

Zodiac

Gear Box



Company Profile

We "Shyam Industries" are one of the leading manufacturer of precision machines engineering parts having manufacturing units located at Ahmadabad. Also, we have technically qualified well trained and experienced engineers and highly skilled operator, we are always ready to tack up any challenging job and confident to fulfill our commitments to our valued clients.

'ZODIAC' Shaft Mounted Speed Reducers are high quality products submitted to intense quality control and manufactured with highest precision. 'ZODIAC' SMSR are compact, totally enclosed and are designed for direct mounting to ensure positive drive and permanent alignment minimizing space requirement and layout problems.

Salient features and benefits of 'ZODIAC' Shaft Mounts are:

- ISO 9001-2008 certified manufacturing system.
- Gear housing manufactured by using best quality materials with high accuracy in the manufacturing process.
- Gear housing is made of closely grained cast iron.
- All Gears are of high grade alloy steel for Higher efficiency.
- Achieve for extra strength of gear we apply forging process before machining.
- Each unit supplied with corrosion resistant Torque Arm and double lip oil seals.
- Long gear and bearing lifetime due to heavier design.
- All mounting positions possible.
- Low noise level.

Available in 5:1, 13:1 and 20:1 Ratio.

Selection of Gear box

SELECTION PROCEDURE

- 1) Determine required output speed.
- 2) Determine power absorbed by drive.

$$\text{Absorbed Power (Kw)} = \frac{\text{Absorbed Torque (Nm)} \times \text{Machine Speed (rpm)}}{9550}$$

- 3) Determine Service Factor from Table.
- 4) Multiply the absorbed power by the service factor.
- 5) Using Table for power rating select the smallest gear unit that is suitable for transmitting this power at the output speed

EXAMPLE

A torque of 1000Nm is required to be transmitted on a conveyor at 70rpm

The conveyor is not uniformly loaded and operates for 12 hours a day

$$\text{Absorbed power} = 1000 \times 70 / 9550 = 7.32\text{KW}$$

Service factor from Table = 1.4

$$\text{Selection power } 7.32 \times 1.4 = 10.26\text{KW}$$

From power rating chart at 70rpm size "F" Double Reduction Gear unit at 11.3KW is the smallest for this application.

Selection of Gear Box

Driven Machine Types Service Factors	Daily Operating Hours		
	Below 10 hours	Between 10-16 hours	Above 16 hours
UNIFORM LOAD Liquid and semi liquid mixers, Centrifugal discharged equipments, Bottling machine. Fixed load carrier, Ovens, Washing machine, Transmission shafts, Centrifugal and gear pumps, Wire drawing machines.	1	1.12	1.25
MODERATE SHOCK Variable density mixers, Variable load conveyors, Cranes moveable carriers and lifters, Rolling machines, Heavy load elevators, Drying stove, Drying machines, Lifting machines, Piston pumps with 3 or more cylinders, Pulp machines, Drying machines, Honing cylinder, Wet pressing machines, Small Mixers and calendars, Rotary screens, Textile machine,	1.25	1.4	1.5
HEAVY SHOCK Brick press machines, Briquette manufacturing machines, Conveyor band moving forward / backward and shaking machine, Hammer mill, Piston pumps with 1 or 2 cylinders, Extruders, Vibrators, Forging mills	1.6	1.8	2

