Parallel Helical Geared Motor Shaft Mounted Speed Reducer Series

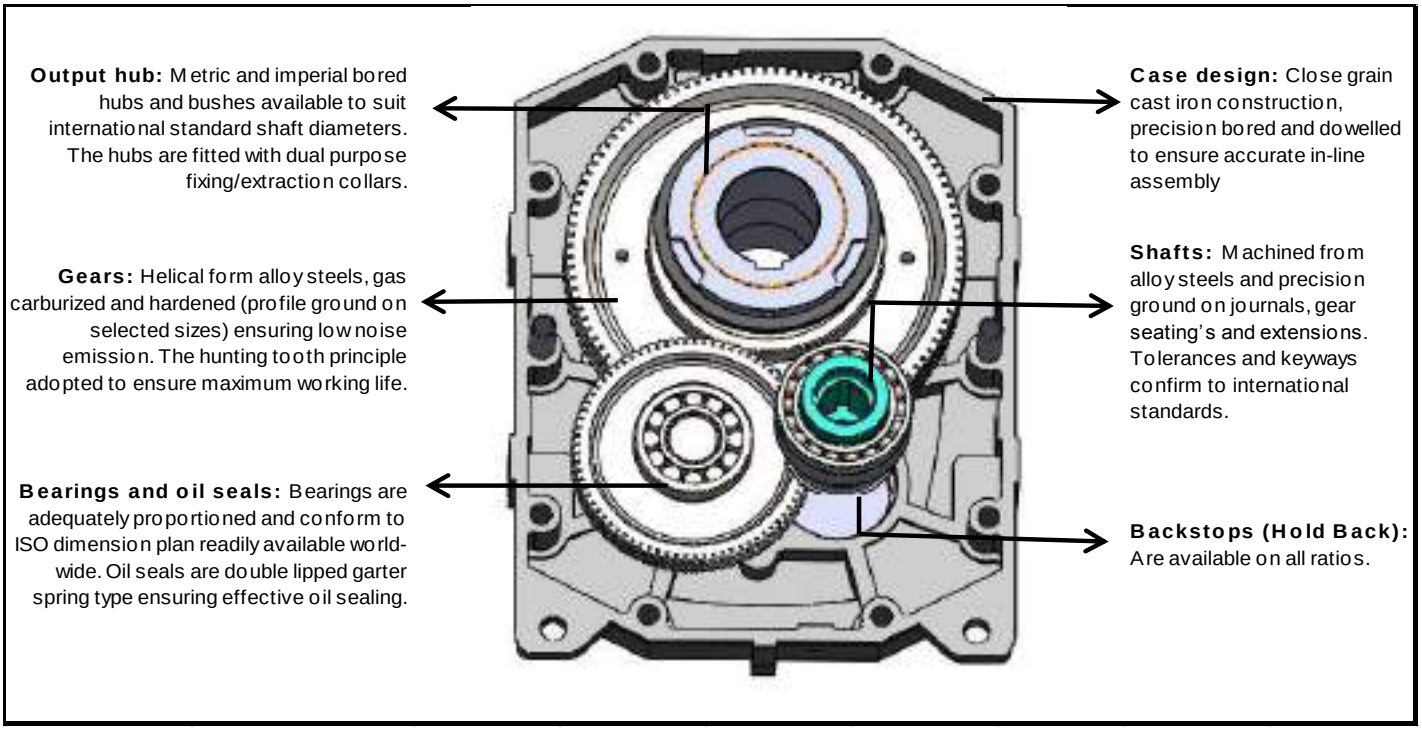
A torque-arm anchors the Reducer and provides stability to the mounting with Equipment assembly turnbuckle. The Fenner Parallel Helical Geared Motor Shaft Mounted Speed Reducer is manufactured in eight gear case sizes, designated by the letters B through to J. The eight sizes may have anyone of twelve nominal gear ratios, 5:1, 6.3:1, 6.8:1, 10:1, 13:1, 15:1, 20:1, 25:1, 30:1, 40:1, 50:1, and 63:1.

A very wide choice of final driven speed can be determined by the use of the ratios, with different motor frame size adaptors to mount, according to the application need.

The units will normally be oil lubricated, but they are equally suitable for "lubricated for life" greases.

Salient Features of Parallel Helical Geared Motor:

- Improved Power Rating
- Backstop assembly in the Adaptor, to facilitate effective stoppage
- Separate provision for fixing the Torque arm without opening casing assembly bolts.
- Compact Design results in improved performance of Equipment.



SELECTION PROCEDURE

a) Service Factor

From Table 01 select the service factor applicable to the drive

b) Design Power

Multiply the absorbed power (or motor power if absorbed power not known) by the service factor chosen in step (a).

Note: Ensure that design power exceeds motor rated power.

c) Peak Load

Divide any peak load by two.

d) Unit Selection

Using the greater value of steps (b) and (c) refer to the Power Rating and select the correct size of unit. The choice of single or double reduction gearbox will be determined by the output speed required. The normal operating speeds for each of the gear boxes may be observed in the Power Rating Tables. For other speeds consult FENNER.

Selection of Associated Drive for 1440 rev/min Electric Motors

(e) Output Speed

Refer to the Model chart with exact ration and under the appropriate gearbox size and ratio read down the column headed 'Output Speed' until an output speed equal or near to that required is found.

Selection of Associated Drive for Driving Speeds other than 1440 rev/min Electric Motors

(f) Design Power

Obtain from the Power Rating Tables the rated power of the gearbox at the required output Speed and use it as the design power for the drive..

(g) Gearbox Input Shaft Speed

Multiply the gearbox output speed by the exact gear ratio, to obtain the gear box input shaft speed.

(h) Selection of Gear box

By referring to Charts defined for each model of Fenner Parallel Helical Gear Shaft mounted Speed Reducer Drive Design Manual, a suitable Gear drive train can be chosen referring to the Power rating

Table 1: Service Factor

Types of Drive Machine	Operational Hours Per Day		
	Under 10	10 - 16	16 and over
Uniform Agitators and Mixers- liquid or semi-liquid, Blowers - Centrifugal Bottling machines, Conveyors and elevators- uniformly loaded Cockers, Laundry Washing Machines - non-reversing line shafts, Pumps – centrifugal and gear, Wire Drawing Machines.	1.0	1.12	1.25
Moderate Shock Agitators and Mixers- Variable density Conveyors – not uniformly loaded, Cranes-travel, motion and hoisting. Draw bench, Feeders- pulsating load Hoists, Kilns Laundry Tumblers, lifts, Piston Pumps – with 3 or more cylinders, Pulp and Paper Making Machinery, Rubber Mixer. And Calendars, Rotary screens, Textile Machinery	1.25	1.4	1.5
Heavy Shock Brick Presses, Briquetting Machines, Conveyors – reciprocating and shaker, Crushers, Feeders – reciprocating, Hammer Mills, Piston Pumps – 1 or 2 Cylinders, Rubber Masticators, Vibrating Machines	1.5	1.8	2.0

EXAMPLE

A Parallel Helical Geared motor Shaft Mounted Speed Reducer is required for a uniformity loaded elevator which absorbs 3.6 KW at 48 rev/min. The prime mover is a 4 KW, 1440 rev/min direct-on-line start electric motor, and running for up to 24 hours/day.

