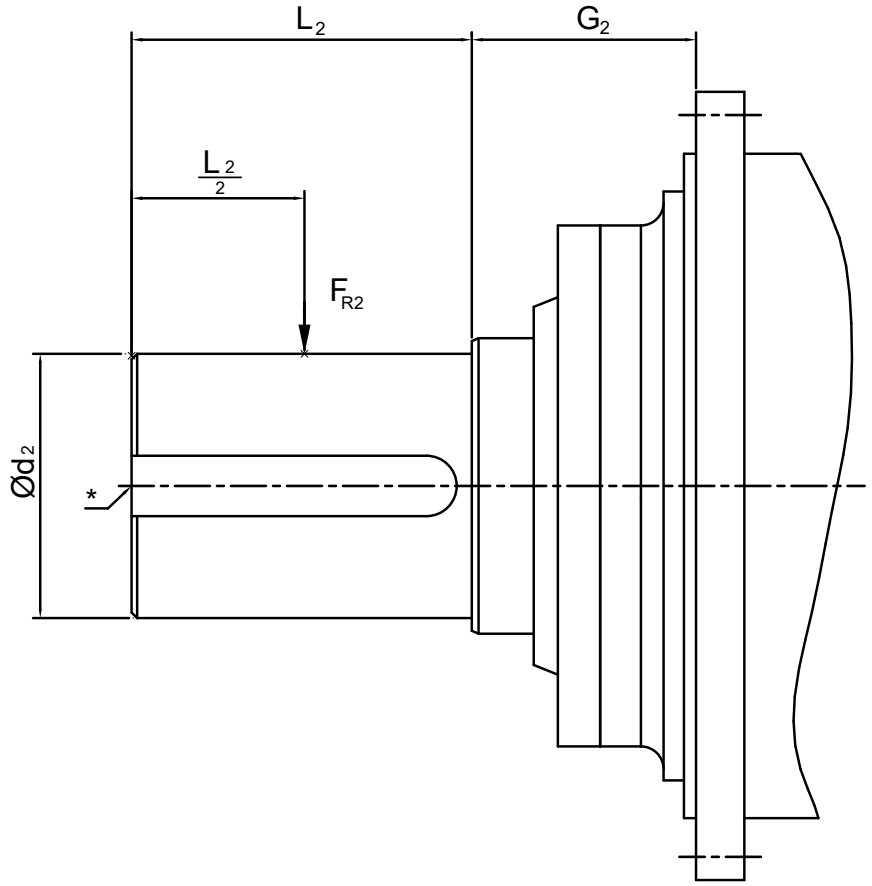
Hollow Shaft with Shrink Disk



Dimensions and weight				
Planetary gear unit	Shrink disk			Weight Kg.
	Size	D mm	Bolt	
31.5	140	230	M 16	13
35.5	165	290	M 16	26
40	175	300	M 16	27
45	185	320	M 20	40
50	220	370	M 20	64
56	260	430	M 20	102
63	280	460	M 24	126
71	320	520	M 24	171
80	360	590	M 27	251
90	420	670	M 27	372
100	460	750	M 30	501
112	500	800	M30	688
125	530	860	M 33	807
140	*			
150				