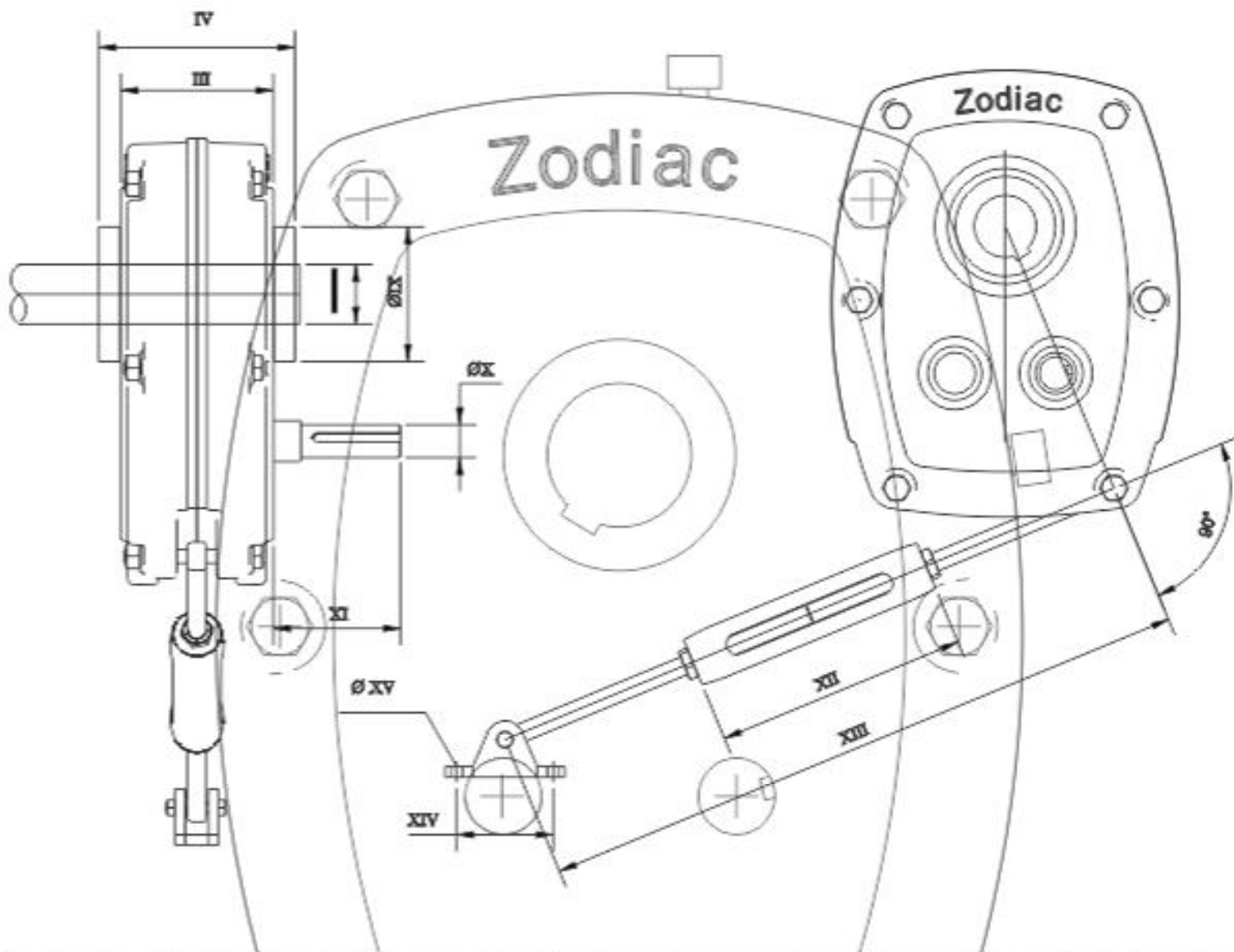
Single Reduction

Double Reduction

Output Rev/Min	B	C	D	E	F	G	H	J
100	1.86	3.76	5.85	9.03	12.67	21.20	31.30	47.50
110	1.97	3.87	6.04	9.52	13.07	22.67	32.42	49.83
120	2.07	4.04	6.38	9.96	13.69	23.68	33.85	52.15
130	2.19	4.22	6.60	10.44	14.23	24.62	35.33	54.30
140	2.30	4.39	6.87	10.60	14.81	25.63	36.83	56.55
150	2.41	4.56	7.14	11.20	15.40	26.64	38.25	58.87
160	2.55	4.74	7.42	11.60	16.02	27.65	39.68	60.98
170	2.64	4.90	7.68	12.10	16.59	28.65	41.18	63.23
180	2.76	5.08	7.97	12.50	17.45	29.69	42.60	65.43
190	2.88	5.26	8.22	12.90	17.72	30.67	44.03	67.65
200	2.99	5.42	8.50	13.30	18.31	31.68	45.45	69.90
210	3.11	5.60	8.76	13.80	18.99	32.69	46.95	72.15
220	3.23	5.73	9.03	14.44	19.47	33.69	48.38	74.33
230	3.35	5.94	9.34	14.60	20.04	34.70	49.80	76.63