Solution

(a) Service Factor : From Table 01 the service factor is 1.25

(b) Design Power

Select on a basis of absorbed power ensuring that the design power exceeds the basic

motor power = 1.25 x 3.6 = 4.5 KW

(c) Peak Load

Assuming that a direct-on-line start can exert 240% of full load torque.

$$\text{Peak Load} = \frac{4 \times 240}{2 \times 100} = 4.8 \text{ KW}$$

(d) Unit Selection

Using 4.8 KW as the basis for selection (being the greater value of steps (b) and (c)), reference to the Power Rating Tables pages indicates that an E30 gear unit will transmit 4.81 KW at 48 rev/min.

(e) Output Speed

If the 30: 1 ratio gearbox is selected and by reference in the Gearbox Drive Tables. 48 rev/min is obtainable.

Table 2: Output Hub & Bushes

Reducer Size		Dimension B (See Page 11-06)			
		Standard Hub Bore	Bush Bores for Standard Hub	Alternative Hub Bore	Bush Bore for Alternative Hub
PHGM	B05 B13 B20	30	25 1"	40	35 1 1/4" 32
	C05 C13 C20	40	35 1 1/4" 32 30	50	45 1 3/4" 42 1 1/2" 38
	D05 D13 D20	50	45 1 3/4" 42 1 1/2" 40 1 1/4"	55	2"
	E05 E13 E20	55	50 2" 45 1 3/4" 42 1 1/2"	65	60 2 1/4"
	F05 F13 F20	65	60 2 1/4" 55 50	75	70 2 3/4" . 2 1/2"
	G05 G13 G20	75	70 2 3/4" 65 2 1/2" 60 2 1/4"	85	80 3"
	H05 H13 H20	85	80 3" 75 2 3/4" 70 2 1/2"	100	95 3 1/2" 90
	J05 J13 J20	100	95 3 3/4" 90	120	110 4 1/2" . 4"

Note: All dimensions are subjected to alteration without notice:

All dimensions are in millimeters unless otherwise stated.

Metric Hubs are bored to F7 limits.

Inch hubs are bored to H7 limits.

Shaft keyways must be to appropriate standard dimensions,
i.e., to B.S. 4235/IS : 2048 for metric shafts and B.S. 46 for inch shafts.

Table 3: Standard Keyways

Shaft Diameter (mm)	Key size	Shaft Diameter (inches)	Key size
20	6 × 6	3/4"	3/6" × 1/16"
25	8 × 7	1"	1/4" × 1/4"
30	8 × 7	1 1/4"	5/16" × 1/4"
32	10 × 8	1 1/2"	3/8" × 1/4"
35	10 × 8	1 3/4"	7/12" × 5/16"
38	10 × 8	2"	1/2" × 5/16"
40	12 × 8	2 1/4"	5/8" × 7/16"
42	12 × 8	2 1/2"	3/4" × 1/2"
45	14 × 9	2 3/4"	7/8" × 5/8"
50	14 × 9	3"	3/4" × 1/16"
55	16 × 9	4"	1" × 3/4"
60	18 × 11	4 1/2"	1 1/4" × 7/8"
65	18 × 11		
70	20 × 12		
75	20 × 12		
80	22 × 14		
85	22 × 14		
90	25 × 14		
95	25 × 14		
100	28 × 16		
110	28 × 16		
120	32 × 18		

Optional Extras

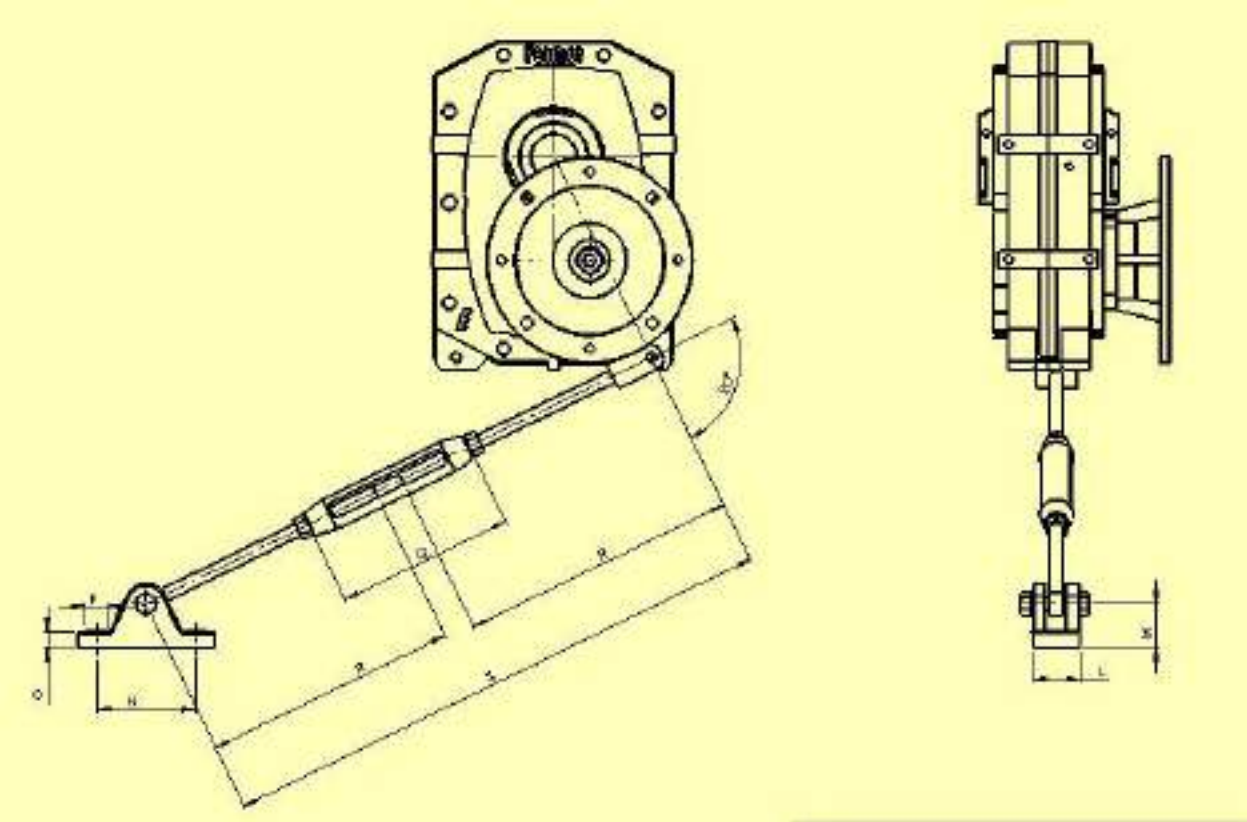
1. **Backstops:** A backstop may be incorporated on applications where it is necessary to prevent reversal of rotation. It is installed within the Adaptor which is mounting the Motor input. This back stop provision is available on special order confirmation

2. **Vertical Shafts:** Units suitable for mounting on vertical shafts can be supplied at extra charge, with Flange output shaft, Motor mounted on top

3. **Reversing Duty:** Shaft Mounted Speed Reducers suitable for reversing duty can be supplied to order.

