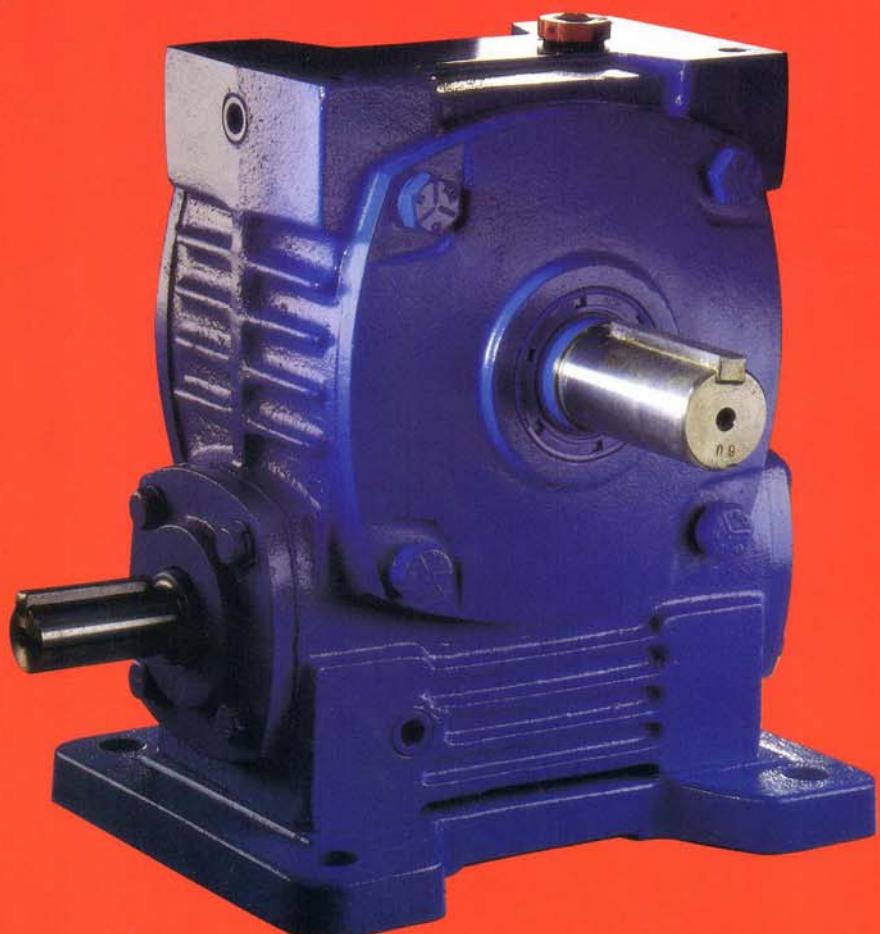


— PERFECT POWER LINE —

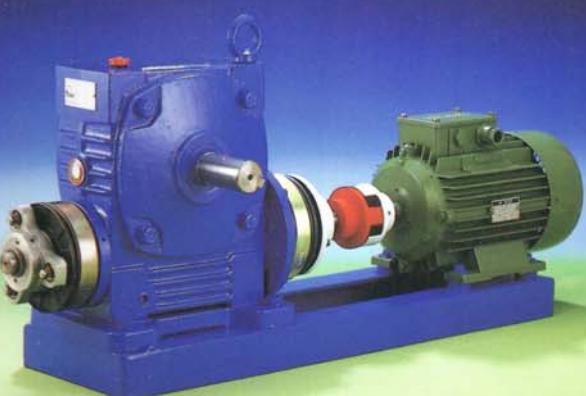
WORM GEAR SPEED REDUCERS



23 PRODUCTS OF WORM GEAR



KA



KA-CB



KA-DO



KA-DN



KA-HO



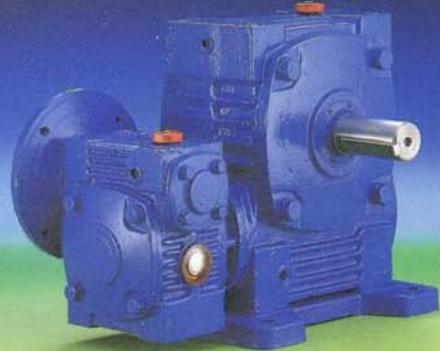
KAD



KAD-HO



KADE



KAD-FN



KH



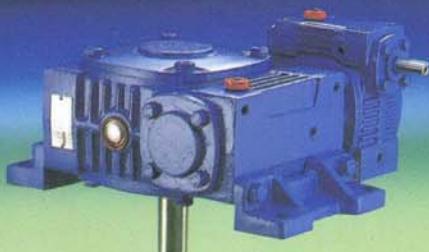
KO-HO



KO-RD



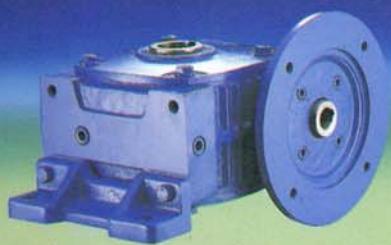
KO-RU



KOD-RD



KOD-RU



KOFN-HO



KR



KR-FN



KRE



KRE-HO



KRFN-DO



KRFN-HO



LB-KRFN

WORM GEAR SPEED REDUCERS

FEATURES

In order to satisfy the need of all industries, we have developed this international standard worm gear speed reducer. Worms and worm gears are designed to give efficiency and long service life at listed ratings. It is so noiseless compact light and Find, that we believe it will do much to your company and plant.

STRUCTURE

- Worm shaft : Made of alloy steel S45C and better, its teeth with hardness up to HS 60° ± 3° achieved by treating with intense heat and tempering, are carefully ground so that they are very tough and durable.
- Worm gear : Made of a special analysis aluminum bronze and gears carefully cut by use of the exclusive hob for all speed reducers.
- Worm gear boss Housing : Made of special cast iron (FC-20 or better and above) capable to receive great impact.
- Bearing : Made of cast iron, with high hardness, able to endure great impact, beautiful in appearance. The casting material is FC-20 or better and above
- Seal : With ball-bearings and tapered roller bearings, which allow for greater overhung and thrust loading.
- Seal : All shaft projections have special designed, high quality oil seals.

USAGE

Worm gear speed reducer is essential to drive systems and is widely used when speed reducer is needed, such as :

- Machingical industry : Conveyer, lift, dryer crane, transport equipment, extending press, filling machine, extruder, can-making machine, foundry and other machinery, etc.
- Chemical & textile industry : Chemical machinery, mixer, coating machine, textile machine, drying machine, doubling-frame, bleaching machine, finishing machine, dyeing machine, printing machine, rubber equipment, dehydrating machine, washing machine, etc.
- Paper & printing industry : Printing machine, paper machine, packing machine, automatic recording machine, cutting machine, winding machine, etc.
- Electric industry : Extending machine, wiring machine, extruding machine, plating machine, paper-covering machine, etc.
- Other industry : Mining equipment, crusher, separator, selector, washing machine, coal feeder, tobacco machine, food machinery, civil engineering equipment, plywood machinery, film-making machine, rubber-machinery, ventilator, gas producer, plastic machinery, refrigerator, air compressor, etc.

WORM GEAR SPEED REDUCERS

HOW TO SELECT

T

To succeed in selecting "TSF" worm gear speed reducers, please refer to the following items:

- **R.P.M. of input shaft** : When driven with shaft coupling or belt, the maximum may be 2000 r.p.m., but 600-1800 r.p.m. is preferable.
- **R.P.M. of output shaft** : It can be calculated with the given r.p.m. of input shaft and speed reduction ratio.
R.P.M. of output shaft = R.P.M. of input shaft \times speed reduction ratio.
If it rotates in very low speed and both efficiency and torsion are lowered and oil feeding to bearings is getting more difficult, special care must be taken to the selection of model and lubricant oil. Please contact the manufacturer.
- **Standard speed reduction ratio** : Single reduction worm gear: 1/10·1/15·1/20·1/25·1/30·1/40·1/50·1/60;
Double reduction worm and helical gear: 1/80·1/90·1/100·1/120·1/150·1/180;
Double reduction worm gear: 1/100·1/150·1/200·1/300·1/400·1/500·1/600·1/800·1/900·1/1000.

CALCULATION DATA

- **Efficiency** : The efficiency of worm gear speed reducer is decided by the lead angle, circular pitch, speed, oil and peripheral temperature. The efficiency listed in this catalog may be checked with the following equation:
$$\text{Efficiency} = \frac{\text{HP of the output shaft}}{\text{HP of the input shaft}} \times 100\%$$
see the table of HP of page 7 and see table 1 for the Efficiency %
- **Load factor** : The calculation of the drive capacity and strength of speed reducers is based on the consecutive rotation of 8 hours per day and the mean load. The torque differs as periodical rotation or consecutive rotation, impact and load do. So it is important to select speed reducer model according to select speed reducer model according to the load factor. (See table 2 Load factor).
- **Overhung load (O.H.L.)** : When attaching chain sprockets or V-pulleys to the output shaft, the overhung load must be taken into consideration. Allowable overhung loads are shown in the following table. Formula to determine overhung load: Allowable overhung load OHL = $T \times H \times S/R$
 T = Torque \times service factor
 S = Position factor.
 H = OHL factor (See table 3)
 R = Radius of pitch of sprocket wheel or pulley.
If overhung load value does not satisfy the above formula, increase R (i.e. radius of pitch of sprocket wheel, gear or pulley).
1) $\ell \leq L/2$ (when load is at middle or innerside) $S = 1$
2) $\ell > L/2$ (when load is at outer side) $S = 2 \ell/L$
- **Allowed temperature limit** : The maximum temperature of the speed reducer housing: 80°C, inner oil tank: 100°C (93°C after rotation for 20 hours). The difference between peripheral temperature and oil tank temperature is 50°C.

WORM GEAR SPEED REDUCERS

TABLE 1 : EFFICIENCY

Speed reduction ratio	Efficiency
1 : 40 (below)	70%
1 : 30	80%
1 : 20 (Over)	85%

TABLE 3: O.H.L. FACTOR(H)

Sprocket	1.00
Gear	1.25
V.belt	1.50
(Flat-belt)	2.50

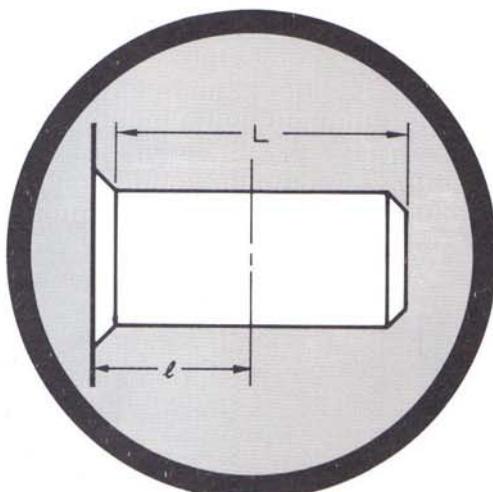


TABLE 2 : LOAD FACTOR

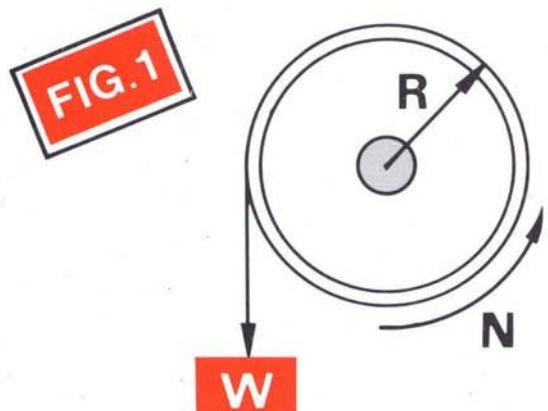
Prime Mover	Driven machine Load Classification	Duration of Service per day (1)			
		Occasional 0.50 hr.	Intermittent 2 hrs.	8-10 hrs.	10-24 hrs.
Electric Motor	Uniform	0.80	0.90	1.00	1.25
	Medium Shock	0.90	1.00	1.25	1.50
	Heavy Shock	1.00	1.25	1.50	1.75

(EXAMPLE) :

If an output shaft with a rope supporting a weight of 200 kgs. is wound around a cylinder of 0.2 meter radius. at a output shaft speed of 36 r.p.m. (see the fig 1) what model of speed reducer should be adopted? (In case of 24-hour rotation, uniform and input shaft rotation 1800 r.p.m. Model KA is suitable.)