240	3.46	8.11	9.58	15.00	20.64	35.75	51.30	78.75
250	3.61	6.29	9.85	15.40	21.25	36.71	52.73	81.15
260	3.78	6.46	10.16	15.90	21.80	37.73	54.15	83.30
270	3.89	6.61	10.40	16.30	22.39	38.73	55.58	85.43
280	3.98	6.81	10.70	16.70	22.97	39.74	57.08	88.93
290	4.05	6.98	10.98	17.10	21.57	40.75	58.50	
300	4.18	7.15	11.22	17.65	24.14	41.76	59.93	
310	4.29	7.35	11.50	18.00	24.80	42.77	61.43	
320	4.43	7.50	11.70	18.40	25.30	43.77	62.85	
330	4.51	7.67	12.00	18.80	25.88	44.78		
340	4.63	7.84	12.30	19.30	26.47	45.79		
350	4.80	8.02	12.52	19.73	27.08	46.79		
360	4.83	8.19	12.80	20.10	27.67	47.85		
370	4.96	8.36	13.10	20.50	28.18	48.86		
380	5.08	8.53	13.40	21.12	30.71			
390	5.19	8.70	13.60	21.40	31.34			
400	5.30	8.88	13.90	21.80	31.92			
Torque at 100rpm (Nm)	252	440	685	1095	1578	2743	3923	6077