4. **Flange Mounting:** The Parallel helical Geared motor Speed Reducer casing design is such that the flange output shaft end fitted to reducer can be bolted direct to supporting framework. This may permit designers to omit a bearing or Plummer block. See page 11 for dimensions

Dimensions – Shaft Mounting Sizes B, C, D, E, F, G, H & J



Sizes	L	M	N	O	P	Q	R	S	
								Min.	Max.
B	24	20	65	5	10	200	300	600	750
C	24	20	65	5	10	200	300	600	750
D	28	24	75	5	12	216	350	700	850
E	28	24	75	5	12	216	350	700	850
F	34	30	100	6	16	216	375	750	900
G	34	30	100	6	16	216	375	660	900
H	70	50	120	18	16	222	375	750	900
J	70	50	120	18	16	222	375	750	900

.

Figure 1: GA Drawing

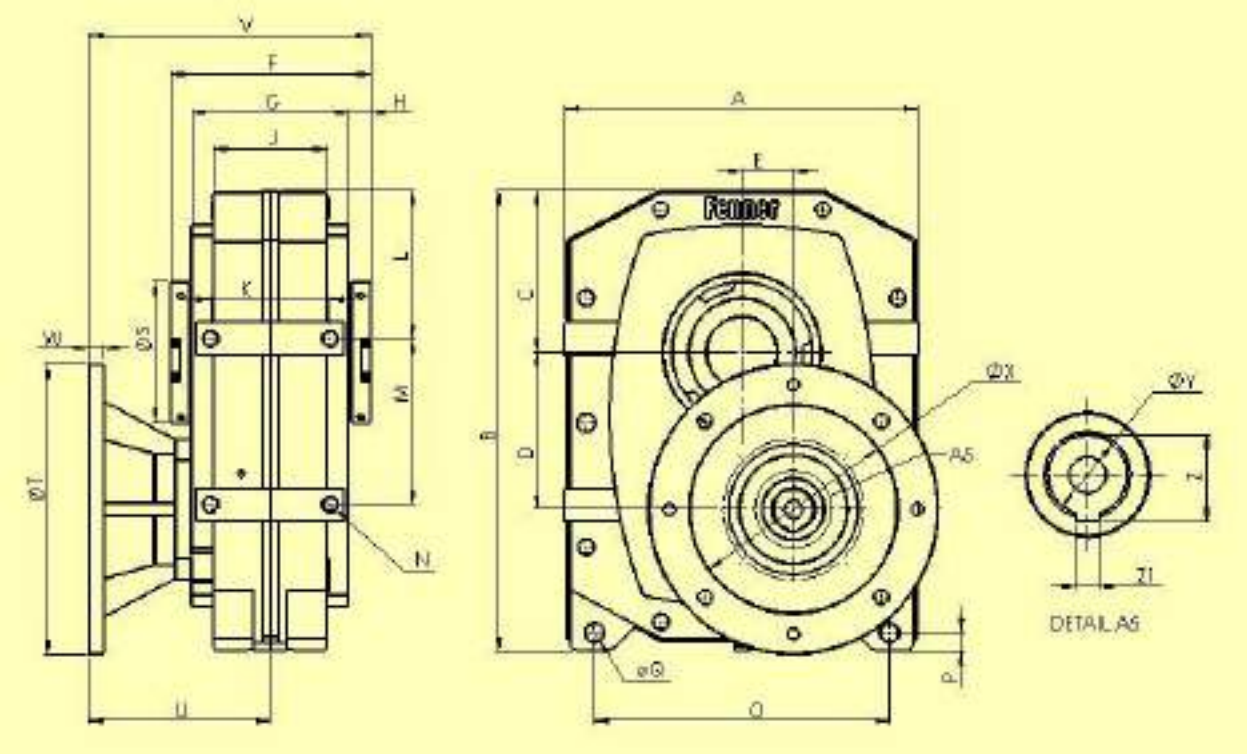


Table 4: GA Drawing Dimensions

Dimensions	PHGM MODEL							
	B	C	D	E	F	G	H	J
A	204	234	262	296	340	370	427	557
B	235	278	337	399	448	478	555	703
C	83	99	123	141	158	168	195	257
D	85	90	110	125	141	156	189	255
E	24	31	37	44	50	56	62	75
F	134	142	150	170	189	216	242	258
G	104	110	118	134	150	178	190	200
H	15	16	16	18	19	19	26	29
J	72	80	84	100	116	118	136	142
K	82	84	82	98	114	138	144	142
L	42	83	105	126	130	68	176	181
M	144	100	125	140	185	280	200	360
N	M8x16	M10x25	M12x20	M12x22	M16x28	M16x28	M20x30	M20x40
O	166	198	206	238	282	310	356	471
P	11	11	12	15	23	25	22	19
øQ	9	9	11	11	15	15	22	22
øS	80	90	100	115	130	145	170	196

Table 5 Motor Frame Dimensions

PHGM MODEL	B				C					D			
Motor frame	63	71	80	90L/90S	63	71	80	90L/90S	100L	71	80	90S/90L	112M/100L
øT	140	160	200	200	140	160	200	200	250	160	200	200	250
U	109	109	135	135	110	110	136	136	136	142	142	142	142
V	176	176	202	202	181	181	207	207	207	217	217	217	217
W	11	11	12	12	11	11	12	12	12	12	12	12	12
ØX F7	95	110	130	130	110	110	130	130	180	110	130	130	180
øY E7	11	14	19	24	11	14	19	24	28	14	19	24	28
Z	12.8	16.3	21.8	27	12.8	16	21.8	27.3	31.3	16.3	21.8	27.3	31.3
Z1 Js9	4	5	6	8	4	5	6	8	8	5	6	8	8

PHGM MODEL	E			F				G			
Motor frame	80	90S/90L	112M/100L	80	90S/90L	112M/100L	132M/132S	90S/90L	100L/112M	132S/132M	160M/160L
øT	200	200	250	200	200	250	300	200	250	300	350
U	147	147	147	172	172	172	201	181	181	210	210
V	232	232	232	266	266	266	295	289	289	318	318
W	12	12	12	14	14	14	18	14	14	18	18
ØX F7	130	130	180	130	130	180	230	130	180	230	250
øY E7	19	24	28	19	24	28	38	24	28	38	42
Z	21.8	27.3	31.3	21.8	27.3	31.3	41.3	27.3	31.3	41.3	45.3
Z1 Js9	6	8	8	6	8	8	10	8	8	10	12

PHGM MODEL	H				J				
Motor frame	100L/112M	132S/132M	160M/160L	180M/180L	100L/112M	132S/132M	160M/160L	180M/180L	200L
øT	250	300	350	350	250	300	350	350	400
U	193	193	221	221	198	198	226	226	226
V	315	315	343	343	327	327	355	355	355
W	15	15	18	18	15	15	18	18	18
ØX F7	180	230	250	250	180	230	250	250	300
øY E7	28	38	42	48	28	38	42	48	55
Z	31.3	41.3	45.3	51.8	31.3	41.3	45.3	51.8	59.3
Z1 Js9	8	10	12	14	8	10	12	14	16