* = on request

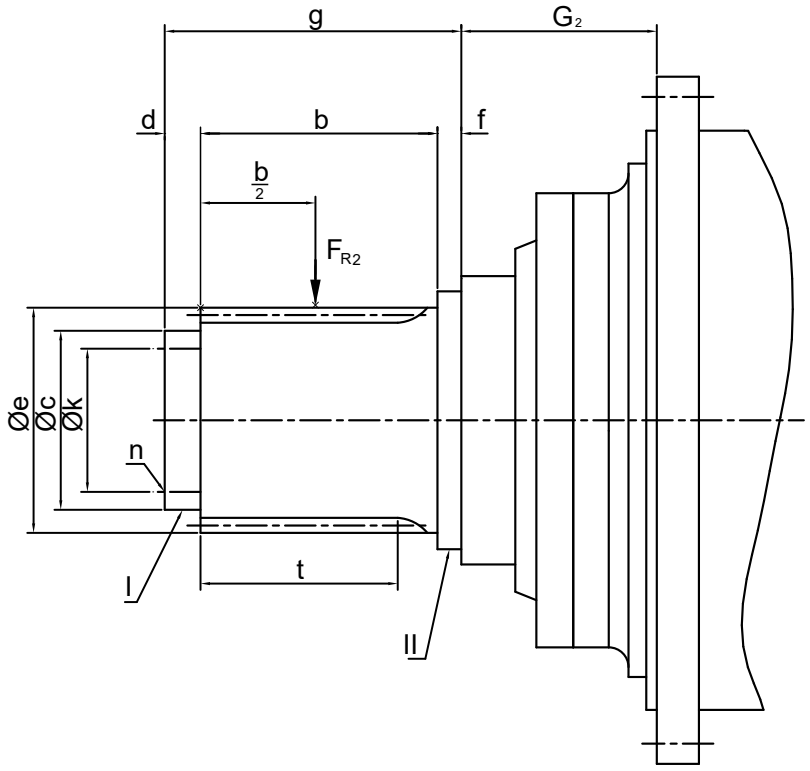
Solid shaft with parallel key



Dimension				
Planetary gear unit	Ø d_2 m6	l_2	G_2	F_{R2}
	mm	mm	mm	kN
31.5	130	200	100	*
35.5	150	260	110	
40	160	275	119	
45	185	320	123	
50	210	350	129	
56	250	400	148	
63	260	410	149	
71	310	460	157	
80	350	520	167	
90	400	602	190	
100	460	680	195	
112	510	760	201	
125	530	780	199	
140	*			
150				

* = on request

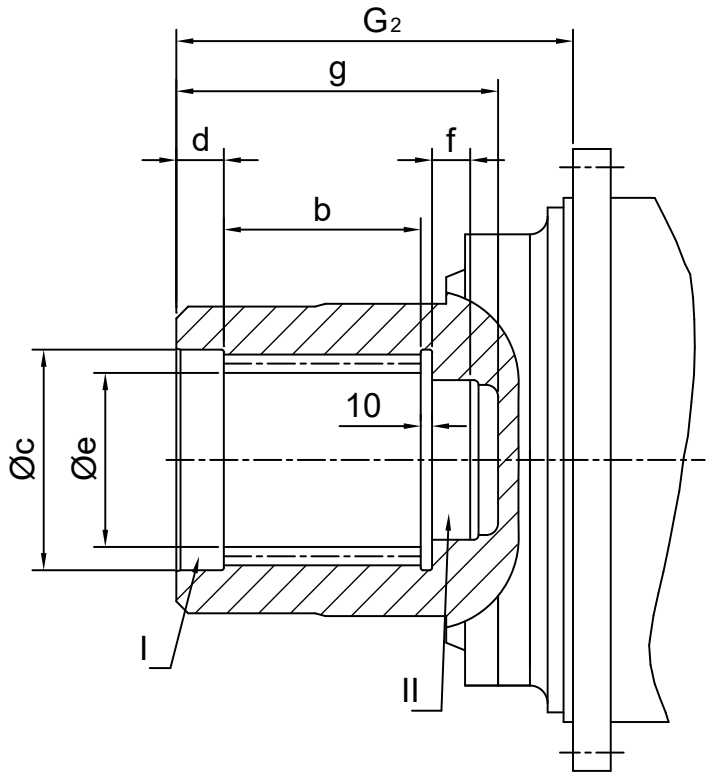
Solid shaft with involute spline according To DIN 5480