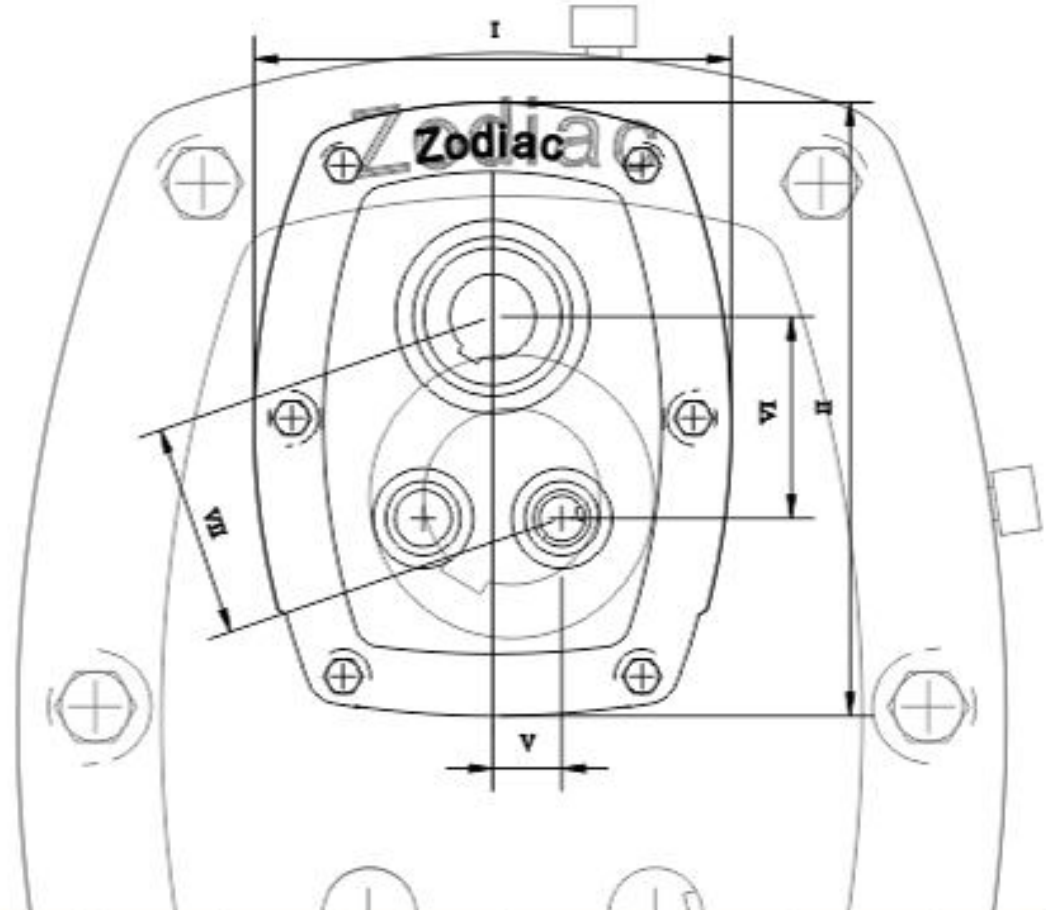
Output Rev/min	B13	C13	D13	E13	F13	G13	H13	J13
	B20	C20	D20	E20	F20	G20	H20	J20
10	0.29	0.52	0.81	1.26	1.84	3.15	4.53	6.98
12	0.36	0.63	0.96	1.53	2.23	3.87	5.55	8.56
14	0.41	0.73	1.14	1.20	2.64	4.58	6.58	10.12
16	0.47	0.87	1.33	2.08	3.06	5.29	7.60	11.70
18	0.49	0.98	1.51	2.37	3.47	6.01	8.66	13.20
20	0.54	1.08	1.69	2.65	3.89	6.71	9.64	14.80
22	0.61	1.19	1.85	2.93	4.35	7.43	10.72	16.40
24	0.66	1.33	2.05	3.27	4.71	8.15	11.70	17.90
26	0.70	1.42	2.22	3.50	5.12	8.86	12.76	19.57
28	0.77	1.53	2.41	3.78	5.53	9.57	13.70	21.10
30	0.82	1.63	2.59	4.05	5.94	10.30	14.78	22.70
32	0.88	1.77	2.78	4.37	6.36	11.18	15.83	24.30
34	0.93	1.84	2.95	4.62	6.77	11.70	16.85	25.90
38	1.04	2.12	3.12	4.90	7.18	12.40	17.79	27.48
40	1.11	2.12	3.40	5.18	7.63	13.10	18.92	29.17
42	1.14	2.22	3.48	5.47	8.01	13.90	19.90	30.67
46	1.25	2.34	3.66	5.75	8.42	14.60	20.90	32.20
50	1.35	2.46	3.84	6.11	8.84	15.30	21.91	33.80
52	1.42	2.55	4.02	6.31	9.24	16.08	23.23	35.20
54	1.44	2.68	4.25	6.59	9.65	16.70	24.14	36.83
58	1.57	2.81	4.38	6.87	10.10	17.40	25.17	38.41
62	1.69	2.91	4.56	7.15	10.50	18.10	26.19	40.08
66	1.77	3.11	4.73	7.43	10.90	18.90	27.10	41.60
70	1.85	3.14	4.97	7.78	11.30	19.60	28.13	43.20
74	1.96	3.26	5.10	8.09	11.72	20.30	29.17	44.79
78	2.04	3.46	5.42	8.51	12.56	21.60	31.24	47.60
80	2.15	3.66	5.75	9.02	13.21	22.90	32.72	50.61
85	2.22	3.88	6.13	9.54	14.16	24.20	34.73	53.32
90	2.37	4.07	6.41	10.10	14.70	25.50	36.60	56.38
95	2.49	4.30	6.73	10.60	15.50	26.82	38.50	59.19
100	2.59	4.32	6.73	10.58	15.50	26.80	38.50	
Torque at 10rpm (Nm)	267	505	785	1241	1814	3132	4512	6932