Table 6 Exact Gear Ratio

Technical Data for the PHGM Series an Overview										
PHGM	Input RPM (n1)	1440	Exact Ratio Chart							
	Nominal Ratio (in)	Output RPM (n2)	B	C	D	E	F	G	H	J
	5	Refer Individual Model Ratings	5.047	5.047	5.047	5.047	5.047	5.047	5.047	5.047
	6.3		6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41
	6.8		6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875
	10		9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94
	13		13.59	13.59	13.59	13.59	13.59	13.59	13.59	13.59
	15		14.93	14.93	14.93	14.93	14.93	14.93	14.93	14.93
	20		20.46	20.46	20.46	20.46	20.46	20.46	20.46	20.46
	25		25.98	25.98	25.98	25.98	25.98	25.98	25.98	25.98
	30		31.66	31.66	31.66	31.66	31.66	31.79	31.66	31.66
	40		39.75	39.75	39.75	39.75	40.07	40.07	39.82	39.75
	50		50.89	50.89	50.89	50.89	50.92	50.89	48.49	50.89
	63		62.24	62.24	62.24	62.24	63.25	63.35	61.50	62.24

Table 7 Power Ratings

Technical Data for the PHGM Series an Overview											
PHGM	Input RPM (n1)	1440		Power Ratings Table (Kw)							
	Nominal Ratio (in)	Exact Ratio (ir)	Output RPM (n2)	B	C	D	E	F	G	H	J
	5	Refer Individual Model Ratings	280.00	3.85	5.41	8.80	12.90	18.52	33.30	47.20	111
	6.3		222.22	3.35	4.80	7.72	11.50	16.36	28.60	40.90	99
	6.8		205.88	2.98	4.26	7.35	10.90	15.58	27.40	36.20	94
	10		140.00	3.42	5.30	9.35	14.00	18.50	37.00	42.00	62
	13		107.69	2.56	4.32	7.30	11.10	16.90	27.00	37.00	58
	15		93.33	2.30	3.54	6.20	9.29	14.00	24.50	34.20	52.7
	20		70.00	1.71	2.89	4.94	7.56	11.40	18.70	28.50	43.8
	25		56.00	1.32	2.24	3.75	5.80	8.90	14.80	22.40	36.2
	30		46.67	1.10	1.86	3.00	4.81	7.35	12.50	18.60	29.5
	40		35.00	0.86	1.46	2.43	3.76	5.78	9.81	14.90	23.9
	50		28.00	0.66	1.14	1.98	3.05	4.70	7.80	12.30	19.1
	63		22.22	0.47	0.91	1.60	3.39	3.54	6.30	9.10	15.2

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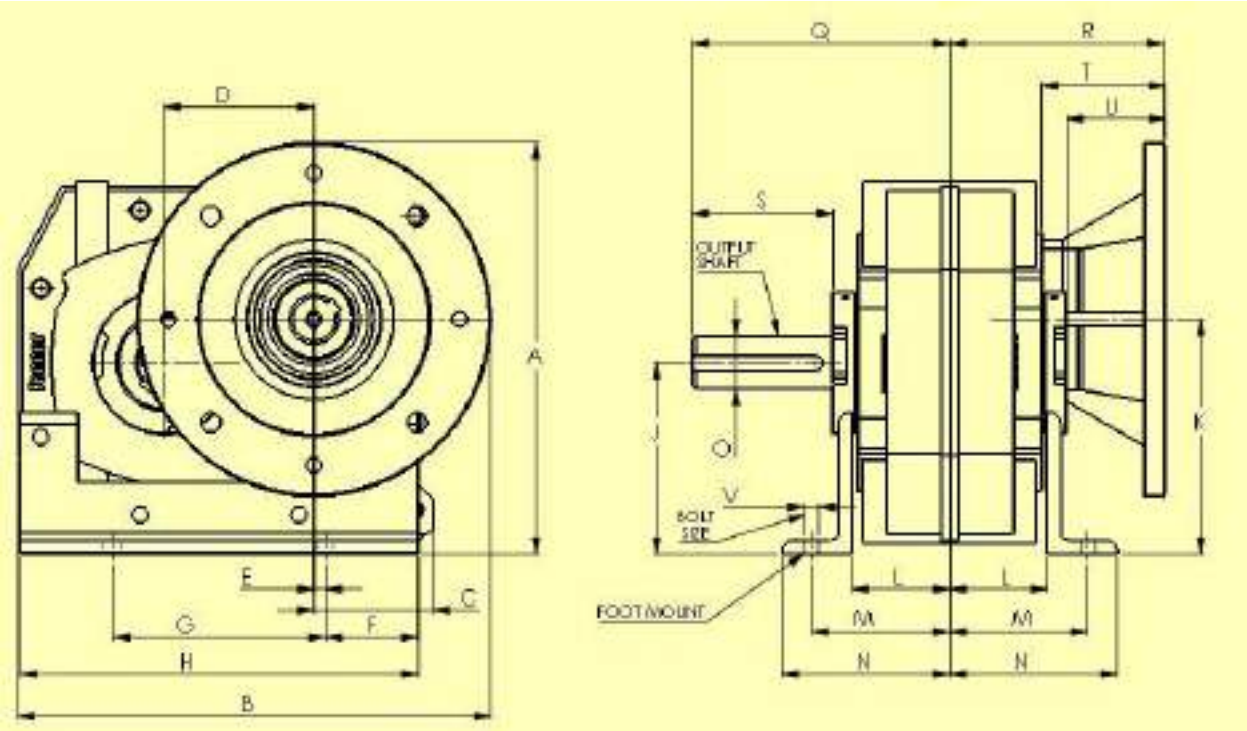
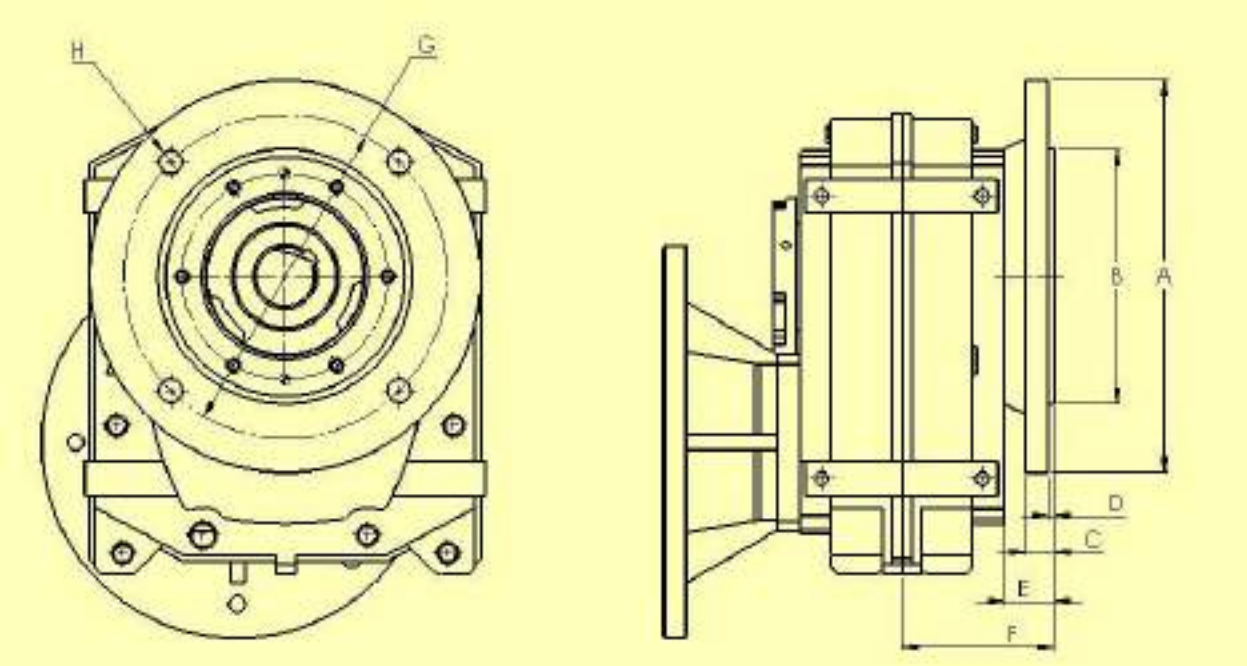
Foot mounting details in preparation