- HP = Horse power
- T = Torque-Kg-m.
- N = r.p.m. (Worm gear rotation per minute) = 36 r.p.m.
- R = radius (m) = 0.2 m.
- W = load (Kg) = 200 Kgs.

(SOLUTION) :



$$\text{Speed reduction ratio} = 36/1800 = 1/50$$

$$T = W \times R = 200 \times 0.2 = 40 \text{ kg-m}$$

$$HP = \frac{T \times N}{716.2 \text{ (Co-efficient)}} = \frac{40 \times 36}{716.2} = 2.0$$

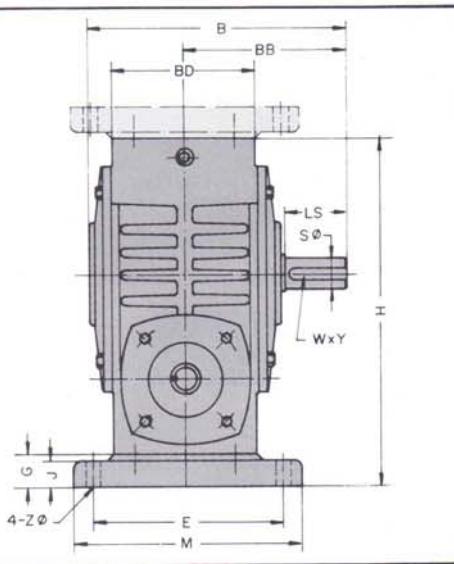
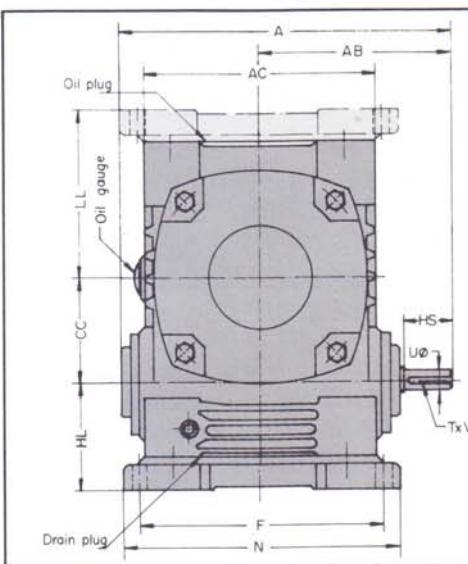
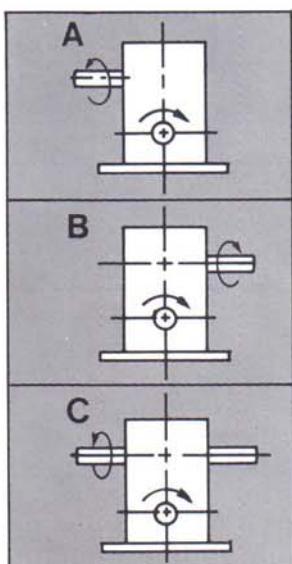
From Table 1 : efficient = 0.7

From Table 2 : Load factor = 1.25

$$\text{Speed reducer capacity} = \frac{HP \times (\text{Load factor})}{\text{efficiency}} \\ = \frac{2.0 \times 1.25}{0.70} = 3.57 \text{ HP}$$

■ From the HP Table on page 18 Model KA,135 Ratio 1/50 is the right answer.

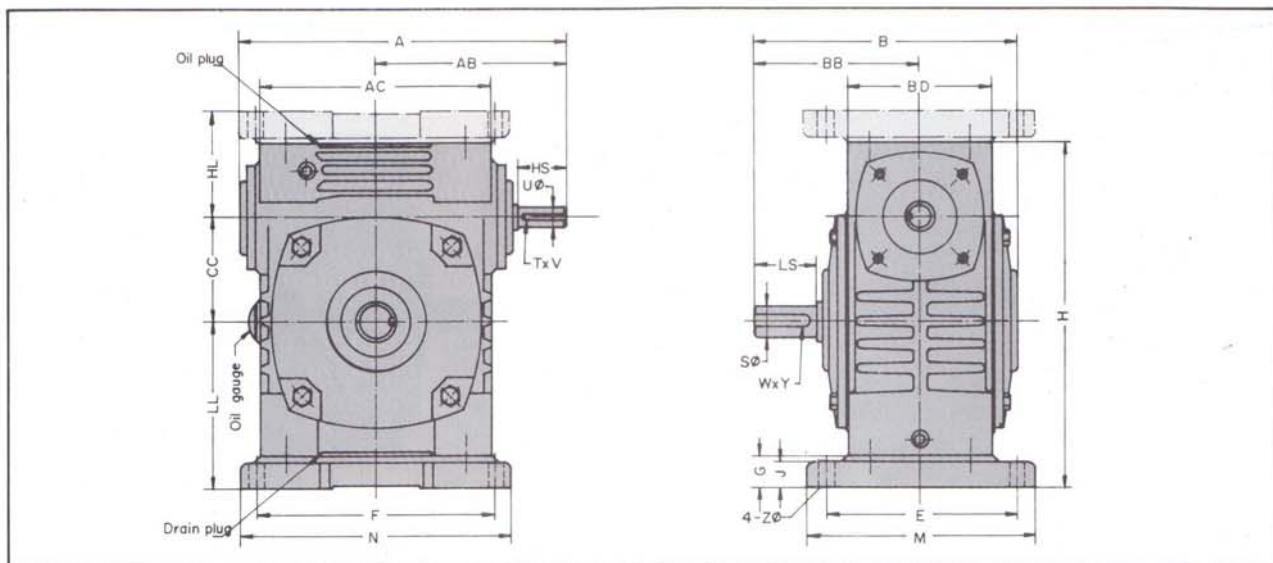
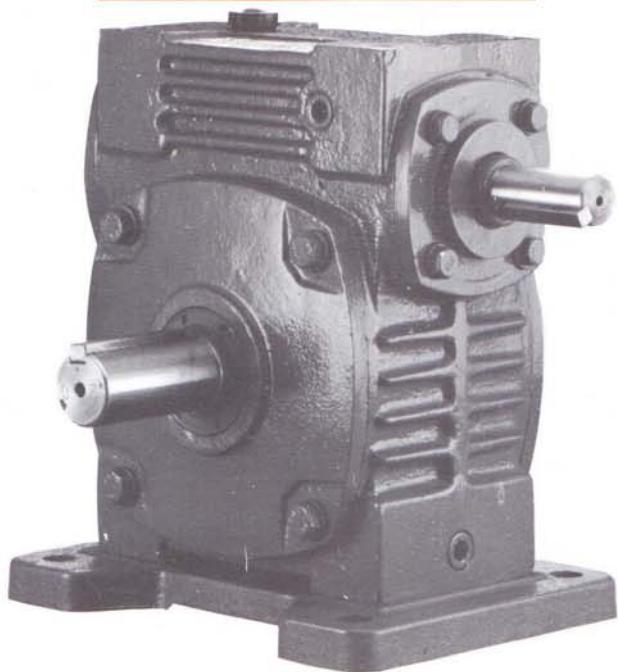
KA



DIMENSION (in millimeter)

Size	Ratio																(Input Shaft)			(Output Shaft)				
		A	AB	AC	B	BB	BD	CC	E	F	H	HL	LL	M	N	J	G	Z	HS	U	T x V	LS	S	W x Y
40	1/10	160	96	102	130	84	68	40	90	100	140	47	66	110	125	11	13	10	28	12	4 x 2.5	35	15	5 x 3
50		175	105	115	145	95	68	50	95	110	165	50	80	120	140	13	15	11	30	12	4 x 2.5	40	17	5 x 3
60		195	120	127	165	110	78	60	105	120	195	60	93	130	150	15	18	11	40	15	5 x 3	50	22	7 x 4
70		234	140	156	195	130	88	70	115	150	225	70	105	150	190	18	20	15	40	18	5 x 3	60	28	7 x 4
80		264	160	176	210	140	101	80	135	180	252	80	112	170	220	18	20	15	50	22	7 x 4	65	32	10 x 4.5
100		322	190	227	260	170	115	100	155	220	315	100	140	190	270	22	25	15	50	25	7 x 4	75	38	10 x 4.5
120		385	230	265	290	190	135	120	180	260	395	120	180	230	320	22	25	18	65	30	7 x 4	85	45	12 x 4.5
135		435	260	300	320	210	145	135	200	290	455	135	215	250	350	28	30	18	75	35	10 x 4.5	95	55	15 x 5
155		507	302	330	387	252	160	155	220	320	490	135	235	280	390	31	35	20	85	40	10 x 4.5	110	60	15 x 5
175		550	325	370	407	262	185	175	250	350	555	160	260	310	420	36	40	20	85	45	12 x 4.5	110	65	18 x 6

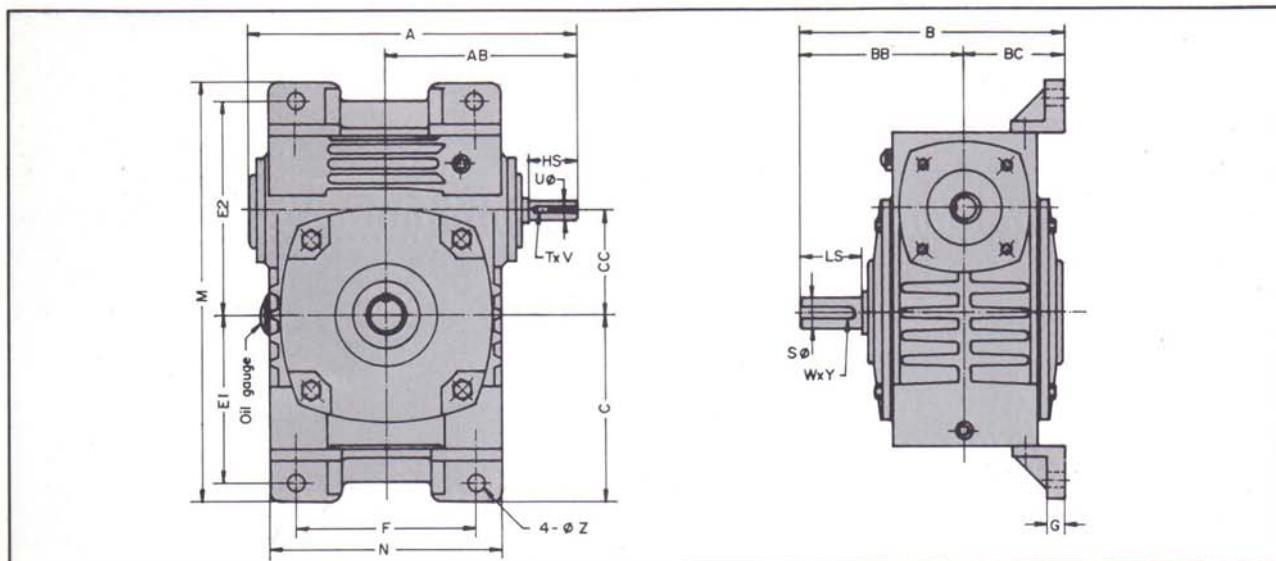
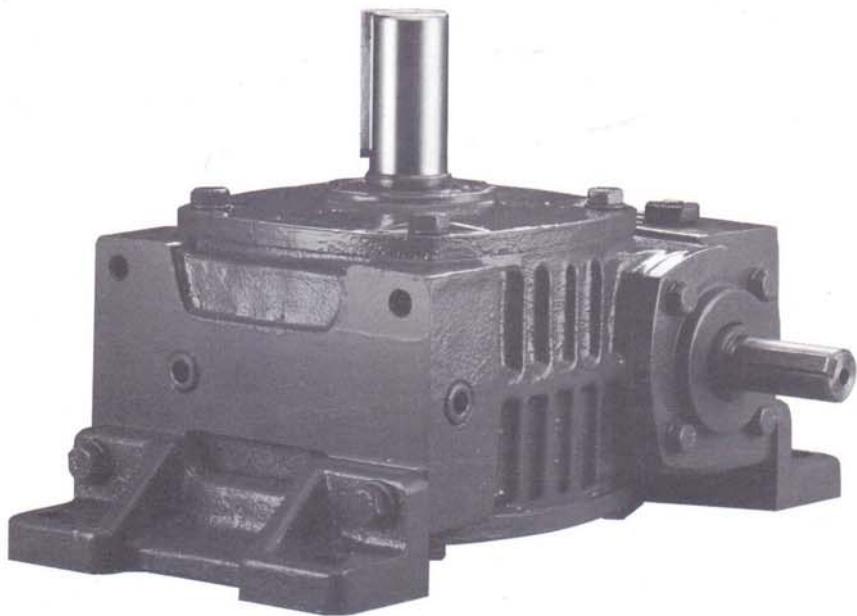
KR