Dimensions												
Planetary gear unit	involute spline according To DIN 5480	t	b	Centre hole I		Centre hole II		g	k	n	G_2	F_{R2} kN
				Ø c k6	b	Ø e k6	f					
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
31.5	140 x 5 x 30 x 26 x 8f	50	60	120	20	142	20	100	90	3 x M16 x 24	100	
35.5	160 x 5 x 30 x 30 x 8f	70	80	140	20	162	20	120	110	3 x M16 x 24	110	
40	170 x 5 x 30 x 32 x 8f	80	90	150	30	172	20	140	120	3 x M16 x 24	119	
45	180 x 5 x 30 x 34 x 8f	100	110	160	30	182	25	165	130	3 x M20 x 30	123	
50	220 x 5 x 30 x 42 x 8f	100	110	200	30	222	25	165	170	3 x M20 x 30	129	
56	260 x 5 x 30 x 50 x 8f	120	130	240	30	262	25	185	200	3 x M20 x 30	148	
63	280 x 8 x 30 x 34 x 8f	140	160	260	30	280	30	220	220	3 x M20 x 30	149	*
71	320 x 8 x 30 x 38 x 8f	140	160	300	40	322	30	230	260	6 x M20 x 30	157	
80	360 x 8 x 30 x 44 x 8f	160	180	340	40	362	30	250	300	7 x M20 x 30	167	
90	420 x 8 x 30 x 51 x 8f	180	200	400	40	422	30	270	360	8 x M24 x 36	190	
100	460 x 8 x 30 x 56 x 8f	210	230	440	40	462	40	310	400	8 x M24 x 36	195	
112	500 x 8 x 30 x 61 x 8f	250	270	480	40	502	40	350	440	8 x M24 x 36	201	
125	500 x 8 x 30 x 61 x 8f	280	300	480	40	520	40	380	440	8 x M24 x 36	199	
140	*											
150												

* = on request

Hollow shaft with involute spline according To DIN 5480

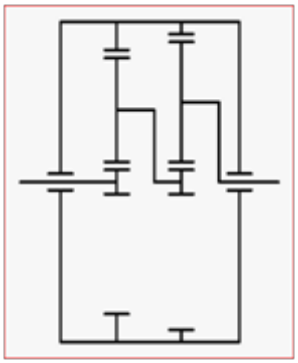


Dimensions								
Planetary gear unit	involute spline according To DIN 5480	Facewidth b	Centre hole I		Centre hole II		G_2	F_{R2} kN
			Ø c H7	b	Ø e H7	f		
	mm	mm	mm	mm	mm	mm	mm	mm
31.5	110 x 3 x 30 x 35 x 9H	80	112	25	95	20	215	125
35.5	130 x 3 x 30 x 42 x 9H	100	132	25	105	20	245	145
40	140 x 3 x 30 x 45 x 9H	110	142	25	125	20	264	155
45	150 x 3 x 30 x 48 x 9H	140	152	30	135	20	303	190
50	160 x 5 x 30 x 30 x 9H	165	162	30	140	25	334	220
56	200 x 5 x 30 x 38 x 9H	190	202	30	180	25	378	245
63	220 x 5 x 30 x 42 x 9H	210	222	40	200	25	409	275
71	260 x 5 x 30 x 50 x 9H	210	262	40	240	30	417	280
80	300 x 5 x 30 x 58 x 9H	240	302	40	280	30	457	310
90	320 x 8 x 30 x 38 x 9H	280	322	45	300	30	525	355
100	360 x 8 x 30 x 44 x 9H	280	362	45	320	35	530	360
112	400 x 8 x 30 x 48 x 9H	280	402	50	370	35	541	365
125	420 x 8 x 30 x 51 x 9H	300	422	50	390	35	559	385
140	*							
150								

* = on request

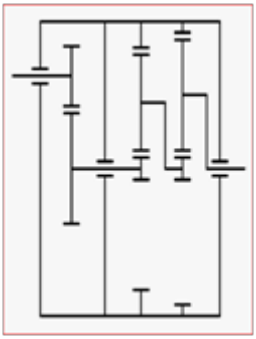
1) m1 dim is distance of first hole from flange surface

ACTUAL RATIO



P2C

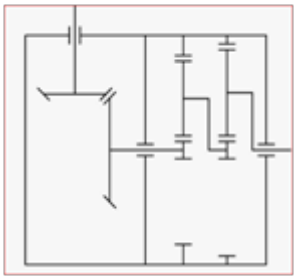
Size	NOMINAL RATIO / ACTUAL RATIO				
	16	20	25	30	36
31.5	-	21.259	25.309	29.525	35.430
35.5	-	21.614	23.676	30.525	36.630
40	16.616	20.572	26.183	30.546	37.332
45	-	20.604	25.509	31.887	35.430
50	16.616	20.949	25.936	29.830	36.630
56	16.616	21.148	24.992	30.240	37.332
63	-	21.364	26.450	30.694	36.000
71	-	18.610	23.041	32.000	37.332
80	-	21.148	26.183	32.000	37.332
90	-	21.148	24.992	28.939	35.370
100	-	22.218	26.450	30.694	36.000
112	-	19.354	24.992	30.546	37.332
125	-	21.148	24.992	30.546	35.370