FOOT MOUNTING DIMENSIONS	SIZE							
	B	C	D	E	F	G	H	J
A	232	299	300	327	382	431	460	573
B	268	314	360	403	448	478	563	712
C	67	89	104	133	150	154	171	191
D	75	90	110	125	141	156	189	255
E	6	11	20	20	34	39	76	120
F	53	70	80	110	115	100	85	75
G	120	130	160	180	200	220	360	480
H	225	270	335	400	430	460	550	706
J	108	143	138	159	182	192	223	297
K	132	174	175	202	232	256	285	372
L	55	58	62	70	78	92	98	103

M	78	86	90	117	113	139	139	158
N	95	108	112	145	143	167	173	203
O	38 k6	45 k6	50 k6	55 m6	60 m6	75 m6	90 m6	100 m6
Q	146	181	185	225	234	246	292	341
R	122	125	142	147	201	210	221	226
S	80	110	110	140	140	140	170	210
T	69	70	83	80	126	121	126	126
U	56	54	67	61	106	104	101	95
V	M8	M10	M10	M12	M16	M16	M16	M20

Flange Mounting Details



SIZE	FLANGE MOUNTING DIMENSIONS							
	A	B f7	C	D	E	F	G	H
B	200	130	15	3.5	26	78	165	12
C	250	180	19	4	39	94	215	15
D	250	180	19	4	39	98	215	15
E	300	230	19	4	50	117	265	15
F	300	230	19	4	50	125	265	15
G	350	250	20	5	55	149	300	19
H	400	300	20	5	70	165	350	19
J	400	300	20	5	70	170	350	19

Lubrication – Parallel Helical Geared Motor SMSR

IMPORTANT: The Shaft Mounted Speed Reducers are dispatched without oil. They must be filled as instructed before running. Use high grade oil as shown on lubrication chart supplied attached to breather plug or alternative grades stated below. Fill to level plug when Reducer Is not running. Drain, flush and refill every six months of operation. Check oil level regularly. Positions of filler, breather and drain plug for different mounting positions are shown in Fig. below.

Normal operating positions are shown in Fig. below. Note that the Reducer is supplied with four plugs. After the Reducer has been mounted in its running position the plugs must be located as shown in Fig. below for the appropriate mounting position.

If the Reducer is not within 20° of one of the positions shown, the oil level plug cannot be safely used to check the oil level. This can be overcome by disconnecting the torque-arm and swinging the Reducer around to one of the positions shown.

Because of the many positions of the Reducer it may be necessary or desirable to make special adaptations using the plug holes in the Reducer with standard pipe fittings or oil level gauges.

CAUTION

Too much oil will cause over-heating. Too little oil will cause gear failure.

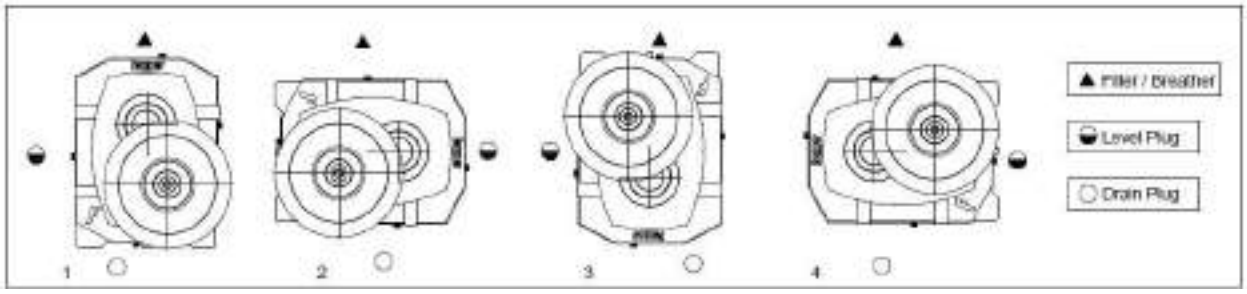


Table 7 Recommended Lubricants

		13,20,25,30,40,50,63 Ratio gear Box			5,6.3,6.8,10 Ratio Gear Box			
	Ambiant Temp °C	0-20 rev/min	21-50 rev/min	51-120 rev/min	1-100 rev/min	101-200 rev/min	201-400 rev/min	
		BCDEFGHJ	BCDEFGHJ	BCDEFGHJ	BCDEFGHJ	BCDEFGHJ	BC	DEFGHJ
Bharat Petrolium (Amocam)	-10 to +5	220	220	150	100	100	100	68
	6 to 25	460	460	320	460	320	320	220
	26 to 40	680	680	680	800	680	680	460
Indian Oil (Servomesh)	-10 to +5	SP 68	SP 68	SP 68	SP 100	SP 100	SP 100	SP 68
	6 to 25	SP 220	SP 150	SP 100	SP 460	SP 320	SP 320	SP 220
	26 to 40	SP 460	SP 320	SP 320	SP 800	SP 680	SP 680	SP 460

Table 7 A Oil Quantities (Liters)

Unit Size	Approximate Capacity - Liters							
	13:1,15:1,20:1,25:1,30:1,40:1,50:1,63:1				5:1,6.3:1,6.8:1,10:1			
	1	2	3	4	1	2	3	4
B	0.4	0.7	0.6	0.7	0.5	0.5	0.5	0.6
C	0.7	0.9	0.8	0.9	0.8	0.9	0.8	0.9
D	1.1	1.8	1.6	1.7	1.3	1.7	1.5	1.8
E	2.1	2.5	2.4	2.1	2.4	2.5	2.4	2.5
F	2.8	3.1	3.1	3.1	3.5	3.4	3.4	3.5
G	3.7	5.5	4.4	5	4	4.8	4.2	5.7
H	6	8.5	7	8.5	6.5	8.8	7.5	9.2
J	9.5	17	14	16	12	20	16	20

Table 8 Adaptor IEC Frames

Adaptor Frame size for each model (Motor RPM 1440)								
Frame size / Kw	B	C	D	E	F	G	H	J
63 (0.12/0.18)								
71 (0.25/0.37)								
80 (0.55/0.75)								
90 (1.1/1.5)								
100/112 (2.2/3.7)								
132 (5.5/7.5)								
160 (9.3/11/15)								
180 (18.5/22)								
200 (30)								

Note: The following frame size can be provided on request.