DIMENSION (in millimeter)

Size	Ratio	A	AB	AC	B	BB	BD	CC	E	F	H	HL	LL	M	N	J	G	Z	(Input Shaft)			(Output Shaft)		
																			HS	U	TxV	LS	S	WxY
40	1/10	160	96	102	130	84	68	40	90	100	140	47	66	110	125	11	13	10	28	12	4×2.5	35	15	5×3
50	1/15	175	105	115	145	95	68	50	95	110	165	50	80	120	140	13	15	11	30	12	4×2.5	40	17	5×3
60	1/20	195	120	127	165	110	78	60	105	120	195	60	93	130	150	15	18	11	40	15	5×3	50	22	7×4
70	1/30	234	140	156	195	130	88	70	115	150	225	70	105	150	190	18	20	15	40	18	5×3	60	28	7×4
80	1/40	264	160	176	210	140	101	80	135	180	252	80	112	170	220	18	20	15	50	22	7×4	65	32	10×4.5
100	1/50	322	190	227	260	170	115	100	155	220	315	100	140	190	270	22	25	15	50	25	7×4	75	38	10×4.5
120	1/60	385	230	265	290	190	135	120	180	260	395	120	180	230	320	22	25	18	65	30	7×4	85	45	12×4.5
135		435	260	300	320	210	145	135	200	290	455	135	215	250	350	28	30	18	75	35	10×4.5	95	55	15×5
155		507	302	330	387	252	160	155	220	320	490	135	235	280	390	31	35	20	85	40	10×4.5	110	60	15×5
175		550	325	370	407	262	185	175	250	350	555	160	260	310	420	36	40	20	85	45	12×4.5	110	65	18×6

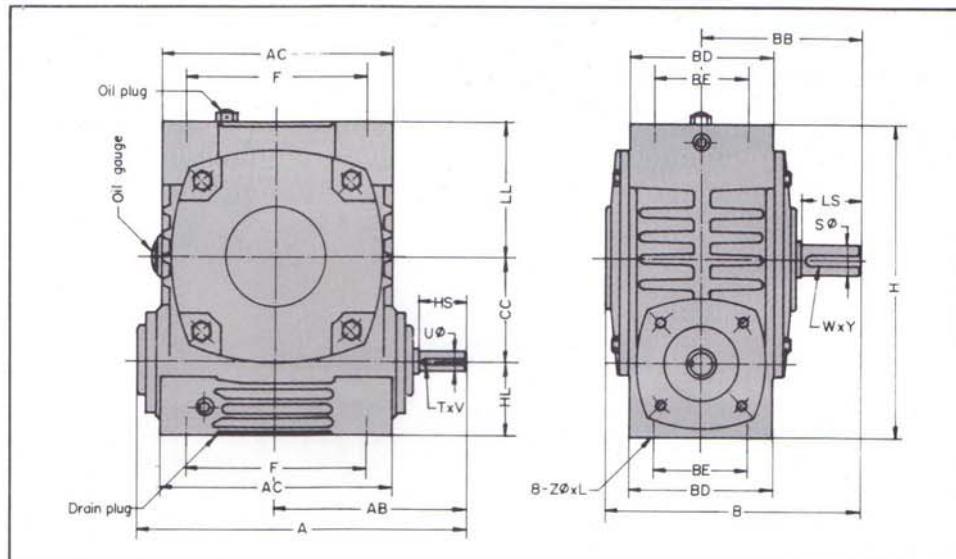
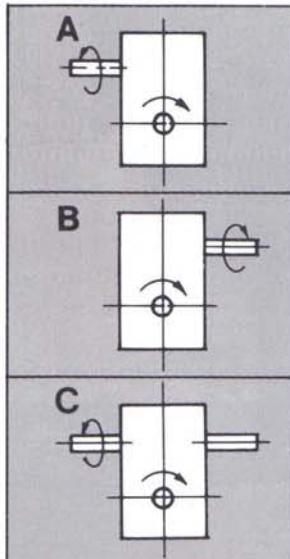
KO-RU



DIMENSION (in millimeter)

Size	Ratio	A	AB	B	BB	BC	C	CC	E1	E2	F	M	N	G	Z	(Input Shaft)			(Output Shaft)		
																HS	U	T x V	LS	S	W x Y
40	1/10	160	96	131	84	47	87	40	75	96	80	195	105	11	9	28	12	4 x 2.5	35	15	5 x 3
50		175	105	145	95	50	102	50	90.5	110.5	90	224	116	14	11	30	12	4 x 2.5	40	17	5 x 3
60	1/15	195	120	165	110	55	118	60	102	129	100	263	127	15	11	40	15	5 x 3	50	22	7 x 4
70		234	140	195	130	65	135	70	120	155	120	305	156	18	15	40	18	5 x 3	60	28	7 x 4
80	1/20	264	160	212	140	72	147	80	132	180	140	342	176	18	15	50	22	7 x 4	65	32	10 x 4.5
100		322	190	260	170	90	175	100	155	215	190	410	226	22	15	50	25	7 x 4	75	38	10 x 4.5
120	1/30	385	230	285	190	95	199	120	195	255	220	496	264	22	18	65	30	7 x 4	85	45	12 x 4.5
135		435	260	320	210	110	253	135	230	285	260	561	304	23	18	75	35	10 x 4.5	95	55	15 x 5
155	1/40	507	302	392	252	140	170	155	145	267	290	456	336	35	20	85	40	10 x 4.5	110	60	15 x 5
175		550	325	412	262	150	207	175	167	293	320	516	380	40	20	85	45	12 x 4.5	110	65	18 x 6

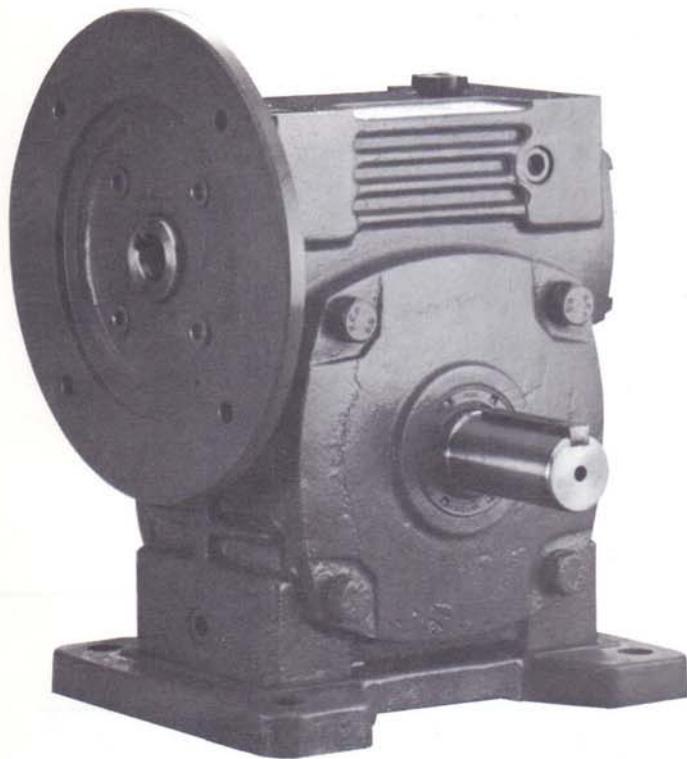
KH



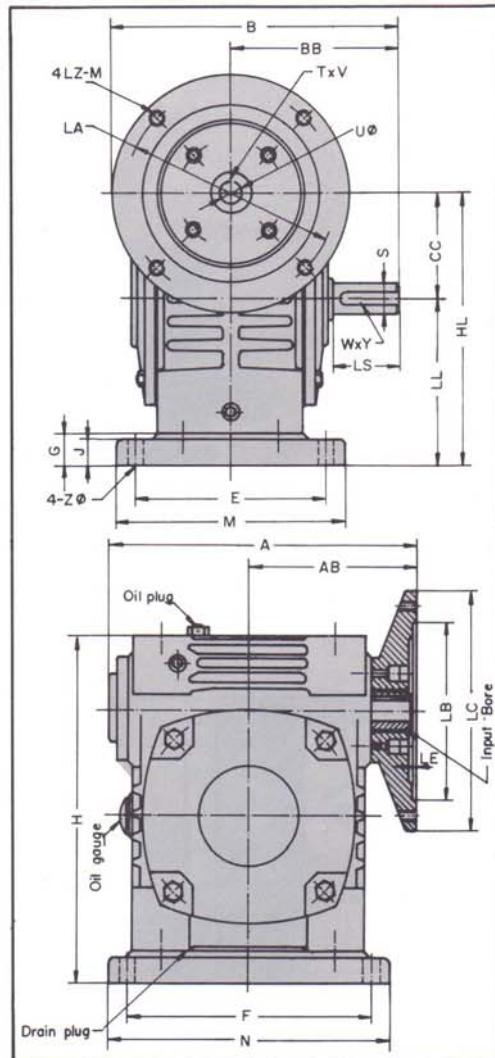
DIMENSION (in millimeter)

Size	Ratio	A	AB	AC	B	BB	BD	BE	CC	F	H	HL	LL	Z × L	(Input Shaft)			(Output Shaft)		
															HS	U	T × V	LS	S	W × Y
40	1/10	160	96	102	130	84	68	54	40	80	127	34	53	M 8 × 16	28	12	4 × 2.5	35	15	5 × 3
50	1/15	175	105	115	145	95	68	50	50	90	150	35	65	M 8 × 16	30	12	4 × 2.5	40	17	5 × 3
60		195	120	127	165	110	78	54	60	100	177	42	75	M 10 × 20	40	15	5 × 3	50	22	7 × 4
70	1/20	234	140	156	195	130	88	66	70	125	205	50	85	M 10 × 20	40	18	5 × 3	60	28	7 × 4
80	1/30	264	160	176	210	140	101	75	80	145	232	60	92	M 10 × 20	50	22	7 × 4	65	32	10 × 4.5
100		322	190	227	260	170	115	85	100	185	290	75	115	M 12 × 24	50	25	7 × 4	75	38	10 × 4.5
120	1/40	385	230	265	290	190	135	100	120	220	370	95	155	M 14 × 30	65	30	7 × 4	85	45	12 × 4.5
135		435	260	300	320	210	145	110	135	260	425	105	185	M 16 × 35	75	35	10 × 4.5	95	55	15 × 5
155	1/50	507	302	330	387	252	160	120	155	280	455	100	200	M 16 × 35	85	40	10 × 4.5	110	60	15 × 5
175		550	325	370	407	262	185	140	175	320	515	120	220	M 16 × 35	85	45	12 × 4.5	110	65	18 × 6