P2H

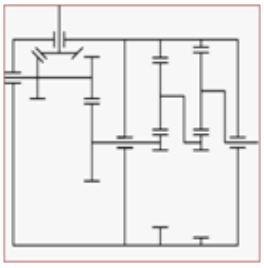
Size	NOMINAL RATIO / ACTUAL RATIO										
	40	45	50	56	63	71	80	90	100	112	125
40	42.120	47.379	52.366	58.600	64.834	72.315	82.683	90.186	104.732	115.203	122.184
45	40.226	45.704	51.019	56.816	63.773	70.730	80.354	90.700	102.037	110.904	121.478
50	42.034	47.069	52.833	58.097	65.359	72.170	81.191	91.394	103.745	113.640	127.097
56	39.802	43.985	49.022	55.190	62.479	69.977	78.545	89.444	98.390	108.227	124.518
63	40.205	44.762	50.697	56.508	64.539	71.301	81.870	88.128	99.924	111.089	122.774
71	39.821	44.443	49.776	55.307	61.722	69.254	78.992	88.886	100.862	109.231	126.404
80	40.982	46.082	51.228	54.548	61.887	69.028	78.549	89.022	100.368	110.403	126.404
90	40.542	45.603	50.404	56.404	63.668	73.085	76.932	79.585	99.325	112.352	125.459
100	41.565	44.966	50.382	57.077	62.159	72.516	77.959	90.465	100.517	108.815	126.947
112	39.760	44.985	49.983	56.560	61.230	70.810	81.223	88.206	97.025	97.025	123.932
125	40.138	44.340	49.122	55.815	61.587	70.976	80.408	89.554	102.046	111.413	125.399

ACTUAL RATIO



P2B

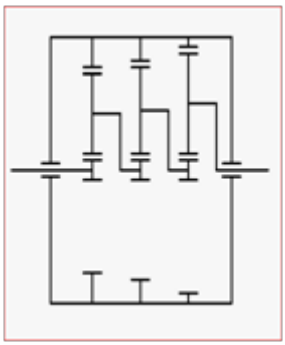
Size	NOMINAL RATIO / ACTUAL RATIO										
	40	45	50	56	63	71	80	71	80	90	100
40	40.927	46.991	52.519	57.602	63.773	73.110	81.204	73.110	81.204	91.047	98.877
45	39.096	43.983	48.695	56.485	65.897	71.623	82.109	71.623	82.109	91.647	99.979
50	41.844	45.893	50.811	56.155	64.376	71.854	79.703	71.854	79.703	88.961	102.445
56	39.150	46.525	51.510	55.339	63.441	70.431	79.863	70.431	79.863	93.469	103.817
63	40.270	44.436	49.196	56.399	63.269	70.618	80.116	70.618	80.116	90.356	100.145
71	41.065	44.798	50.398	56.860	62.029	71.551	81.820	71.551	81.820	91.203	101.300
80	41.846	46.525	51.692	54.983	64.378	73.802	80.231	73.802	80.231	90.833	100.922



P2K

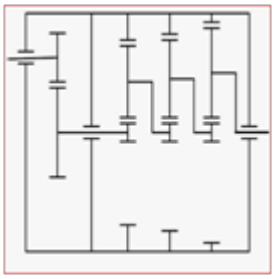
Size	NOMINAL RATIO / ACTUAL RATIO												
	112	125	140	160	180	200	225	250	280	315	355	400	450
40	114.59	127.75	143.96	160.50	178.24	198.72	225.60	244.37	285.44	320.00	355.20	414.39	462.92
45	114.76	122.49	142.09	162.15	177.61	197.35	220.02	246.59	283.44	316.04	354.30	393.27	439.33
50	116.68	127.81	141.26	166.15	184.61	204.03	227.47	254.94	293.04	326.74	366.30	406.59	454.21
56	109.37	117.79	139.20	155.20	187.15	194.09	219.93	244.37	272.36	308.49	340.89	416.64	462.92
63	101.93	126.20	141.75	159.02	177.19	196.87	229.68	254.16	282.97	312.73	344.45	410.40	460.80
71	121.17	127.23	141.36	158.79	182.42	197.91	225.85	245.91	283.88	304.16	351.80	397.08	445.85
80	105.52	119.91	146.55	163.30	181.44	202.24	220.48	257.22	273.83	304.26	345.17	409.47	477.70

