



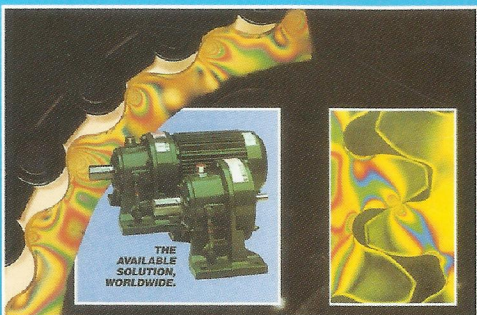
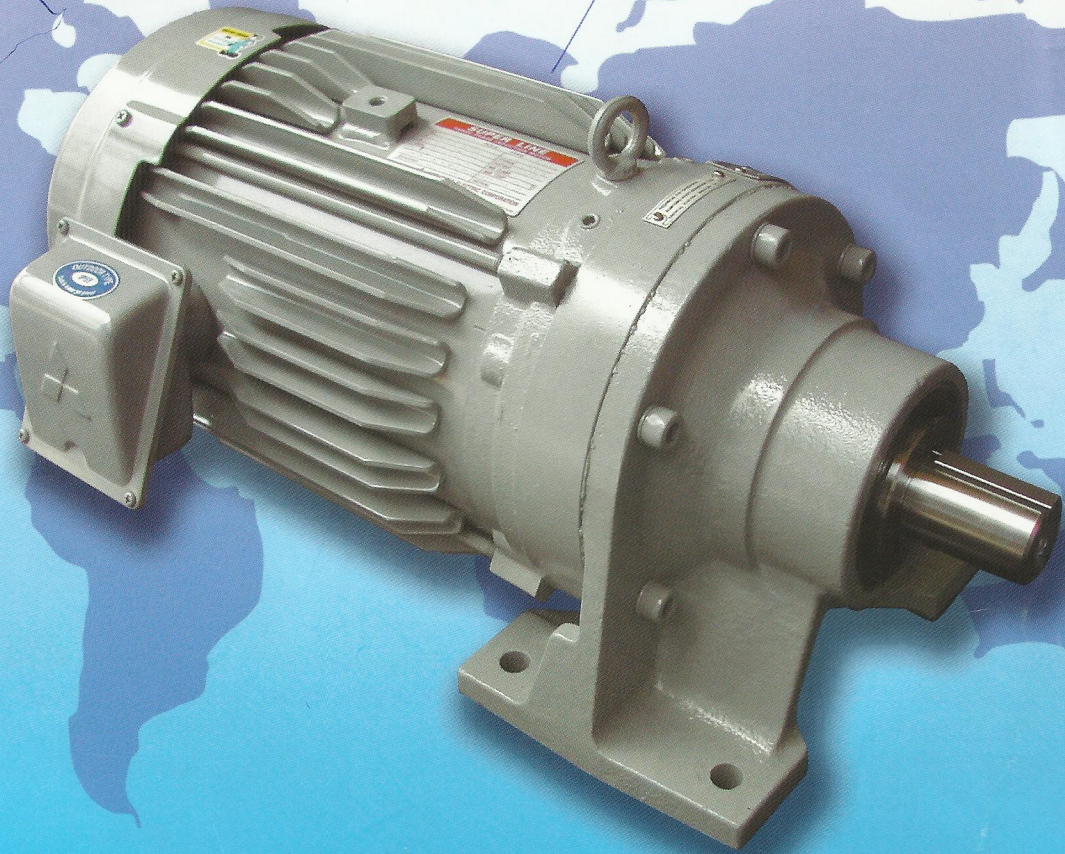
Oriental Electric Industry
Company Limited



CYCLO DRIVE 6000 SERIES

SUMITOMO CYCLO-DRIVE WITH
MITSUBISHI ELECTRIC MOTOR

**...ABSORB 500% SHOCK LOAD
WITHOUT DAMAGE!**



THE
AVAILABLE
SOLUTION,
WORLDWIDE.