KR-FN

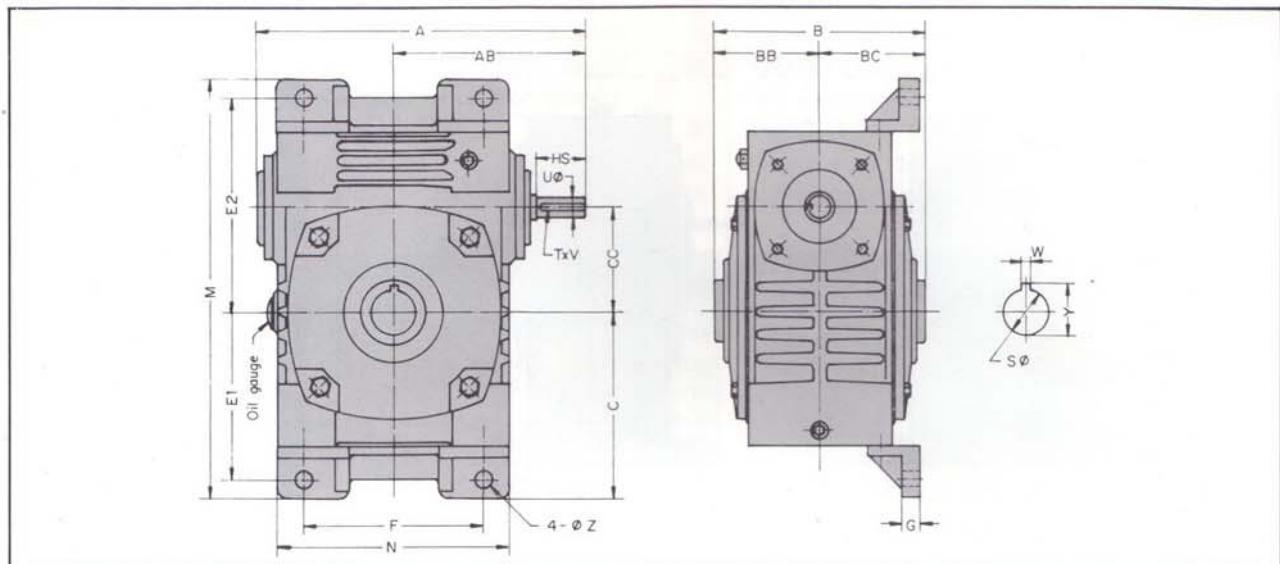


DIMENSION (in millimeter)



Size	Ratio	Adaptor (IEC)																Input Bore		Output Shaft			Motor					
		A	AB	B	BB	CC	E	F	H	HL	LL	M	N	J	G	Z	LS	LB	LC	LE	LZ	U	T x V	LS	S	W x Y		
40	1/10	132	70	154	84	40	90	100	140	106	66	110	125	11	13	10	115	95	140	4	M8	11	4 x 1.5	35	15	5 x 3	0.2kw	
50		149	78	165	95	50	95	110	165	130	80	120	140	13	15	11	115	95	140	4	M8	11	4 x 1.5	40	17	5 x 3	0.2kw	
60	1/15	160	85	180	190	110	60	105	120	195	153	93	130	150	15	18	11	115	95	140	4	M8	11	4 x 1.5	50	22	7 x 4	0.2kw
70		196	140	210	230	130	70	115	150	225	175	105	150	190	18	20	15	130	110	160	4	M10	14	5 x 2	60	28	7 x 4	0.4kw
80	1/20	217	114	240	140	80	135	180	252	192	112	170	220	18	20	15	165	130	200	5	M12	19	5 x 2	65	32	10 x 4.5	0.75kw	
100		271	141	270	295	170	100	155	220	315	240	140	190	270	22	25	15	165	130	200	5	M12	28	7 x 3	75	38	10 x 4.5	1.5kw
120	1/30	326	170	315	190	120	180	260	395	300	180	230	320	22	25	18	215	180	250	5	M12	28	7 x 3	85	45	12 x 4.5	2.2kw	
135		362	190	335	360	210	135	200	290	455	350	215	250	350	27	30	18	215	180	250	5	M12	38	7 x 3	95	55	15 x 5	3.75kw
155	1/40	430	215	402	252	155	220	320	490	390	235	280	390	31	35	20	265	230	300	5	M12	38	10 x 3.5	110	60	15 x 5	5.5kw	
175		475	235	402	437	262	175	250	350	555	435	260	310	420	36	40	20	265	230	300	6	M12	38	10 x 8.5	110	65	18 x 6	7.5kw
																									11kw			

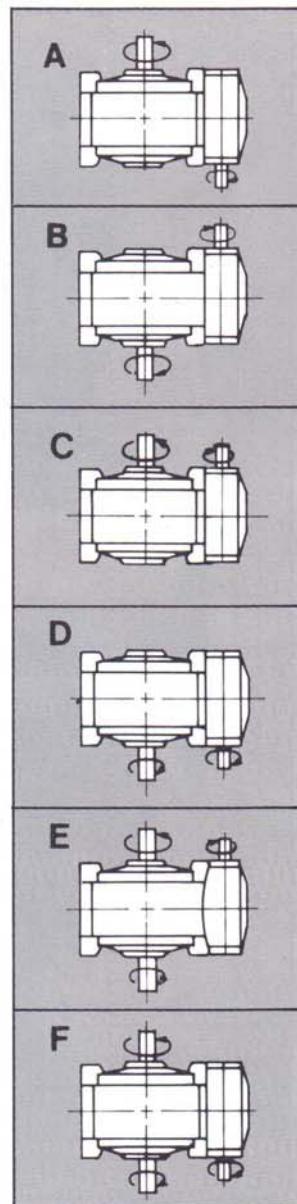
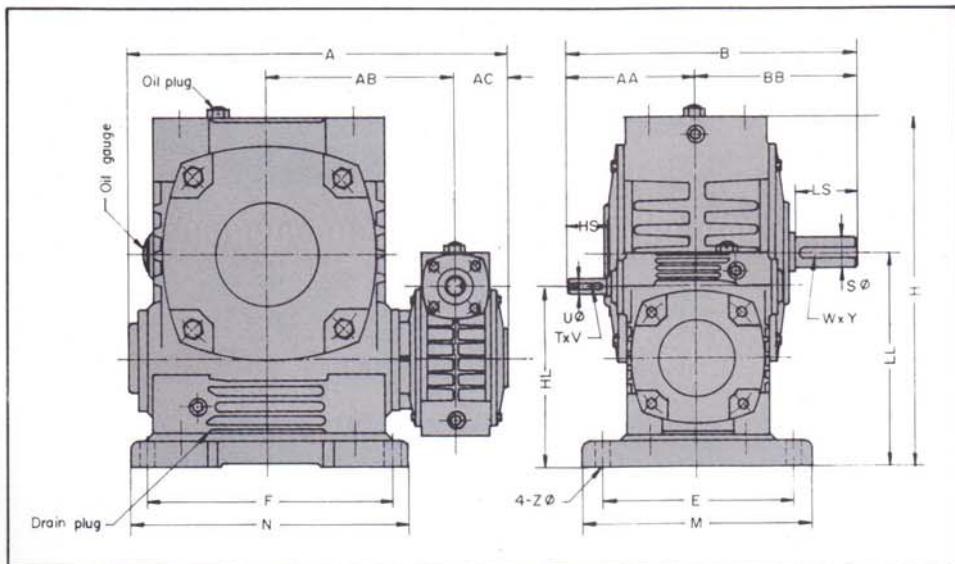
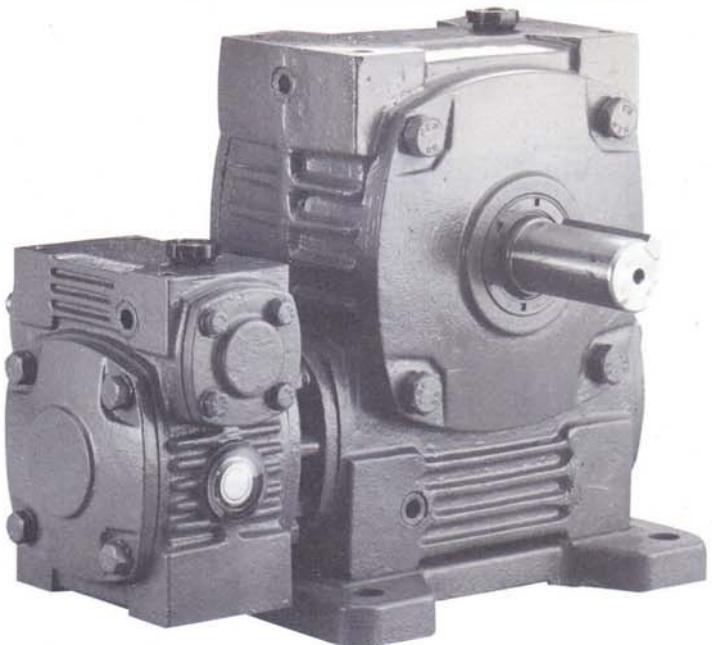
KO-HO



DIMENSION (in millimeter)

Size	Ratio	A	AB	B	BB	BC	C	CC	E1	E2	F	M	N	G	Z	(Input Shaft)			(Output Shaft)		
																HS	U	T x V	S	W	Y
40	1/10	160	96	98	49	49	87	40	75	96	80	195	105	11	9	28	12	4 x 2.5	20	5	22
50	1/15	175	105	107	53.5	53.5	102	50	90.5	110.5	90	224	116	14	11	30	12	4 x 2.5	20	5	22
60	1/20	195	120	117	58.5	58.5	118	60	102	129	100	263	127	15	11	40	15	5 x 3	25	7	28
70	1/30	234	140	131	65.5	65.5	135	70	120	155	120	305	156	18	15	40	18	5 x 3	30	7	33
80	1/40	264	160	144	72	72	147	80	132	180	140	342	176	18	15	50	22	7 x 4	35	10	38.5
100	1/50	322	190	175	87.5	87.5	175	100	155	215	190	410	226	22	15	50	25	7 x 4	40	10	43.5
120	1/60	385	230	210	105	105	199	120	195	255	220	496	264	22	18	65	30	7 x 4	50	12	53.5
135		435	260	222	111	111	253	135	230	285	260	561	304	23	18	75	35	10 x 4.5	60	15	65
155		507	302	280	140	140	170	155	145	265	290	456	336	35	20	85	40	10 x 4.5	70	18	76
175		550	325	310	155	155	207	175	167	293	320	516	380	40	20	85	45	12 x 4.5	80	20	86

KAD



DIMENSION (in millimeter)

Size	Ratio	A	AB	AC	B	BB	AA	E	F	H	HL	LL	M	N	G	Z	(Input Shaft)			(Output Shaft)		
																	HS	U	T×V	LS	S	W×Y
60	1:100	245	127	46	206	110	96	105	120	195	100	120	130	150	18	11	28	12	4×2.5	50	22	7×4
70	1:150	277	142	46	226	130	96	115	150	225	120	140	150	190	20	15	28	12	4×2.5	60	28	7×4
80	1:200	311	157	50	245	140	105	135	180	252	130	160	170	220	20	15	30	12	4×2.5	65	32	10×4.5
100	1:300	373	190	55	290	170	120	155	220	315	160	200	190	270	25	15	40	15	5×3	75	38	10×4.5
120	1:400	442	221	65	330	190	140	180	260	395	190	240	230	320	25	18	40	18	5×3	85	45	12×4.5
135	1:500	484	248	70	370	210	160	200	290	455	215	270	250	350	30	18	50	22	7×4	95	55	15×5
155	1:800	550	273	85	442	252	190	220	320	490	235	290	280	390	35	20	50	25	7×4	110	60	15×5
175	1:900	624	309	100	492	262	230	250	350	555	280	335	310	420	40	20	20	30	7×4	110	65	18×6

SELECTION OF LUBRICANT OIL

Lubricant oil must have a viscosity sufficient to reduce friction of the worm and worm gear. So that the speed reducer can operate smoothly under high load and impact.

LOAD	Ambient (Room) Temperature Range	SHELL OIL	MOBIL OIL
Common Load	-30°C ~ 5°C	Omala Oil 68	Mobil Comp 629
	5°C ~ 40°C	Omala oil R220	Mobil Comp 632 600 W Cylinder oil
	40°C ~ 65°C	Omala oil R320	Mobil Comp 634 600 W Cylinder oil
Heavy Load	-30°C ~ 5°C	Omala oil R150	Mobil Comp 632
	5°C ~ 40°C	Omala oil R320	Mobil Comp 634
	40°C ~ 65°C	Omala oil R680	Mobil Comp 636

After 300 hrs. of primary operation, drain away the oil and clean the internal of the machine, then put it new oil. Do so hereafter every 2500 hrs. of operation.

(NOTE): Please keep in touch with our company, when you are operating the machinery under special conditions for example: high speed, high temperature, low speed heavy load.

- If you want to book speed reducers, please specify the following:
- Classification, Model and Ratio.
- Out put shaft power and revolution per minute.
- Rotation direction and required direction shaft (right, left, or duplex).
- Load.
- Wag of drive (direct, by belt or chain).
- Number of sets and name of the machine to be installed.