1.) PHGM F-160M

2.) PHGM E-132S

Table 9 PHGM Series Data on Model B

Technical Data for PHGM Series									
PHGM	Input RPM (n1) =1440			Design Data		Max. Motor Frame Size			232 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (N-m)	Power (Kw)	Torque (N-m)	FS	IEC Frames Available
B	5	5.047	285.32	3.85	129	1.5	50	2.57	90/80/71/63
	6.3	6.41	224.65	3.35	142	1.5	64	2.23	90/80/71/63
	6.8	6.875	209.45	2.98	136	1.5	68	1.99	90/80/71/63
	10	9.94	144.87	3.42	225	1.5	99	2.28	90/80/71/63
	13	13.59	105.96	2.56	231	1.5	135	1.71	90/80/71/63
	15	14.93	96.45	2.3	228	1.5	149	1.53	90/80/71/63
	20	20.46	70.38	1.71	232	1.5	204	1.14	90/80/71/63
	25	25.98	55.43	1.32	227	1.1	190	1.2	90/80/71/63
	30	31.66	45.48	1.1	231	1.1	231	1	90/80/71/63
	40	39.75	36.23	0.86	227	0.75	198	1.15	80/71/63
	50	50.89	28.3	0.66	223	0.55	186	1.2	80/71/63
	63	62.24	23.14	0.47	194	0.37	153	1.27	71/63

Table 10 PHGM Series Data on Model C

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			392 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
c	5	5.047	285.32	5.41	181	2.2	74	2.46	100/90/80/71/63
	6.3	6.41	224.65	4.8	204	2.2	94	2.18	100/90/80/71/63
	6.8	6.875	209.45	4.26	194	2.2	100	1.94	100/90/80/71/63
	10	9.94	144.87	5.3	349	2.2	145	2.41	100/90/80/71/63
	13	13.59	105.96	4.32	389	2.2	198	1.96	100/90/80/71/63
	15	14.93	96.45	3.54	351	2.2	218	1.61	100/90/80/71/63
	20	20.46	70.38	2.89	392	2.2	299	1.31	100/90/80/71/63
	25	25.98	55.433	2.24	386	2.2	379	1.02	100/90/80/71/63
	30	31.66	45.48	1.86	391	1.5	315	1.24	90/80/71/63
	40	39.75	36.23	1.46	385	1.1	290	1.33	90/80/71/63
	50	50.89	28.3	1.14	385	1.1	371	1.04	90/80/71/63
	63	62.24	23.14	0.91	376	0.75	310	1.21	80/71/63

Table 11 PHGM Series Data on Model D

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			670 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
D	5	5.047	285.32	8.8	295	3.7	124	2.38	112/100/90/80/71
	6.3	6.41	224.65	7.72	328	3.7	157	2.09	112/100/90/80/71
	6.8	6.875	209.45	7.35	335	3.7	169	1.99	112/100/90/80/71
	10	9.94	144.87	9.35	616	3.7	244	2.53	112/100/90/80/71
	13	13.59	105.96	7.3	658	3.7	333	1.97	112/100/90/80/71
	15	14.93	96.45	6.2	614	3.7	366	1.68	112/100/90/80/71
	20	20.46	70.38	4.94	670	3.7	502	1.34	112/100/90/80/71
	25	25.98	55.43	3.75	646	3.7	638	1.01	112/100/90/80/71
	30	31.66	45.48	3	630	2.2	462	1.36	112/100/90/80/71
	40	39.75	36.23	2.43	641	2.2	580	1.1	112/100/90/80/71
	50	50.89	28.3	1.98	668	1.5	506	1.32	90/80/71
	63	62.24	23.14	1.6	660	1.5	619	1.07	90/80/71

Table 12 PHGM Series Data on Model E

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			1029 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
E	5	5.047	285.32	12.9	432	3.7	124	3.49	112/100/90/80
	6.3	6.41	224.65	11.5	489	3.7	157	3.11	112/100/90/80
	6.8	6.875	209.45	10.9	497	3.7	169	2.95	112/100/90/80
	10	9.94	144.87	14	923	3.7	244	3.78	112/100/90/80
	13	13.59	105.96	11.1	1000	3.7	333	3.00	112/100/90/80
	15	14.93	96.45	9.29	920	3.7	366	2.51	112/100/90/80
	20	20.46	70.38	7.56	1026	3.7	502	2.04	112/100/90/80
	25	25.98	55.43	5.8	999	3.7	638	1.57	112/100/90/80
	30	31.66	45.48	4.81	1010	3.7	777	1.30	112/100/90/80
	40	39.75	36.23	3.76	991	3.7	975	1.02	112/100/90/80
	50	50.89	28.3	3.05	1029	2.2	742	1.39	112/100/90/80
	63	62.24	23.14	2.39	987	2.2	908	1.09	112/100/90/80

Table 13 PHGM Series Data on Model F

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			1587 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
F	5	5.047	285.32	18.52	620	7.5	251	2.47	132/112/100/90/80
	6.3	6.41	224.65	16.36	695	7.5	319	2.18	132/112/100/90/80
	6.8	6.875	209.45	15.58	710	7.5	342	2.08	132/112/100/90/80
	10	9.94	144.87	18.5	1220	7.5	494	2.47	132/112/100/90/80
	13	13.59	105.96	16.9	1523	7.5	676	2.25	132/112/100/90/80
	15	14.93	96.45	14	1386	7.5	743	1.87	132/112/100/90/80
	20	20.46	70.38	11.4	1547	7.5	1018	1.52	132/112/100/90/80
	25	25.98	55.43	8.9	1533	7.5	1292	1.19	132/112/100/90/80
	30	31.66	45.48	7.35	1543	5.5	1155	1.34	132/112/100/90/80
	40	40.07	35.94	5.78	1536	5.5	1462	1.05	132/112/100/90/80
	50	50.92	28.28	4.7	1587	3.7	1269	1.27	112/100/90/80
	63	63.25	22.77	3.54	1485	2.2	923	1.61	112/100/90/80

Table 14 PHGM Series Data on Model G

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			2636 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
G	5	5.047	285.32	33.3	1115	15	502.07	2.22	160/132/112/100/100/90
	6.3	6.41	224.65	28.6	1217	15	637.66	1.91	160/132/112/100/100/90
	6.8	6.875	209.45	27.4	1251	15	683.92	1.83	160/132/112/100/100/90
	10	9.94	144.87	37	2438	15	988.82	2.47	160/132/112/100/100/90
	13	13.59	105.96	27	2433	15	1351.92	1.80	160/132/112/100/100/90
	15	14.93	96.45	24.5	2426	15	1485.22	1.63	160/132/112/100/100/90
	20	20.46	70.38	18.7	2536	15	2035.34	1.25	160/132/112/100/100/90
	25	25.98	55.43	14.8	2550	11	1895.28	1.35	160/132/112/100/100/90
	30	31.79	45.30	12.5	2636	11	2319.12	1.14	160/132/112/100/100/90
	40	40.07	35.94	9.81	2606	9.3	2471.40	1.05	160/132/112/100/100/90
	50	50.89	28.30	7.8	2606	7.5	2531.25	1.04	132/112/100/100/90
	63	63.35	22.73	6.3	2632	5.5	2310.74	1.15	132/112/100/100/90