ACTUAL RATIO



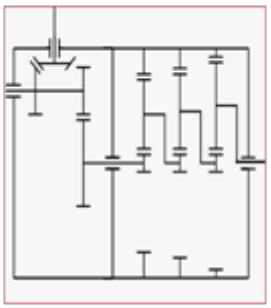
P3C

Size	NOMINAL RATIO / ACTUAL RATIO						
	112	125	140	160	180	200	220
31.5	109.96	127.55	148.80	153.94	178.56	194.08	212.58
35.5	102.86	129.68	144.00	151.29	181.55	198.86	219.78
40	108.76	126.89	144.00	157.10	183.28	201.60	223.92
45	111.97	127.55	138.63	160.70	182.22	194.08	212.58
50	114.73	129.68	137.68	155.62	181.55	197.80	219.78
56	114.20	128.53	141.38	155.03	183.20	201.53	223.92
63	110.20	125.76	139.42	156.19	182.22	201.38	212.58
71	113.61	127.28	140.66	157.74	175.83	205.13	227.84
80	116.19	129.11	132.04	159.85	186.48	205.13	227.84
90	116.64	127.23	131.54	155.45	190.00	199.03	220.00
100	109.88	128.18	136.03	158.70	185.15	194.40	216.00
112	113.11	126.84	138.19	157.10	183.20	201.53	223.92
125	103.82	120.21	142.06	149.95	173.63	201.04	212.22



P3H

Size	NOMINAL RATIO / ACTUAL RATIO												
	225	250	280	315	355	400	450	500	560	630	710	800	900
40	217.53	241.46	271.91	309.98	348.76	395.90	439.73	499.04	558.28	626.31	710.55	781.60	904.64
45	218.67	246.34	279.93	314.43	366.57	394.81	440.44	490.59	567.29	630.32	714.24	797.18	873.34
50	222.32	244.56	277.91	304.47	352.72	391.96	444.65	500.87	568.20	631.08	715.91	805.40	894.89
56	226.21	250.45	278.73	319.12	360.86	392.83	456.78	505.64	555.32	618.02	707.59	806.40	895.68
63	226.20	252.22	282.76	313.29	356.27	402.64	452.41	490.39	551.00	621.82	716.93	805.54	906.23
71	228.64	256.32	284.01	319.11	362.89	410.12	457.51	501.15	553.86	625.95	703.32	811.11	911.35
80	220.44	250.94	282.82	310.55	349.37	402.09	452.71	509.12	554.56	636.38	820.51	820.22	911.35
90	223.93	249.38	281.18	318.08	349.90	403.17	451.56	506.39	562.45	624.95	712.52	796.11	880.01
100	229.90	246.11	274.31	307.37	348.51	403.77	449.91	491.98	570.90	634.33	699.84	816.48	920.81
112	230.07	248.84	278.87	311.53	350.64	404.97	453.96	504.40	560.25	638.84	719.45	799.39	906.88
125	226.07	256.51	286.94	315.64	350.71	404.87	449.85	499.55	562.73	620.62	724.12	794.32	882.58



P3K

Size	NOMINAL RATIO / ACTUAL RATIO						
	560	630	710	800	900	1000	1120
40	564.801	621.270	724.794	805.039	897.356	996.706	1162.792
45	560.629	639.794	710.883	789.342	915.607	995.169	1090.053
50	557.873	660.406	729.866	844.006	924.507	1027.230	1135.271
56	557.177	658.446	724.277	804.465	938.517	1032.388	1147.097
63	565.076	652.702	743.494	808.100	915.607	995.169	1090.053
71	545.562	618.672	713.312	773.340	891.641	990.358	1155.385
80	546.870	626.527	710.904	815.799	868.836	1001.745	1168.670
90	548.297	609.219	705.431	808.053	888.843	987.568	1097.297
100	549.420	647.854	714.220	793.577	881.753	974.505	1028.683
112	573.571	651.797	716.964	828.085	920.095	1022.328	1135.879