OIL QUANTITY (l)

Model No. Model	40	50	60	70	80	100	120	135	155	175
KA	0.22	0.40	0.55	0.83	1.40	2.65	4.80	6.30	7.50	12.60
KR	0.18	0.25	0.38	0.60	1.10	2.10	3.55	5.30	7.20	11.40
KO	0.22	0.37	0.45	0.70	1.25	2.50	4.00	5.80	7.40	12.30
KAD			0.73	1.08	1.65	3.03	5.40	7.40	9.60	16.50
KOD			0.63	0.95	1.50	2.88	4.60	6.90	9.50	15.85

DIMENSIONS OF BEARINGS

TYPE	KA·KR·KH·KO	
	Input Shaft	Output Shaft
50	6203	6204
60	6204	6205
70	30205	6206
80	30206	6207
100	30207	6208
120	30308	6210
135	30309	6212
155	30310, 6310	32213
175	30311, 6311	32214

SELF-LOCKING

Conventional worm gears have an integral braking effect. "TSF" reducers, however, because of their extra-precise tolerances, provide poor braking. To obtain adequate braking, operating efficiency must be reduced by more than 50 percent.

Self-locking is different with moving loads and stationary loads. Static friction is always greater than dynamic friction, so self-locking for stationary loads may not be effective for moving loads. Locking efficiency depends on such factors as rpm and helix angle. For single screw threads, self-locking is usually effective at a ratio of 1/50 or 1/60. With "TSF" reducers, however, tooth engagement is so smooth that a helix angle of approx. 3° is required. If self-locking is needed, modifications can be made upon request. Write for details.

Size 40-60

KA, KR, KO, KH/Horsepower and Torque Ratings (Kg-m)

Ratio		1800PPM INPUT SPEED				1500PPM INPUT SPEED				1200PPM INPUT SPEED				900PPM INPUT SPEED				600PPM INPUT SPEED				300PPM INPUT SPEED			
		In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.
40	1/10	0.83	0.65	2.6	70	0.77	0.60	2.8	70	0.67	0.51	3.1	70	0.56	0.42	3.4	70	0.43	0.32	3.8	70	0.23	0.16	3.8	70
	1/20	0.38	0.27	2.1	70	0.34	0.24	2.3	70	0.30	0.21	2.5	70	0.26	0.17	2.8	70	0.20	0.13	3.1	70	0.13	0.08	3.7	70
	1/30	0.43	0.28	3.3	70	0.40	0.25	3.5	70	0.34	0.21	3.8	70	0.27	0.16	3.8	70	0.20	0.11	3.8	70	0.10	0.05	3.8	70
	1/40	0.26	0.15	2.5	70	0.24	0.14	2.6	70	0.21	0.12	2.8	70	0.18	0.10	3.1	70	0.14	0.07	3.4	70	0.09	0.04	3.8	70
	1/50	0.25	0.14	2.8	70	0.23	0.12	3.0	70	0.20	0.11	3.2	70	0.17	0.09	3.5	70	0.13	0.06	3.8	70	0.07	0.03	3.8	70
	1/60	0.20	0.10	2.4	70	0.19	0.09	2.6	70	0.16	0.08	2.7	70	0.14	0.06	5.0	70	0.11	0.05	3.2	70	0.07	0.03	3.8	70
50	1/10	1.44	1.15	4.59	100	1.31	1.03	4.94	107	1.16	0.90	5.40	115	0.89	0.68	5.43	120	0.60	0.45	5.43	140	0.31	0.23	5.43	200
	1/15	1.07	0.81	4.89	115	0.97	0.73	5.22	120	0.82	0.60	5.43	130	0.63	0.45	5.43	140	0.43	0.30	5.43	160	0.22	0.15	5.43	200
	1/20	0.65	0.48	3.85	130	0.58	0.43	4.13	140	0.51	0.37	4.48	155	0.43	0.31	4.94	170	0.32	0.22	5.43	200	0.17	0.12	5.43	200
	1/30	0.68	0.45	5.43	150	0.58	0.37	5.43	170	0.48	0.30	5.43	180	0.37	0.22	5.43	200	0.26	0.15	5.43	200	0.14	0.07	5.43	200
	1/40	0.44	0.28	4.50	170	0.40	0.25	4.80	180	0.35	0.21	5.16	200	0.28	0.17	5.43	200	0.20	0.11	5.43	200	0.10	0.05	5.43	200
	1/50	0.39	0.23	4.55	200	0.35	0.20	4.94	200	0.31	0.17	5.29	200	0.24	0.13	5.43	200	0.17	0.09	5.43	200	0.09	0.04	5.43	200
	1/60	0.31	0.18	4.35	200	0.28	0.16	4.60	200	0.24	0.13	4.87	200	0.21	0.11	5.34	200	0.15	0.07	5.43	200	0.08	0.03	5.43	200
60	1/10	2.32	1.87	7.44	98	2.08	1.66	7.95	104	1.88	1.47	8.80	110	1.57	1.21	9.68	121	1.23	0.93	11.1	140	0.66	0.48	11.6	200
	1/15	1.72	1.32	7.91	116	1.55	1.18	8.46	123	1.36	1.01	9.07	133	1.17	0.85	10.2	145	0.90	0.64	11.5	167	0.48	0.32	11.6	200
	1/20	1.21	0.89	7.15	138	1.10	0.80	7.66	146	0.98	0.69	8.31	157	0.83	0.57	9.16	172	0.65	0.43	10.4	200	0.38	0.24	11.6	200
	1/25	1.24	0.92	9.10	153	1.12	0.82	9.70	162	0.99	0.71	10.5	174	0.82	0.58	11.5	192	0.48	0.32	11.6	200	0.30	0.19	11.6	200
	1/30	1.14	0.78	9.31	151	1.05	0.70	10.0	159	0.92	0.59	10.6	172	0.78	0.48	11.6	189	0.54	0.32	11.6	200	0.30	0.19	11.6	200
	1/40	0.82	0.52	8.27	178	0.75	0.46	8.83	189	0.67	0.39	9.49	200	0.58	0.32	10.4	200	0.45	0.24	11.6	200	0.25	0.12	11.6	200
	1/50	0.77	0.49	9.70	200	0.70	0.43	10.2	200	0.62	0.37	11.0	200	0.40	0.23	9.22	200	0.31	0.17	10.3	200	0.19	0.09	11.6	200
	1/60	0.64	0.38	9.20	200	0.58	0.34	9.70	200	0.51	0.29	10.4	200	0.43	0.24	11.3	200	0.25	0.13	9.52	200	0.14	0.07	11.2	200

Size 70-100

KA, KR, KO, KH/Horsepower and Torque Ratings (Kg-m)

Ratio		1800PPM INPUT SPEED				1500PPM INPUT SPEED				1200PPM INPUT SPEED				900PPM INPUT SPEED				600PPM INPUT SPEED				300PPM INPUT SPEED			
		In.	HP	Out.	HP	In.	HP	Out.	HP	In.	HP	Out.	HP	In.	HP	Out.	HP	In.	HP	Out.	HP	In.	HP	Out.	HP
70	1/10	3.48	2.82	11.2	128	3.11	2.50	11.9	136	2.77	2.20	13.1	145	2.33	1.81	14.4	159	1.85	1.41	16.9	180	1.20	0.88	21.1	228
	1/15	2.53	1.96	11.7	153	2.29	1.76	12.6	161	2.02	1.52	13.6	174	1.73	1.28	15.2	190	1.34	0.96	17.3	218	0.87	0.59	21.4	277
	1/20	1.93	1.47	11.7	178	1.75	1.31	12.5	188	1.55	1.14	13.6	202	1.31	0.94	15.0	222	1.02	0.71	17.1	255	0.65	0.43	20.6	300
	1/25	1.79	1.34	13.3	203	1.63	1.19	14.3	211	1.43	1.02	15.3	231	1.21	0.85	16.8	255	0.95	0.64	19.2	292	0.60	0.38	22.8	300
	1/30	1.69	1.16	13.8	198	1.55	1.05	15.0	208	1.36	0.89	16.1	225	1.18	0.74	17.7	247	0.92	0.56	20.1	284	0.59	0.33	23.8	300
	1/40	1.24	0.82	13.1	233	1.13	0.73	14.0	247	1.01	0.63	15.0	266	0.86	0.51	16.5	293	0.67	0.39	18.6	300	0.43	0.23	21.9	300
	1/50	1.12	0.72	14.3	266	1.03	0.64	15.2	282	0.91	0.55	16.3	300	0.77	0.45	17.8	300	0.60	0.33	19.7	300	0.39	0.19	23.2	300
	1/60	0.94	0.58	13.9	289	0.86	0.51	14.6	300	0.76	0.43	15.6	300	0.65	0.36	17.0	300	0.50	0.26	18.6	300	0.32	0.15	22.0	300
80	1/10	4.93	4.01	15.9	180	4.43	3.58	17.0	191	3.89	3.12	18.6	204	3.30	2.59	20.6	224	2.63	2.02	24.1	254	1.70	1.26	30.1	321
	1/15	3.57	2.79	16.7	215	3.21	2.49	17.8	228	2.83	2.17	19.4	244	2.44	1.81	21.7	267	1.90	1.38	24.7	306	1.24	0.85	30.7	388
	1/20	2.53	1.90	15.1	253	2.30	1.71	16.3	267	2.04	1.49	17.8	287	1.73	1.22	19.5	316	1.37	0.93	22.4	362	0.89	0.57	27.2	400
	1/25	2.49	1.85	18.5	279	2.25	1.66	19.9	296	1.99	1.44	21.4	318	1.69	1.18	23.5	350	1.32	0.90	26.7	400	0.84	0.54	31.9	400
	1/30	2.38	1.66	19.8	277	2.15	1.47	21.1	294	1.90	1.28	22.9	316	1.65	1.06	25.3	345	1.31	0.80	28.7	398	0.84	0.47	34.0	400
	1/40	1.70	1.10	17.5	326	1.54	0.98	18.7	347	1.38	0.85	20.4	372	1.19	0.69	22.2	400	0.94	0.52	25.0	400	0.62	0.31	29.8	400
	1/50	1.57	1.01	20.1	364	1.43	0.90	21.6	385	1.28	0.77	23.1	400	1.09	0.63	25.1	400	0.85	0.47	28.0	400	0.55	0.28	33.0	400
	1/60	1.29	0.79	18.9	400	1.18	0.71	20.4	400	1.05	0.60	21.6	400	0.91	0.50	23.7	400	0.70	0.36	26.0	400	0.46	0.21	30.8	400
100	1/10	8.73	7.18	28.5	167	7.93	6.46	30.8	177	6.93	5.6	33.4	190	5.87	4.69	37.3	207	4.68	3.65	43.3	235	2.79	2.09	50.0	297
	1/15	6.33	5.02	29.9	204	5.66	4.43	31.7	217	5.09	3.94	35.3	230	4.33	3.29	39.3	251	3.38	2.48	44.5	289	1.99	1.39	50.0	365
	1/20	5.02	3.93	31.2	239	4.57	3.54	33.8	252	4.03	3.09	36.9	269	3.40	2.53	40.3	297	2.67	1.93	46.2	240	1.52	1.04	50.0	435
	1/25	3.95	3.02	30.1	272	3.53	2.67	31.9	289	3.15	2.35	35.0	309	2.66	1.92	38.2	341	2.09	1.47	43.9	390	1.26	0.83	50.0	500
	1/30	4.20	3.00	35.8	265	3.81	2.66	38.2	281	3.35	2.30	41.1	302	2.89	1.92	46.0	330	2.23	1.39	50.0	382	1.20	0.69	50.0	500
	1/40	3.17	2.20	35.1	316	2.86	1.96	37.4	336	2.54	1.71	40.9	359	2.03	1.28	46.0	397	1.71	1.04	50.0	458	0.92	0.52	50.0	500
	1/50	2.39	1.59	31.8	364	2.17	1.42	34.0	386	1.93	1.24	37.0	415	1.66	1.01	40.2	458	1.29	0.75	44.7	500	0.79	0.41	50.0	500
	1/60	1.96	1.27	30.4	400	1.79	1.14	32.7	424	1.59	0.97	34.9	458	1.37	0.79	38.1	500	1.05	0.58	42.0	500	0.68	0.34	49.8	500

Size 120-155

KA, KR, KO, KH/Horsepower and Torque Ratings (Kg-m)