**SUMITOMO CYCLODRIVE
500% SHOCK LOAD
VISUAL PROOF!**

The quality move

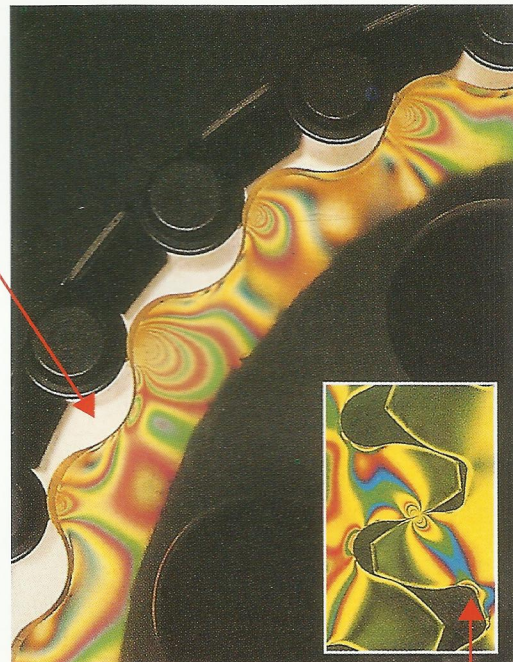
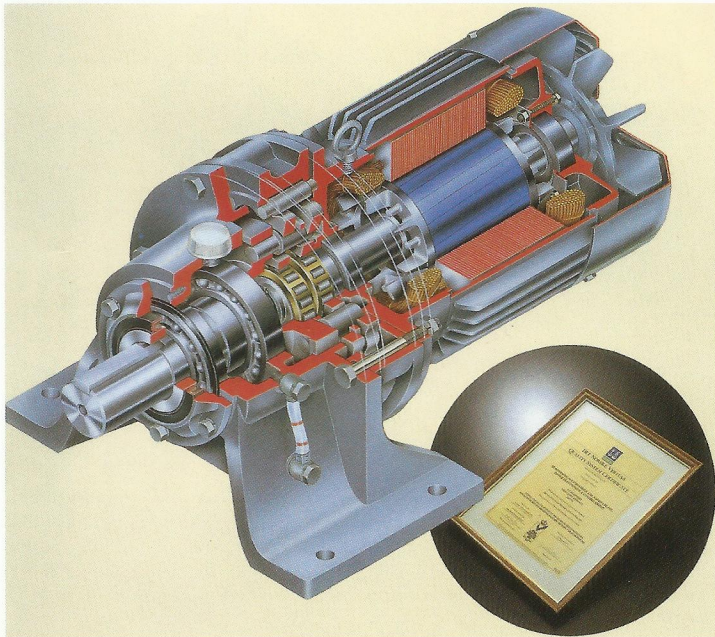




CYCLO DRIVE® Brilliant engineering with unmatched performance advantages

500% OVER SHOCK LOAD

This photoelastic experiment clearly shows a number of cycloidal teeth constantly in contact with the rollers, thereby distributing the loads. Furthermore, the stress lines clearly shows no stress concentration in the root area. Unlike involute teeth, CYCLO teeth can not break.



In the involute gear system, only one or two teeth are engaged and are carrying the full load. There is a high stress concentration in the root area of the teeth. Teeth can break under shock load and overload.

High quality Nickel Chrome Bearing Steel material are used to make the Cycloidal discs and rollers. Output shafts are made from forged steel. All parts manufactured in Japan ensuring worldwide uniformity and quality.

COMPACT IN SIZE

The CYCLO can offer high ratio in a single stage reduction (119/1) thereby making the reducer size more compact and lightweight.

HIGH EFFICIENCY

The CYCLO can offer ratio up to 119:1 on a single stage reduction at the same time maintaining high efficiency throughout.