Thermal capacities

	Thermal capacities P_{G1} in kW *)														
	Gear Unit Sizes : P2C														
	31.5	35.5	40	45	50	56	63	71	80	90	100	112	125	140	150
	Thermal capacities P_{G1} in kW														
1) P_{G1} for small confined spaces	26	29	35	42	54	69	82	100	116	149	184	239	297	-	-
2) P_{G1} for large halls, workshops etc.	36	41	49	59	75	96	115	140	162	209	257	334	416	-	-
3) P_{G1} in the open	49	56	67	81	102	130	156	190	219	284	349	454	565	-	-

	Thermal capacities P_{G1} in kW												
	Gear Unit Sizes : P2H												
	40	45	50	56	63	71	80	90	100	112	125	140	150
	Thermal capacities P_{G1} in kW												
1) P_{G1} for small confined spaces	27	34	42	54	66	80	95	112	156	197	246	-	-
2) P_{G1} for large halls, workshops etc.	38	48	59	76	92	111	133	171	219	275	345	-	-
3) P_{G1} in the open	51	65	80	103	125	151	181	232	297	374	468	-	-

	Thermal capacities P_{G1} in kW										
	Gear Unit Sizes : P2B										
	40	45	50	56	63	71	80	90	100	112	125
	Thermal capacities P_{G1} in kW										
1) P_{G1} for small confined spaces	27	33	43	55	66	78	92	-			
2) P_{G1} for large halls workshops etc.	38	47	60	78	93	109	129	-			
3) P_{G1} in the open	51	64	81	105	126	148	175	-			

	Thermal capacities P_{G1} in kW												
	Gear Unit Sizes : P2K												
	40	45	50	56	63	71	80	90	100	112	125	140	150
	Thermal capacities P_{G1} in kW												
1) P_{G1} for small confined spaces	21	26	32	42	50	59	70	-					
2) P_{G1} for large halls workshops etc.	29	37	45	58	70	82	98	-					
3) P_{G1} in the open	40	50	61	79	95	112	132	-					

*) Values apply to horizontal mounting position. For other mounting positions refer to Elecon.

1) wind velocity ≥ 0.5 m/s
2) wind velocity ≥ 1.4 m/s
3) wind velocity ≥ 3.7 m/s

Thermal capacities

	Thermal capacities P_{G1} in kW *)														
	Gear Unit Sizes : P3C														
	31.5	35.5	40	45	50	56	63	71	80	90	100	112	125	140	150
	Thermal capacities P_{G1} in kW														
1) P_{G1} for small confined spaces	21	23	26	34	40	53	63	79	91	112	141	177	226	-	-
2) P_{G1} for large halls, workshops etc.	29	33	37	48	57	74	89	111	127	157	198	248	317	-	-
3) P_{G1} in the open	40	44	50	65	77	101	120	157	173	213	288	337	430	-	-

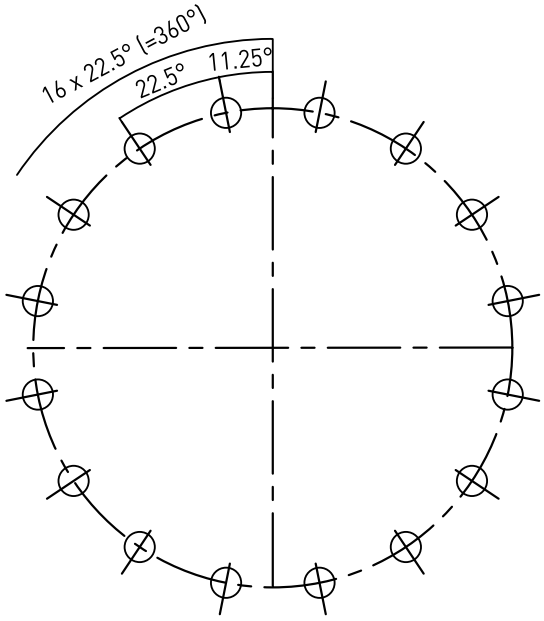
	Thermal capacities P_{G1} in kW												
	Gear Unit Sizes : P3H												
	40	45	50	56	63	71	80	90	100	112	125	140	150
	Thermal capacities P_{G1} in kW												
1) P_{G1} for small confined spaces	22	28	34	44	49	66	76	94	120	150	191	-	-
2) P_{G1} for large halls workshops etc.	30	39	48	61	69	92	107	132	168	209	268	-	-
3) P_{G1} in the open	41	54	65	83	93	125	145	179	228	284	363	-	-