Ratio		1800PPM INPUT SPEED				1500PPM INPUT SPEED				1200PPM INPUT SPEED				900PPM INPUT SPEED				600PPM INPUT SPEED				300PPM INPUT SPEED			
		In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.	In. HP	Out. HP	Out. Torque	O.H.L.
120	1/10	13.8	11.4	45.7	177	12.6	10.4	49.6	184	11.0	9.02	53.8	198	9.38	7.55	60.1	214	7.46	5.86	69.9	241	4.64	3.51	84.0	305
	1/15	10.0	8.05	48.0	218	9.02	7.15	51.2	231	8.08	6.32	56.5	244	6.83	5.26	62.8	267	5.39	4.01	71.9	305	3.30	2.34	84.0	386
	1/20	7.16	5.54	44.0	270	6.49	4.97	47.4	285	5.72	4.30	51.3	306	4.85	3.58	57.0	335	3.87	2.74	65.4	383	2.53	1.69	80.7	488
	1/25	6.66	5.21	51.8	294	5.93	4.59	54.8	313	5.28	4.05	60.4	333	4.45	3.31	65.9	368	3.50	2.53	75.7	420	2.04	1.40	84.0	545
	1/30	6.66	4.82	57.5	285	6.00	4.28	61.3	302	5.31	3.70	66.3	325	4.55	3.09	73.9	354	3.65	2.34	83.9	408	1.97	1.17	84.0	531
	1/40	4.68	3.19	50.7	357	4.19	2.81	53.6	380	3.77	2.45	58.5	407	3.24	2.03	64.8	446	2.62	1.53	73.3	514	1.64	0.88	84.0	665
	1/50	3.93	2.74	54.5	404	3.54	2.43	58.0	429	3.15	2.12	63.4	459	2.69	1.72	68.7	508	2.09	1.28	76.5	588	1.24	0.70	84.0	700
	1/60	3.14	2.04	48.9	453	2.84	1.81	51.9	481	2.52	1.56	56.2	518	2.17	1.28	61.3	571	1.70	0.94	67.5	662	1.12	0.56	81.1	700
135	1/10	19.8	16.5	66.0	304	18.0	15.0	71.7	319	15.8	13.0	77.7	342	13.3	10.9	86.8	372	10.6	8.46	101	421	6.87	5.30	126	533
	1/15	14.7	11.9	71.4	362	13.1	10.6	76.1	384	11.8	9.38	84.0	407	9.95	7.82	93.3	445	7.83	5.96	106	510	5.11	3.73	133	644
	1/20	11.3	9.11	72.5	426	10.3	8.19	78.2	449	8.97	7.03	83.9	484	7.69	5.92	94.3	528	6.05	4.51	107	605	3.88	2.76	131	772
	1/25	9.04	7.12	70.8	483	8.08	6.30	75.2	514	7.11	5.48	81.7	551	6.04	4.55	90.5	605	4.75	3.46	103	693	3.00	2.08	124	890
	1/30	9.68	7.21	86.0	468	8.71	6.40	91.7	496	7.70	5.53	99.1	533	6.58	4.62	110	583	5.24	3.50	125	670	3.13	1.95	140	866
	1/40	6.98	5.08	80.8	566	6.37	4.54	86.8	599	5.60	3.92	93.6	645	4.80	3.27	104	707	3.81	2.45	117	814	2.43	1.45	138	950
	1/50	5.28	3.73	74.2	650	4.76	3.29	78.7	691	4.23	2.87	85.8	742	3.60	2.35	93.6	819	2.83	1.75	104	944	1.82	1.04	124	950
	1/60	4.15	2.80	67.0	724	3.75	2.48	71.2	769	3.31	2.15	77.0	827	2.84	1.76	84.1	912	2.21	1.29	92.6	950	1.45	0.77	111	950
155	1/10	32.9	27.3	105	1500	29.8	24.7	114	1500	26.4	21.7	125	1500	22.3	18.1	139	1500	17.8	14.3	165	1500	11.7	8.99	207	1500
	1/15	22.9	18.5	106	1500	20.5	16.5	114	1500	18.1	14.4	124	1500	15.4	12.0	139	1500	12.1	9.31	161	1500	8.06	5.84	202	1500
	1/20	14.9	11.8	94.5	1500	13.5	10.6	102	1500	11.9	9.29	110	1500	10.0	7.70	122	1500	8.01	5.94	141	1500	5.18	3.65	174	1500
	1/25	12.0	9.41	93.6	1500	10.8	8.42	100	1500	9.54	7.28	108	1500	8.05	6.04	120	1500	6.39	4.61	137	1500	4.09	2.80	167	1500
	1/30	13.3	9.78	112	1500	12.1	8.82	122	1500	10.4	7.55	130	1500	9.08	6.32	146	1500	7.24	4.87	168	1500	4.77	2.92	202	1500
	1/40	9.32	6.67	106	1500	8.26	5.86	112	1500	7.40	5.11	122	1500	6.28	4.22	134	1500	5.02	3.19	152	1500	3.25	1.91	182	1500
	1/50	7.13	4.97	98.9	1500	6.42	4.40	105	1500	5.76	3.84	114	1500	4.89	3.17	126	1500	3.90	2.37	141	1500	2.53	1.41	168	1500
	1/60	5.85	3.99	95.3	1500	5.37	3.57	102	1500	4.72	3.05	109	1500	3.94	2.48	118	1500	3.20	1.87	133	1500	2.10	1.12	160	1500

Size 175-250

KA, KR, KO, KH/Horsepower and Torque Ratings (Kg-m)

Ratio		1800PPM INPUT SPEED				1500PPM INPUT SPEED				1200PPM INPUT SPEED				900PPM INPUT SPEED				600PPM INPUT SPEED				300PPM INPUT SPEED			
		In.	Out.	Out.	Out.	In.	Out.	Out.	Out.	In.	Out.	Out.	Out.	In.	Out.	Out.	Out.	In.	Out.	Out.	Out.	In.	Out.	Out.	Out.
		HP	HP	Torque	O.H.L.	HP	HP	Torque	O.H.L.	HP	HP	Torque	O.H.L.	HP	HP	Torque	O.H.L.	HP	HP	Torque	O.H.L.	HP	HP	Torque	O.H.L.
175	1/10	46.8	39.1	150	1770	42.5	35.4	163	1800	37.7	31.3	180	1800	31.7	26.0	200	1800	25.2	20.4	235	1800	16.6	12.9	297	1800
	1/15	33.0	26.7	154	1800	29.6	23.9	165	1800	25.9	20.8	180	1800	22.1	17.5	202	1800	17.3	13.4	233	1800	11.4	8.44	292	1800
	1/20	22.8	18.2	141	1800	20.4	16.2	151	1800	18.0	14.2	165	1800	15.2	11.7	182	1800	12.1	9.15	212	1800	7.87	5.62	261	1800
	1/25	16.3	12.7	126	1800	14.6	11.4	136	1800	12.8	9.89	147	1800	10.8	8.18	162	1800	8.66	6.31	188	1800	5.57	3.82	228	1800
	1/30	19.0	14.1	163	1800	17.2	12.7	176	1800	15.0	11.0	190	1800	12.9	9.20	212	1800	10.2	7.04	243	1800	6.73	4.23	293	1800
	1/40	13.2	9.60	149	1800	11.9	8.58	159	1800	10.4	7.36	171	1800	8.96	6.12	190	1800	7.10	4.65	216	1800	4.69	2.80	261	1800
	1/50	9.78	6.81	135	1800	8.74	6.03	144	1800	7.98	5.37	160	1800	6.64	4.32	171	1800	5.28	3.25	194	1800	3.46	1.94	231	1800
	1/60	8.23	5.74	132	1800	7.74	5.31	147	1800	6.62	4.41	152	1800	5.56	3.60	166	1800	4.45	2.70	187	1800	2.90	1.62	224	1800
200	1/10	52.6	44.0	181	1750	47.7	39.9	196	1840	41.8	34.8	215	1950	35.6	29.3	241	2120	28.0	22.8	281	2200	18.5	14.4	356	2200
	1/15	39.5	32.1	198	1990	35.4	28.7	212	2090	30.9	25.0	231	2200	26.3	21.0	259	2200	20.6	16.1	298	2200	13.6	10.0	373	2200
	1/20	30.2	24.3	193	2200	27.0	21.6	206	2200	23.8	18.9	226	2200	20.1	15.7	250	2200	15.9	12.2	291	2200	10.3	7.48	357	2200
	1/25	23.3	18.5	184	2200	21.0	16.6	198	2200	18.4	14.3	214	2200	15.5	11.9	237	2200	12.4	9.24	275	2200	7.97	5.59	333	2200
	1/30	25.1	18.8	232	2200	22.6	16.8	249	2200	19.8	14.6	270	2200	16.9	12.1	300	2200	13.3	9.32	345	2200	8.78	5.60	414	2200
	1/40	18.2	13.3	213	2200	16.5	12.0	230	2200	14.3	10.3	247	2200	12.3	8.62	274	2200	9.56	6.43	307	2200	6.44	3.94	376	2200
	1/50	13.8	9.84	195	2200	12.3	8.68	207	2200	11.2	7.76	231	2200	9.29	6.21	247	2200	7.33	4.69	280	2200	4.83	2.80	334	2200
	1/60	11.5	8.01	188	2200	10.3	7.11	200	2200	9.64	6.49	228	2200	7.76	5.05	237	2200	6.12	3.77	264	2200	4.03	2.26	318	2200
250	1/10	96.6	81.3	323	2700	88.3	74.2	354	2700	78.4	65.7	392	2700	65.5	54.7	435	2700	51.8	42.6	508	2700	34.2	27.1	648	2700
	1/15	72.3	59.3	354	2700	66.4	54.3	389	2700	57.9	47.2	423	2700	49.0	39.7	474	2700	38.3	30.3	544	2700	25.3	19.2	689	2700
	1/20	55.3	45.0	367	2700	49.2	39.9	391	2700	43.3	35.0	428	2700	36.4	29.0	473	2700	28.7	22.4	549	2700	18.6	13.8	678	2700
	1/25	41.0	33.1	342	2700	36.9	29.6	367	2700	32.1	25.6	397	2700	27.3	21.3	441	2700	21.5	16.5	513	2700	13.7	9.96	618	2700
	1/30	47.2	35.8	427	2700	42.2	31.9	457	2700	37.1	27.9	499	2700	31.0	23.0	551	2700	24.7	17.6	633	2700	16.3	10.8	774	2700
	1/40	32.9	24.6	401	2700	29.8	22.2	435	2700	25.9	19.1	468	2700	22.8	16.4	537	2700	17.2	11.9	587	2700	11.4	7.30	715	2700
	1/50	23.7	17.3	359	2700	21.2	15.4	383	2700	18.7	13.5	418	2700	15.8	11.0	458	2700	12.2	8.23	511	2700	8.12	4.97	617	2700
	1/60	20.2	14.6	350	2700	18.0	12.9	371	2700	16.8	11.9	426	2700	13.4	9.21	439	2700	10.5	6.88	493	2700	6.91	4.13	591	2700

Size 70-100

KAD, KOD/Horsepower and Torque Ratings (Kg-m)