Dimensions of Gearbox



Size	I	II	III	IV	V	VI	VII	STD. Hub Bore VIII	IX	X	XI	liput Shaft KeyWay	XII	XIII		XIV	XV	Approximate Mass kg,	
														MAX	MIN			5 Ratio	13 - 20 Ratios
B	190	232	108	138	25	75	79	30	78	16h7	60	5 x 3 x 50	200	600	750	76	10	17	19
C	224	276	114	148	31	90	95	40	88	22h7	68	6x3.5x65	200	600	750	76	10	22	26
D	261	335	120	156	37	110	116	(50)	96	25b7	72	8 x 4 x 65	216	700	850	76	10	33	37
E	295	381	130	166	43	125	133	55	115	28h7	65	8 x 4 x 70	216	700	850	76	10	45	53
F	324	414	150	192	50	141	150	65	130	32h7	90	10x5x85	216	700	850	76	10	56	69
G	370	472	174	214	56	156	166	75	145	42h7	105	12 x 5x90	216	750	900	76	10	105	110
H	436	554	190	244	62	189	200	85	170	48h7	116	14x5.5x100	222	750	900	121	16	138	167
J	548	702	198	258	75	255	266	100	200	55h7	136	16x6x110	222	750	900	121	16	198	228

Dimensions of Gearbox



Gear Size	Bore Size (H7)	Alternate Bore in mm	Standard Hub Bore mm	Alternate Bore in mm	Alternate Bore in inch	Alternate Bore in inch	Key Size
B	Hub Bore	25	30	35	1"	1 1/4"	10X8
	Key Way	10X4	10X4	10X4	10X4	10X4	
C	Hub Bore	35	40	45	1 1/2"	1 3/4"	12X8
	Key Way	12X4	12X4	12X4	12X4	12X4	
D	Hub Bore	45	50	55	2"	2 1/4"	14X9
	Key Way	14X4	14X4	14X4	14X4	14X4	
E	Hub Bore	50	55	60	2"	2 1/2"	16X10
	Key Way	16X4	16X4	16X4	16X4	16X4	
F	Hub Bore	60	65	70	2 1/2"	2 3/4"	18X11
	Key Way	18X5	18X5	18X5	18X5	18X5	
G	Hub Bore	70	75	80	3"	3 1/4"	21X12
	Key Way	20X5	20X5	20X5	20X5	20X5	
H	Hub Bore	80	85	90	3 1/4"	3 1/2"	22X14
	Key Way	22X6	22X6	22X6	22X6	22X6	
J	Hub Bore	95	100	105	4"	4 1/4"	28X16
	Key Way	28X6	28X6	28X6	28X6	28X6	

Backstops

The simple accessory prevents reversal of the reducer and are ideal for use in incline conveyors. It is important that the backstop is installed correctly to ensure a safe operation.