	Thermal capacities P_{G1} in kW										
	Gear Unit Sizes : P3K										
	40	45	50	56	63	71	80	90	100	112	125
	Thermal capacities PG_1 in kW										
1) P_{G1} for small confined spaces	19	23	27	37	44	55	63	79	98	122	152
2) P_{G1} for large halls workshops etc.	26	32	38	51	61	77	88	110	137	170	213
3) P_{G1} in the open	35	44	52	70	83	104	120	150	186	231	289

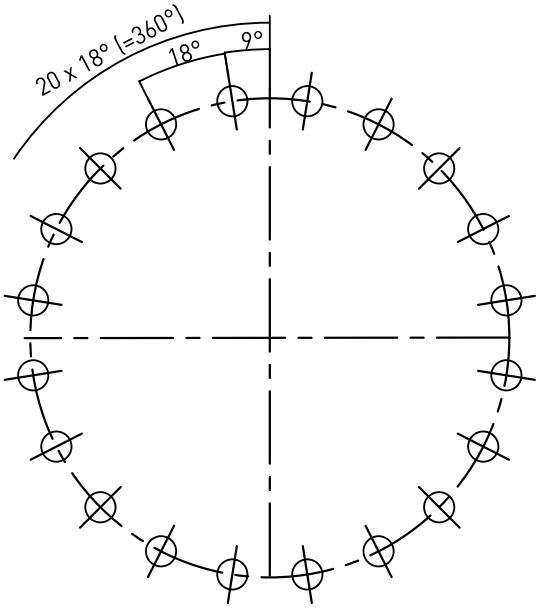
*) Values apply to horizontal mounting position. For other mounting positions refer to Elecon.

1) wind velocity ≥ 0.5 m/s
2) wind velocity ≥ 1.4 m/s
3) wind velocity ≥ 3.7 m/s

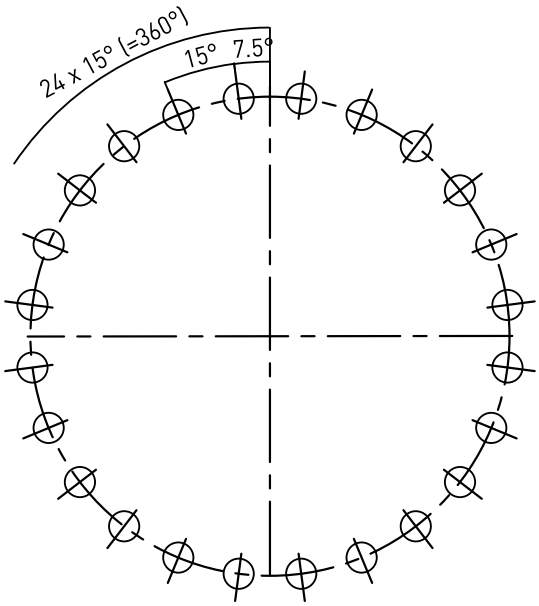
Holes Patterns on Output Flanges



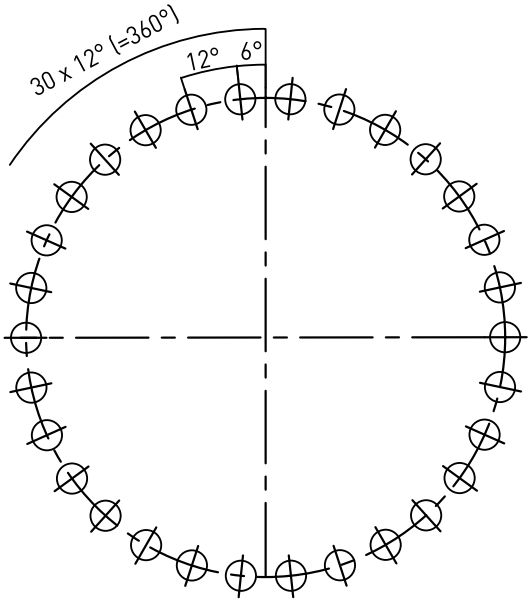
Size 31.5



Size 35.5,40,45,50,56



Size 63,71,80,90



Size 100,112,125

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