Type	Input Speeds (r.p.m.)	Ratio	1/100	1/150	1/200	1/250	1/300	1/400	1/500	1/600
70	1800	Input (KW)	0.76	0.54	0.42	0.35	0.30	0.24	0.20	0.18
		Efficiency (%)	60.7	57.3	55.4	53.4	50.7	48.5	46.9	42.9
		Output Torque (kg-m)	25	25	25	25	25	25	25	25
		O.H.L. (kg)	295	295	295	295	295	295	295	295
	1500	Input (KW)	0.64	0.46	0.35	0.29	0.26	0.20	0.17	0.15
		Efficiency (%)	59.9	56.2	54.4	52.7	49.4	47.6	46.0	41.7
		Output Torque (kg-m)	25	25	25	25	25	25	25	25
		O.H.L. (kg)	295	295	295	295	295	295	295	295
	1200	Input (KW)	0.52	0.37	0.29	0.24	0.21	0.17	0.14	0.13
		Efficiency (%)	58.9	55.1	53.1	51.2	48.1	46.4	44.5	40.5
		Output Torque (kg-m)	25	25	25	25	25	25	25	25
		O.H.L. (kg)	295	295	295	295	295	295	295	295
	1000	Input (KW)	0.44	0.32	0.25	0.20	0.18	0.14	0.12	0.11
		Efficiency (%)	57.8	53.8	52.1	50.2	47.3	45.3	43.5	39.2
		Output Torque (kg-m)	25	25	25	25	25	25	25	25
		O.H.L. (kg)	295	295	295	295	295	295	295	295
	800	Input (KW)	0.36	0.26	0.20	0.17	0.15	0.12	0.10	0.09
		Efficiency (%)	56.5	52.8	50.7	48.9	45.9	44.1	42.3	37.7
		Output Torque (kg-m)	25	25	25	25	25	25	25	25
		O.H.L. (kg)	295	295	295	295	295	295	295	295
80	1800	Input (KW)	1.16	0.83	0.64	0.55	0.49	0.38	0.34	0.30
		Efficiency (%)	60.5	56.5	55.0	50.6	47.3	45.8	41.7	39.5
		Output Torque (kg-m)	38	38	38	38	38	38	38	38
		O.H.L. (kg)	406	406	406	406	406	406	406	406
	1500	Input (KW)	0.98	0.70	0.54	0.47	0.42	0.33	0.29	0.25
		Efficiency (%)	59.4	55.5	53.9	49.3	46.4	44.6	40.6	38.4
		Output Torque (kg-m)	38	38	38	38	38	38	38	38
		O.H.L. (kg)	406	406	406	406	406	406	406	406
	1200	Input (KW)	0.81	0.58	0.44	0.39	0.35	0.27	0.24	0.21
		Efficiency (%)	58.1	54.1	52.7	47.8	44.9	43.2	39.1	36.8
		Output Torque (kg-m)	38	38	38	38	38	38	38	38
		O.H.L. (kg)	406	406	406	406	406	406	406	406
	1000	Input (KW)	0.68	0.49	0.38	0.34	0.30	0.23	0.21	0.18
		Efficiency (%)	57.4	52.9	51.8	46.3	43.6	42.4	37.7	35.3
		Output Torque (kg-m)	38	38	38	38	38	38	38	38
		O.H.L. (kg)	406	406	406	406	406	406	406	406
	800	Input (KW)	0.56	0.40	0.31	0.28	0.24	0.19	0.17	0.15
		Efficiency (%)	56.0	51.9	50.2	45.0	42.5	41.0	36.4	34.1
		Output Torque (kg-m)	38	38	38	38	38	38	38	38
		O.H.L. (kg)	406	406	406	406	406	406	406	406
100	1800	Input (KW)	1.64	1.17	0.94	0.80	0.64	0.50	0.44	0.39
		Efficiency (%)	62.0	57.7	54.3	50.8	52.9	51.0	45.7	43.6
		Output Torque (kg-m)	55	55	55	55	55	55	55	55
		O.H.L. (kg)	455	455	455	455	455	455	455	455
	1500	Input (KW)	1.39	1.00	0.79	0.68	0.54	0.42	0.38	0.33
		Efficiency (%)	60.9	56.6	53.4	49.8	51.8	49.9	44.7	43.3
		Output Torque (kg-m)	55	55	55	55	55	55	55	55
		O.H.L. (kg)	455	455	455	455	455	455	455	455
	1200	Input (KW)	1.13	0.82	0.65	0.56	0.45	0.35	0.31	0.27
		Efficiency (%)	59.8	55.2	51.9	48.1	50.5	48.5	43.2	41.6
		Output Torque (kg-m)	55	55	55	55	55	55	55	55
		O.H.L. (kg)	455	455	455	455	455	455	455	455
	1000	Input (KW)	0.96	0.69	0.55	0.48	0.38	0.30	0.27	0.23
		Efficiency (%)	58.6	54.2	50.8	46.9	49.4	47.4	41.9	40.4
		Output Torque (kg-m)	55	55	55	55	55	55	55	55
		O.H.L. (kg)	455	455	455	455	455	455	455	455
	800	Input (KW)	0.78	0.57	0.46	0.40	0.31	0.24	0.22	0.19
		Efficiency (%)	57.6	52.9	49.4	45.4	48.2	46.2	40.5	38.9
		Output Torque (kg-m)	55	55	55	55	55	55	55	55
		O.H.L. (kg)	455	455	455	455	455	455	455	455

1/800	1/900	1/1000	1/1200	1/1500	1/1600	1/1800	1/2000	Ratio	Input Speeds (r.p.m.)	Type
0.14	0.15	0.12	0.12	0.10	0.09	0.09	0.08	Input (KW)	1800	70
40.6	34.1	38.8	32.1	30.5	30.4	26.3	28.8	Efficiency (%)		
25	25	25	25	25	25	25	25	Output Torque (kg-m)		
295	295	295	295	295	295	295	295	O.H.L. (kg)		
0.12	0.13	0.10	0.10	0.09	0.08	0.08	0.07	Input (KW)		
39.9	33.2	37.9	31.2	29.6	29.6	25.4	28.0	Efficiency (%)		
25	25	25	25	25	25	25	25	Output Torque (kg-m)		
295	295	295	295	295	295	295	295	O.H.L. (kg)		
0.10	0.11	0.08	0.08	0.07	0.07	0.07	0.06	Input (KW)		
38.3	32.0	36.0	29.9	28.2	28.3	24.0	26.4	Efficiency (%)		
25	25	25	25	25	25	25	25	Output Torque (kg-m)	1200	80
295	295	295	295	295	295	295	295	O.H.L. (kg)		
0.09	0.095	0.07	0.07	0.06	0.06	0.06	0.05	Input (KW)		
37.3	30.7	34.8	29.0	26.8	27.1	22.9	25.3	Efficiency (%)		
25	25	25	25	25	25	25	25	Output Torque (kg-m)		
295	295	295	295	295	295	295	295	O.H.L. (kg)		
0.07	0.08	0.06	0.06	0.05	0.05	0.05	0.04	Input (KW)		
35.6	29.6	32.8	27.5	25.4	26.0	21.6	23.7	Efficiency (%)		
25	25	25	25	25	25	25	25	Output Torque (kg-m)		
295	295	295	295	295	295	295	295	O.H.L. (kg)		
0.23	0.23	0.21	0.18	0.17	0.16	0.15	0.15	Input (KW)	1800	100
37.8	33.9	32.8	32.0	27.7	26.6	25.4	23.8	Efficiency (%)		
38	38	38	38	38	38	38	38	Output Torque (kg-m)		
406	406	406	406	406	406	406	406	O.H.L. (kg)		
0.20	0.20	0.18	0.16	0.15	0.14	0.13	0.13	Input (KW)		
36.6	32.9	31.5	30.9	26.5	25.8	24.4	22.8	Efficiency (%)		
38	38	38	38	38	38	38	38	Output Torque (kg-m)		
406	406	406	406	406	406	406	406	O.H.L. (kg)		
0.17	0.17	0.16	0.13	0.12	0.12	0.11	0.11	Input (KW)		
35.1	31.6	30.0	29.5	25.1	24.5	22.9	21.6	Efficiency (%)		
38	38	38	38	38	38	38	38	Output Torque (kg-m)	1200	80
406	406	406	406	406	406	406	406	O.H.L. (kg)		
0.14	0.14	0.13	0.11	0.11	0.10	0.10	0.10	Input (KW)		
34.0	30.7	28.4	28.5	23.7	23.5	21.5	20.3	Efficiency (%)		
38	38	38	38	38	38	38	38	Output Torque (kg-m)		
406	406	406	406	406	406	406	406	O.H.L. (kg)		
0.12	0.12	0.11	0.10	0.09	0.08	0.08	0.08	Input (KW)		
32.3	29.2	27.1	27.0	22.5	22.3	20.4	19.2	Efficiency (%)		
38	38	38	38	38	38	38	38	Output Torque (kg-m)		
406	406	406	406	406	406	406	406	O.H.L. (kg)		
0.31	0.32	0.28	0.27	0.24	0.19	0.21	0.20	Input (KW)	1800	100
40.3	35.3	36.2	31.3	28.1	32.7	26.4	25.5	Efficiency (%)		
55	55	55	55	55	55	55	55	Output Torque (kg-m)		
455	455	455	455	455	455	455	455	O.H.L. (kg)		
0.26	0.27	0.24	0.23	0.21	0.17	0.18	0.17	Input (KW)		
39.4	34.2	35.0	30.6	26.8	31.9	25.4	24.5	Efficiency (%)		
55	55	55	55	55	55	55	55	Output Torque (kg-m)		
455	455	455	455	455	455	455	455	O.H.L. (kg)		
0.22	0.23	0.20	0.19	0.18	0.14	0.16	0.15	Input (KW)		
37.6	33.1	33.4	28.9	25.4	30.3	24.1	23.1	Efficiency (%)		
55	55	55	55	55	55	55	55	Output Torque (kg-m)	1200	100
455	455	455	455	455	455	455	455	O.H.L. (kg)		
0.19	0.20	0.18	0.17	0.15	0.12	0.14	0.13	Input (KW)		
36.4	31.8	32.0	27.8	24.4	29.3	23.0	21.9	Efficiency (%)		
55	55	55	55	55	55	55	55	Output Torque (kg-m)		
455	455	455	455	455	455	455	455	O.H.L. (kg)		
0.16	0.16	0.15	0.14	0.13	0.10	0.12	0.11	Input (KW)		
34.8	30.5	30.4	26.6	23.0	28.1	21.3	20.7	Efficiency (%)		
55	55	55	55	55	55	55	55	Output Torque (kg-m)		
455	455	455	455	455	455	455	455	O.H.L. (kg)		

Size 120-155

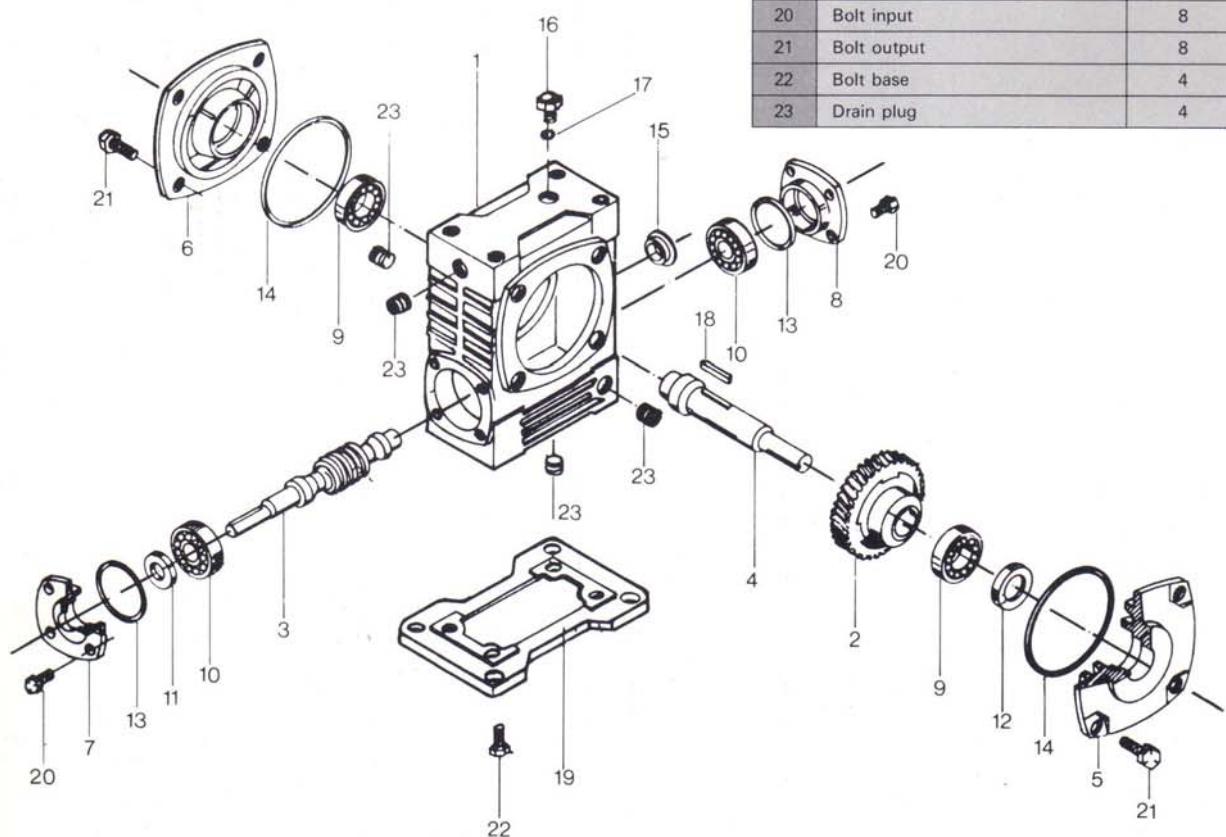
KAD, KOD/Horsepower and Torque Ratings (Kg-m)