Table 15 PHGM Series Data on Model H

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			3955 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
H	5	5.047	285.32	47.2	1580	22	736	2.15	180/160/132/112/100/90
	6.3	6.41	224.65	40.9	1739	22	935	1.86	180/160/132/112/100/90
	6.8	6.875	209.45	36.2	1651	22	1003	1.65	180/160/132/112/100/90
	10	9.94	144.87	42	2769	22	1450	1.91	180/160/132/112/100/90
	13	13.59	105.96	37	3335	22	1983	1.68	180/160/132/112/100/90
	15	14.93	96.45	34.2	3386	22	2178	1.55	180/160/132/112/100/90
	20	20.46	70.38	28.5	3867	22	2985	1.3	180/160/132/112/100/90
	25	25.98	55.43	22.4	3859	22	3791	1.02	180/160/132/112/100/90
	30	31.66	45.48	18.6	3905	18.5	3884	1.01	180/160/132/112/100/90
	40	39.82	36.16	14.9	3935	11	2905	1.35	160/132/112/100/90
	50	48.49	29.70	12.3	3955	11	3537	1.12	160/132/112/100/90
	63	61.5	23.41	9.1	3712	7.5	3059	1.21	132/112/100/90

Table 16 PHGM Series Data on Model J

Technical Data for PHGM Series									
PHGM	Input RPM (n1)	1440		Design Data		Max. Motor Frame Size			6446 Nm
	Nominal Ratio (In)	Exact Ratio (Ir)	Output Rpm (n2)	Power (Kw)	Torque (Nm)	Power (Kw)	Torque (Nm)	FS	IEC Frames Available
J	5	5.047	285.32	111	3715	30	1004	3.7	200/180/160/132/112/100
	6.3	6.41	224.65	99	4209	30	1275	3.3	200/180/160/132/112/100
	6.8	6.87	209.45	94	4286	30	1368	3.13	200/180/160/132/112/100
	10	9.94	144.87	62	4087	30	1978	2.07	200/180/160/132/112/100
	13	13.59	105.96	58	5227	30	2704	1.93	200/180/160/132/112/100
	15	14.93	96.45	52.7	5218	30	2970	1.76	200/180/160/132/112/100
	20	20.46	70.38	43.8	5943	30	4071	1.46	200/180/160/132/112/100
	25	25.98	55.43	36.2	6237	30	5169	1.21	200/180/160/132/112/100
	30	31.66	45.48	29.5	6194	22	4619	1.34	180/160/132/112/100
	40	39.75	36.23	23.9	6301	22	5800	1.09	180/160/132/112/100
	50	50.89	28.30	19.1	6446	15	5062	1.27	160/132/112/100
	63	62.24	23.14	15.2	6274	15	6192	1.01	160/132/112/100

Gearbox Installation - PHGM

Note: Satisfactory performance depends on proper installation, lubrication & maintenance. Therefore, it is important that instructions in the Installation & Maintenance manual supplied with each gearbox are followed carefully. Some of the important aspects of Adaptor and torque-arm installation are listed here under:-

1. If output hub runs anti clockwise, torque-arm should be positioned to the right. See Fig.2.

2. Install torque-arm fulcrum on a rigid support so that the torque-arm will be at approximately right angles to the center line through the driven shaft and the torque-arm case bolt. See Fig.2. Make sure there is sufficient take-up in the turn- buckle for belt tension adjustment.

Figure 2

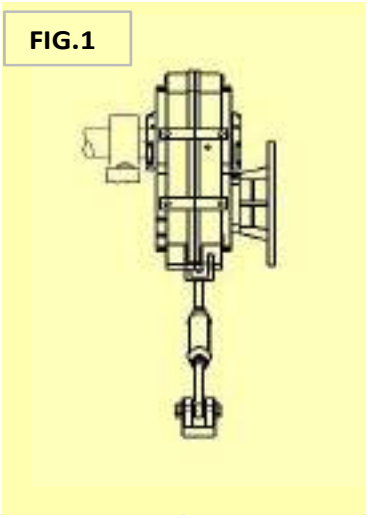


Figure 3

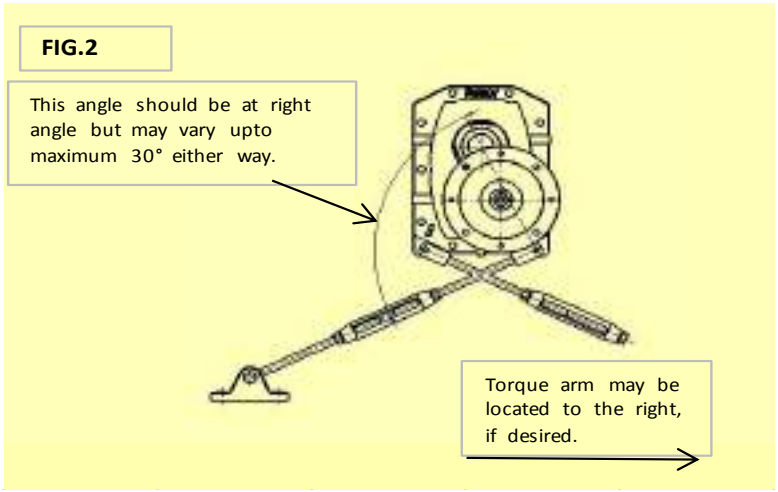


FIG.2

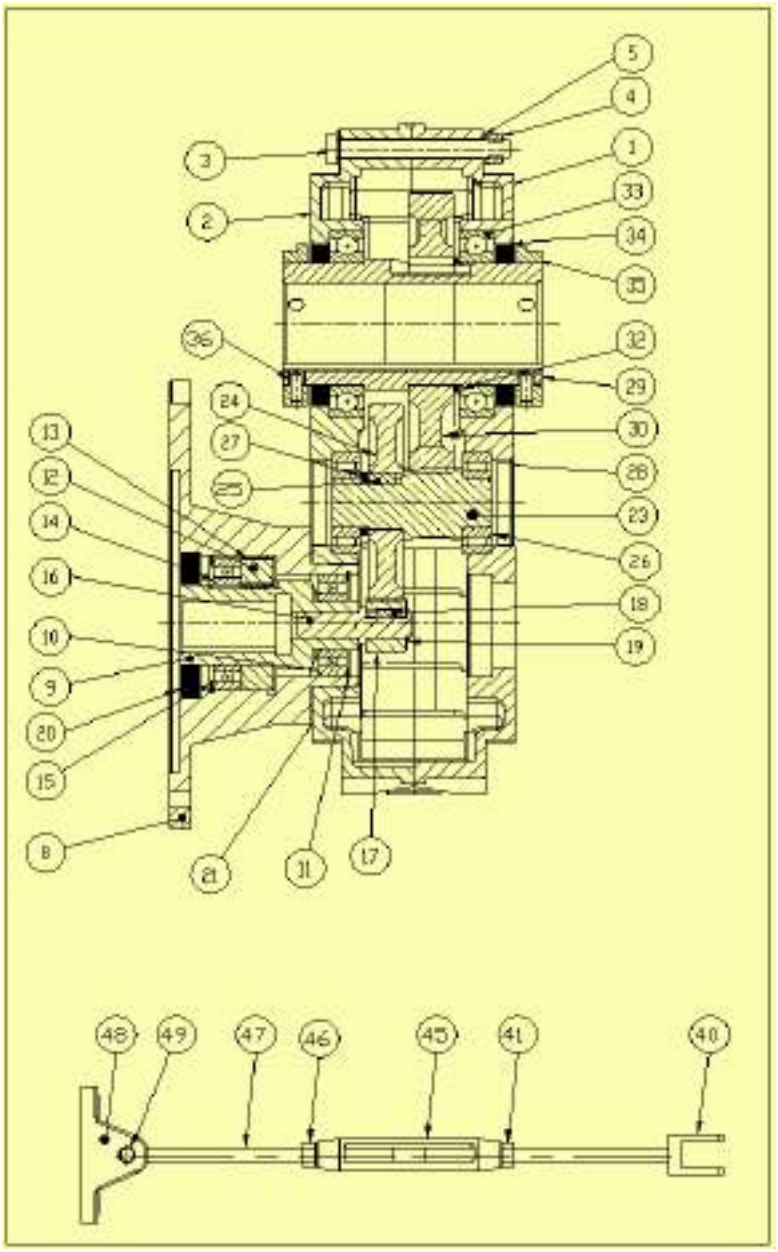
This angle should be at right angle but may vary up to a maximum of 30° either way.