To install a Backstop

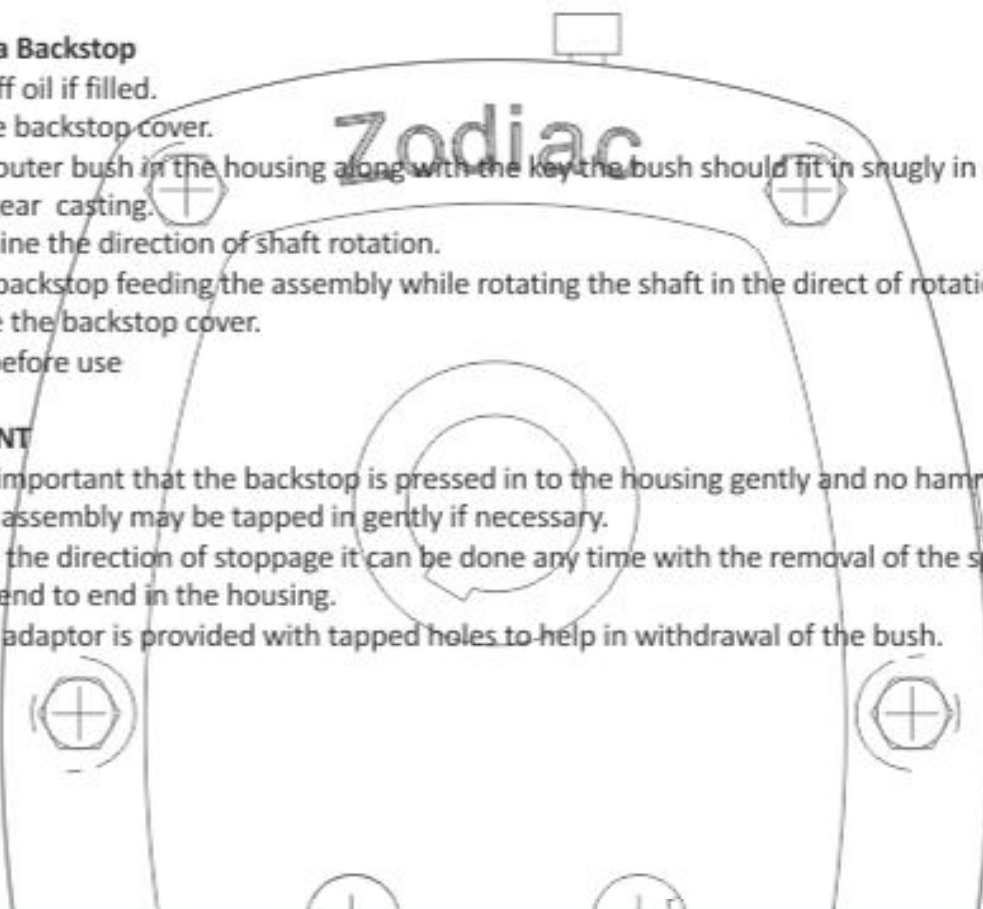
- 1) Drain off oil if filled.
- 2) Remove backstop cover.
- 3) Fit the outer bush in the housing along with the key the bush should fit in snugly in contact with the gear casting.
- 4) Determine the direction of shaft rotation.
- 5) Fit the backstop feeding the assembly while rotating the shaft in the direct of rotation.
- 6) Replace the backstop cover.
- 7) Fill oil before use

IMPORTANT

It is most important that the backstop is pressed in to the housing gently and no hammer is used. The assembly may be tapped in gently if necessary.

To change the direction of stoppage it can be done any time with the removal of the sprag and turning it end to end in the housing.

The outer adaptor is provided with tapped holes to help in withdrawal of the bush.



Installation

Gear Box Installation:

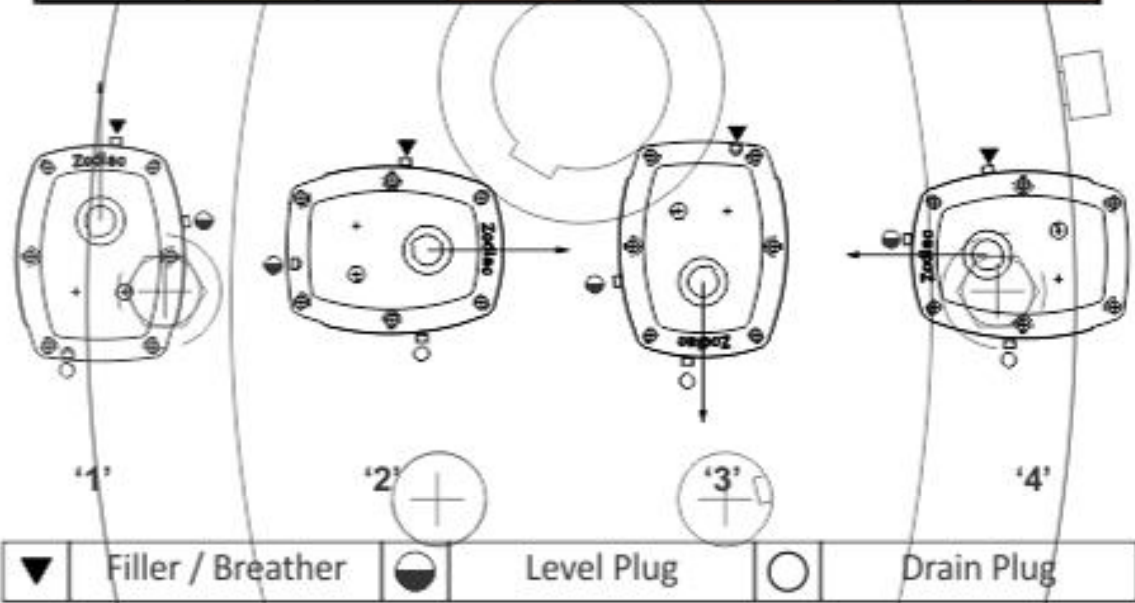
Satisfactory performance depends on proper installation, lubrication and maintenance. Therefore it is important that the instructions in the Installation and Maintenance leaflet supplied with each gearbox, are followed carefully.

Lubrication:

Shaft Mounted Speed Reducers are dispatched without oil. Before running they should be filled with an appropriate amount of the correct lubricant depending on the mounting position as shown in the tables in the installation manual. Viscosity of oil for various ambient temperatures and reducer INPUT speed are shown below

Installation

RECOMMENDED LUBRICANTS							
	13:1 & 20:1 Ratio Gearboxes				5:1 Ratio Gearbox		
	Ambient Temp C°	0-20 Rev/min	21-50 Rev/min	51-120 Rev/min	0-100 Rev/min	101-200 Rev/min	201-400 Rev/min
		B to J	B to J	B to J	B to J	B to J	B to J
SHELL (Omala)	-10 to +5	69	69	41	41	41	33
	6 to 25	81	81	77	77	75	71
	26 to 40	85	85	85	85	81	77
HP (Parthan)	-10 to +5	EP 150	EP220	EP220	EP 150	EP 150	EP 150
	6 to 25	EP 150	EP 220	EP 220	EP 150	EP 150	EP 150
	26 to 40	EP 150	EP 320	EP 220	EP 150	EP 150	EP 150
INDIAN OIL (Servomesh)	-10 to +5	SP68	SP68	SP68	SP100	SP100	Sp68
	6 to 25	SP220	SP220	SP220	SP320	SP320	SP220
	26 to 40	SP 320	SP 320	SP 320	SP 680	SP 680	SP 460



Units are fitted with filler and Drain Plugs generally in the position shown

Approximate Oil Capacity - Litres								
Unit Size	Mounting Position							
	20:1 & 13:1				5 : 1			
	'1'	'2'	'3'	'4'	'1'	'2'	'3'	'4'
B	0.3	0.5	0.4	0.5	0.4	0.4	0.4	0.5
C	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.8
D	1.2	1.5	1.2	1.3	1.0	1.4	1.2	1.5
E	2.0	2.0	1.8	1.6	1.9	2.0	1.8	1.9
F	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.6
G	3.5	4.3	3.4	3.9	3.3	4.1	3.3	4.6
H	4.2	7.8	4.5	7.5	4.5	8.1	4.8	7.5
J	8.5	16	13	15	-	-	-	-

Capacities Shown are approx.



AN ISO 9001:2008 Certified Company

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