Type	Input Speeds (r.p.m.)	Ratio	1/100	1/150	1/200	1/250	1/300	1/400	1/500	1/600
120	1800	Input (KW)	2.64	1.85	1.47	1.21	1.09	0.88	0.72	0.66
		Efficiency (%)	62.9	60.0	56.7	54.9	50.7	47.3	46.0	41.9
		Output Torque (kg-m)	90	90	90	90	90	90	90	90
		O.H.L. (kg)	545	545	545	545	545	545	545	545
	1500	Input (KW)	2.25	1.61	1.24	1.03	0.94	0.75	0.62	0.57
		Efficiency (%)	61.7	57.5	55.8	53.9	49.0	46.1	45.0	40.7
		Output Torque (kg-m)	90	90	90	90	90	90	90	90
		O.H.L. (kg)	545	545	545	545	545	545	545	545
	1200	Input (KW)	1.83	1.31	1.02	0.85	0.77	0.62	0.51	0.47
		Efficiency (%)	60.7	56.3	54.3	52.2	47.9	44.9	43.2	39.4
		Output Torque (kg-m)	90	90	90	90	90	90	90	90
		O.H.L. (kg)	545	545	545	545	545	545	545	545
135	1000	Input (KW)	1.55	1.12	0.87	0.72	0.66	0.53	0.44	0.40
		Efficiency (%)	59.7	55.2	53.2	51.2	46.9	43.6	42.3	38.1
		Output Torque (kg-m)	90	90	90	90	90	90	90	90
		O.H.L. (kg)	545	545	545	545	545	545	545	545
	800	Input (KW)	1.27	0.91	0.71	0.59	0.54	0.44	0.36	0.33
		Efficiency (%)	58.2	53.9	51.8	50.0	45.3	42.2	41.1	36.6
		Output Torque (kg-m)	90	90	90	90	90	90	90	90
		O.H.L. (kg)	545	545	545	545	545	545	545	545
155	1800	Input (KW)	4.60	3.25	2.56	2.12	1.78	1.41	1.17	1.04
		Efficiency (%)	64.3	60.7	57.7	55.9	55.3	52.4	50.5	47.4
		Output Torque (kg-m)	160	160	160	160	160	160	160	160
		O.H.L. (kg)	814	814	814	814	814	814	814	814
	1500	Input (KW)	3.89	2.77	2.18	1.79	1.52	1.20	1.00	0.89
		Efficiency (%)	63.3	59.4	56.4	55.0	54.1	51.1	49.4	45.9
		Output Torque (kg-m)	160	160	160	160	160	160	160	160
		O.H.L. (kg)	814	814	814	814	814	814	814	814
	1200	Input (KW)	3.16	2.25	1.79	1.49	1.24	0.99	0.82	0.73
		Efficiency (%)	62.3	58.4	55.2	53.0	52.7	49.7	48.2	44.7
		Output Torque (kg-m)	160	160	160	160	160	160	160	160
		O.H.L. (kg)	814	814	814	814	814	814	814	814
1000	1000	Input (KW)	2.68	1.91	1.52	1.25	1.05	0.84	0.70	0.63
		Efficiency (%)	61.3	57.4	54.1	52.4	52.0	48.8	47.0	43.5
		Output Torque (kg-m)	160	160	160	160	160	160	160	160
		O.H.L. (kg)	814	814	814	814	814	814	814	814
	800	Input (KW)	2.19	1.56	1.25	1.03	0.87	0.69	0.58	0.52
		Efficiency (%)	59.9	56.0	52.6	51.1	50.5	47.3	45.6	41.9
		Output Torque (kg-m)	160	160	160	160	160	160	160	160
		O.H.L. (kg)	814	814	814	814	814	814	814	814
155	1800	Input (KW)	6.38	4.81	3.40	2.83	2.82	2.23	1.85	1.67
		Efficiency (%)	65.9	62.4	60.7	58.9	53.9	51.9	49.9	46.0
		Output Torque (kg-m)	227	243	223	225	246	250	250	250
		O.H.L. (kg)	1345	1345	1345	1345	1345	1345	1345	1345
	1500	Input (KW)	5.73	4.19	3.04	2.52	2.44	1.90	1.58	1.44
		Efficiency (%)	64.7	61.2	59.5	57.8	52.5	50.6	48.8	44.6
		Output Torque (kg-m)	240	250	235	237	250	250	250	250
		O.H.L. (kg)	1345	1345	1345	1345	1345	1345	1345	1345
	1200	Input (KW)	4.85	3.44	2.59	2.14	2.02	1.56	1.30	1.20
		Efficiency (%)	63.5	59.7	58.6	56.6	50.7	49.5	47.4	42.8
		Output Torque (kg-m)	250	250	247	246	250	250	250	250
		O.H.L. (kg)	1345	1345	1345	1345	1345	1345	1345	1345
1000	1000	Input (KW)	4.09	2.91	2.23	1.85	1.71	1.32	1.11	1.02
		Efficiency (%)	62.7	58.8	57.5	55.4	49.9	48.5	46.3	41.8
		Output Torque (kg-m)	250	250	250	250	250	250	250	250
		O.H.L. (kg)	1345	1345	1345	1345	1345	1345	1345	1345
	800	Input (KW)	3.64	2.37	1.83	1.52	1.41	1.09	0.91	0.84
		Efficiency (%)	61.5	57.7	56.1	54.1	48.6	46.9	44.9	40.5
		Output Torque (kg-m)	250	250	250	250	250	250	250	250
		O.H.L. (kg)	1345	1345	1345	1345	1345	1345	1345	1345

1/800	1/900	1/1000	1/1200	1/1500	1/1600	1/1800	1/2000	Ratio	Input Speeds (r.p.m.)	Type
0.52	0.50	0.44	0.41	0.35	0.36	0.34	0.30	Input (KW)	1800	120
39.6	36.7	37.7	33.6	32.0	29.0	27.5	27.7	Efficiency (%)		
90	90	90	90	90	90	90	90	Output Torque (kg-m)		
545	545	545	545	545	545	545	545	O.H.L. (kg)		
0.45	0.44	0.38	0.35	0.30	0.31	0.29	0.26	Input (KW)		
38.8	35.1	36.7	32.8	30.9	27.7	26.3	26.8	Efficiency (%)		
90	90	90	90	90	90	90	90	Output Torque (kg-m)		
545	545	545	545	545	545	545	545	O.H.L. (kg)		
0.37	0.36	0.32	0.29	0.25	0.26	0.24	0.22	Input (KW)		
37.1	33.9	34.8	31.3	29.2	26.6	25.2	25.2	Efficiency (%)		
90	90	90	90	90	90	90	90	Output Torque (kg-m)		
545	545	545	545	545	545	545	545	O.H.L. (kg)		
0.32	0.31	0.27	0.25	0.22	0.23	0.21	0.19	Input (KW)	1000	135
35.8	32.9	33.5	30.1	28.1	25.6	24.0	24.2	Efficiency (%)		
90	90	90	90	90	90	90	90	Output Torque (kg-m)		
545	545	545	545	545	545	545	545	O.H.L. (kg)		
0.27	0.26	0.23	0.21	0.18	0.19	0.18	0.16	Input (KW)		
34.4	31.4	32.1	28.8	26.8	24.2	22.6	23.0	Efficiency (%)		
90	90	90	90	90	90	90	90	Output Torque (kg-m)		
545	545	545	545	545	545	545	545	O.H.L. (kg)		
0.85	0.84	0.71	0.70	0.59	0.54	0.54	0.54	Input (KW)	1800	155
43.7	39.0	41.7	35.4	33.6	34.3	30.5	32.3	Efficiency (%)		
160	160	160	160	160	160	160	160	Output Torque (kg-m)		
814	814	814	814	814	814	814	814	O.H.L. (kg)		
0.73	0.73	0.61	0.60	0.50	0.47	0.47	0.39	Input (KW)		
42.2	37.5	40.4	34.0	32.5	32.8	28.8	31.2	Efficiency (%)		
160	160	160	160	160	160	160	160	Output Torque (kg-m)		
814	814	814	814	814	814	814	814	O.H.L. (kg)		
0.60	0.60	0.50	0.50	0.42	0.39	0.39	0.33	Input (KW)	1200	155
40.8	36.2	39.1	32.8	31.2	31.6	27.6	30.0	Efficiency (%)		
160	160	160	160	160	160	160	160	Output Torque (kg-m)		
814	814	814	814	814	814	814	814	O.H.L. (kg)		
0.52	0.52	0.43	0.43	0.37	0.34	0.34	0.28	Input (KW)		
39.5	35.2	37.7	31.6	29.9	30.5	26.6	28.8	Efficiency (%)		
160	160	160	160	160	160	160	160	Output Torque (kg-m)		
814	814	814	814	814	814	814	814	O.H.L. (kg)		
0.43	0.43	0.36	0.36	0.30	0.28	0.28	0.24	Input (KW)	800	155
37.9	33.7	36.1	30.1	28.7	29.1	24.9	27.3	Efficiency (%)		
160	160	160	160	160	160	160	160	Output Torque (kg-m)		
814	814	814	814	814	814	814	814	O.H.L. (kg)		
1.31	1.28	1.10	1.01	0.85	0.88	0.75	0.73	Input (KW)		
44.1	40.0	41.9	38.1	36.0	32.8	34.1	31.5	Efficiency (%)		
250	250	250	250	250	250	250	250	Output Torque (kg-m)		
1345	1345	1345	1345	1345	1345	1345	1345	O.H.L. (kg)		
1.13	1.10	0.95	0.88	0.74	0.77	0.65	0.63	Input (KW)	1500	155
42.6	38.8	40.5	36.6	34.7	31.4	33.0	30.3	Efficiency (%)		
250	250	250	250	250	250	250	250	Output Torque (kg-m)		
1345	1345	1345	1345	1345	1345	1345	1345	O.H.L. (kg)		
0.93	0.92	0.78	0.72	0.61	0.63	0.54	0.53	Input (KW)		
41.4	37.0	39.2	35.5	33.5	30.4	31.7	29.2	Efficiency (%)		
250	250	250	250	250	250	250	250	Output Torque (kg-m)		
1345	1345	1345	1345	1345	1345	1345	1345	O.H.L. (kg)		
0.80	0.79	0.68	0.62	0.53	0.54	0.47	0.45	Input (KW)	1000	155
40.4	36.0	37.9	34.5	32.2	29.4	30.5	28.1	Efficiency (%)		
250	250	250	250	250	250	250	250	Output Torque (kg-m)		
1345	1345	1345	1345	1345	1345	1345	1345	O.H.L. (kg)		
0.66	0.66	0.56	0.52	0.44	0.46	0.39	0.38	Input (KW)		
38.7	34.7	36.3	32.9	30.8	28.0	29.2	26.7	Efficiency (%)		
250	250	250	250	250	250	250	250	Output Torque (kg-m)		
1345	1345	1345	1345	1345	1345	1345	1345	O.H.L. (kg)		

MODEL. KA

No.	PARTS NAME	Q 'ty
1	Gear case	1
2	worm wheel	1
3	Input shaft	1
4	Output shaft	1
5	Output shaft cover open	1
6	Output shaft cover close	1
7	Input shaft cover open	1
8	Input shaft cover close	1
9	Output bearing	2
10	Input bearing	2
11	Oil seal input	1
12	Oil seal output	1
13	Oring input	2
14	Oring output	2
15	Oil gauge	1
16	Oil plug	1
17	Oring oil plug	1
18	Key for worm wheel	1
19	Base	1
20	Bolt input	8
21	Bolt output	8
22	Bolt base	4
23	Drain plug	4



DEALER