Torque arm may be located to the right,if desired.

When ordering parts for reducer, please specify:

1. Reducer Size No.
2. Reducer Serial No.
3. Part Name
4. Code Numbers
5. Quantity Required

Note: Inclusion of a gearbox size in this leaflet does not imply availability in all markets.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Ref. No.	Description
1	Case Half RH
2	Case Half LH
3	Case Bolt
4	Case Nut
5	Spring whasher
6	Case Plain Washer (Not shown in drg.)
7	Hollow Dowel (Not shown in drg.)
8	Adaptor
9	Pinion Body
10	Input shaft bearing -1 (Gear side)
11	Internal circlip
12	Back stop
13	Back stop keys
14	Input shaft bearing 2 (Motor Side)
15	Internal circlip
16	Pinion shaft
17	Input Gear
18	Input Gear Key
19	External Circlip
20	oil Seal
21	Gasket
22 A	Hex. Hd. Bolt (Not shown in drg.)
22 B	Spring whasher (Not shown in drg.)
23	Intermediate pinion
24	1st reduction gear
25	1st reduction gear key
26	Intermediate bearing
27	Intermediate Spacer
28	Intermediate cover
29	Output Hub
30	2nd Reduction gear
31	2nd reduction Gear Key (Not shown in drg.)
32	Output axis Spacer
33	Output bearing
34	Output oil seal
35	Output hub Collar
36	Collar Grub screw over key
37	Collar Grub screw Over shaft (Not shown in drg.)
38	Inspection tag
39	Lube tag
38	Breather plug (Not shown in drg.)
39	Pipe plug (Not shown in drg.)
40	Rod End & Extention-01 LH

41	Rod End Lock nut LH
42	Torque -Arm Bolt (Not shown in drg.)
43	Torque -Arm Nut (Not shown in drg.)
44	Torque -Arm Lock washer (Not shown in drg.)
45	Turn buckle
46	Rod End Lock nut RH
47	Rod End & Extention - 02 RH
48	Fulcrum
49	Fulcrum Bolt
50	Fulcrum Nut (Not shown in drg.)
51	Fulcrum lock washer (Not shown in drg.)

Replacement of parts

Removing Reducer from shaft

Loosen screws in both output hub collars. Remove the collar next to end of shaft, turn the collar and replace
with the flush side outwards. Replace and tighten screws fully and then slacken off slightly in order to have maximum engagement in the hub but not gripping the shaft. Using any suitable three legged hub drawer engage the feet recesses of the collar and remove the gearbox by screwing down on the shaft.

Important

Using tools normally found in the maintenance department, the Reducer can be dismantled and reassembled. Cleanliness is very important to prevent the introduction of dirt into the bearings and other parts of the Reducer. A tank of clean solvent, an arbor press and equipment for heating bearings and gears should be available for shrinking these parts on the shafts.

Rubbing type oil seals are fitted and great care should be taken during dismantling and reassembling to
Avoid damage to the rubbing surfaces.

Any burrs on shaft or hub surfaces should be carefully removed before fitting seals. We are prepared to repair reducers for customers who do not have proper facilities or who do for any reason desire factory service. An estimate of the cost will be sent after examination and before the repair is begun.

Ordering Parts

When ordering parts for a Reducer, specify reducer size, serial number, part name, code number, and Quantity required.

It is strongly recommended that when a pinion or gear is replaced, the mating gear or pinion be replaced also. If the large gear on the output hub must be replaced, it is recommended that an output hub assembly of a gear assembled on a hub be ordered to secure undamaged surfaces on the outer hub where the oil seals rub. However, if it is desired to use the old output hub, press the gear and bearing off and examine the rubbing surfaces under the oil seal carefully for possible scratching or other damage resulting from the pressing operation. To prevent oil leakage at the shaft oil seals, the smooth surface of the output hub must not be damaged.

If any part must be pressed from a shaft or from the output hub, this should be done before ordering parts to make sure that none of the bearings or other parts are damaged on removal. Do not press against the outer race of any bearing. Because old shaft oil seals and gaskets may be damaged in dismantling, it is advisable to order replacements for these parts.

Bolt Tightening Torques

Reducer Size	B	C&D	E	F&G	H&J
Torque Nm	16	30	50	80	50&80
Torque lbf ft	12	22	37	59	37&59*

H&J *Torque-arm case bolts only.

Length

Inches x 25.4 = millimeters
Inches x 0.0254 = meters
Feet x 0.30480 = metres

Yards x 0.91440 = metres

Force

Kilogramforce (kgf) x 9.81 = Newtons (N)
Poundsforce (lbf) x 4.45 = Newtons (N)

Note: The kilopond (kp) is an alternative name for the kilogramforce (kgf)

Torque

Kilogramforce metre
(kgfm) x 9.81 = Newton metre (Nm)
Pounds feet (lbf ft) x 1.36 = Newton metre (Nm)
Pounds inches (lbf in) x 0.113 = Newton metre (Nm)

Power

Horse power (hp) x 0.746 = kilowatt (kW)
Cheval-vapeur (CV) x 0.735 = kilowatt (kW)
Pferdestarke (PS) x 0.735 = kilowatt (KW)

Torque and Power Equivalents

The kilowatt (kW) is the common unit of mechanical power, i.e. the rate of doing work.

Torque is a turning moment or twisting effort and is expressed in Newton metres (Nm)

$$Kw = \frac{Nm \times RPM}{9550} \qquad Nm = \frac{Kw \times 9550}{RPM}$$

Pressure

Pounds force per square inch
(lb. f/in" x 0.0689 = bar
Kilo newton per square meter

(KN/m2) x 0.01 = bar

Kilogram force per square centimeter

(Kg. f/crn") x 0.981 = bar

Fluid Volume

Gallons x 4.55 = liters

Cubic inches x 0.0164 = liters

Cubic feet x 28.3 = liters

Cubic meters x 1000 = liters