NO CATASTROPHIC FAILURE

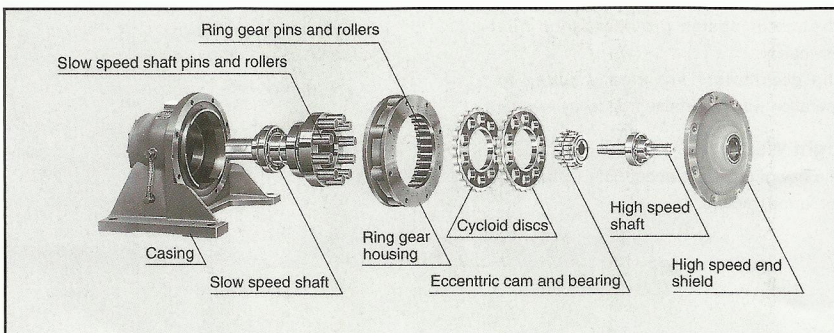
Due to the fact that the Cycloidal teeth can not break, there is no chance for the CYCLO to experience catastrophic (immediate) failure.

WIDE RATIO RANGE

CYCLO have the ratio range available from 6:1 to 1,000,000:1

LOW NOISE

As all parts are rolling. CYCLO generate the lowest noise level.



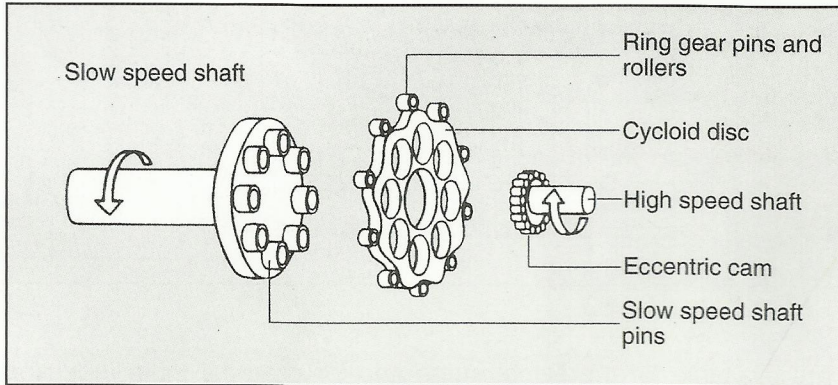
EASE OF MAINTENANCE

As the disassembled unit shows, Cyclo Drive can be easily disassembled and assembled for maintenance using only simple hand tools. Furthermore, the number of parts are less than conventional involute gear system thereby enabling saving on spare parts costs.



HOW IT WORKS

The unique CYCLO speed reducing system is based on an ingeniously simple principle offering many benefits to the designer and user of power transmission drives. Basically, the speed reducer has only three major moving parts:



- High speed input shaft with integrally mounted eccentric cam and roller bearing assembly
- Cycloid discs,
- Slow speed shaft assembly.

As the eccentric cam rotates, it rolls the cycloid discs around the internal circumference of the stationary ring gear. The resulting action is similar to that of a wheel rolling around the inside of a ring. As the wheel (cycloid disc) travels in a clockwise path around the ring (ring gear housing), the wheel itself turns slowly on its own axis in a counter-clockwise direction. In the CYCLO system the cycloidal profile around the outer edge of the disc engages progressively with the rollers of the fixed ring gear housing to produce a reverse rotation at reduced speed. For each complete revolution of the high speed shaft the cycloid disc turns one cycloidal tooth pitch in the opposite direction. In general, there is one less cycloidal tooth around the disc than there are pins in the fixed ring gear housing, which results in reduction ratios being numerically equal to the number of cycloidal teeth on the disc. (Note: On some ratios, there are two less teeth per cycloid disc than there are pins in the ring gear housing.) The reduced rotation of the cycloid discs is transmitted to the slow speed shaft by means of drive pins and rollers which engage with holes located around the middle of each disc. Normally a two disc system is used with a double eccentric cam which increases the torque capacity and offers an exceptionally smooth vibration-free drive.

ADVANTAGE OF CYCLO-DRIVE

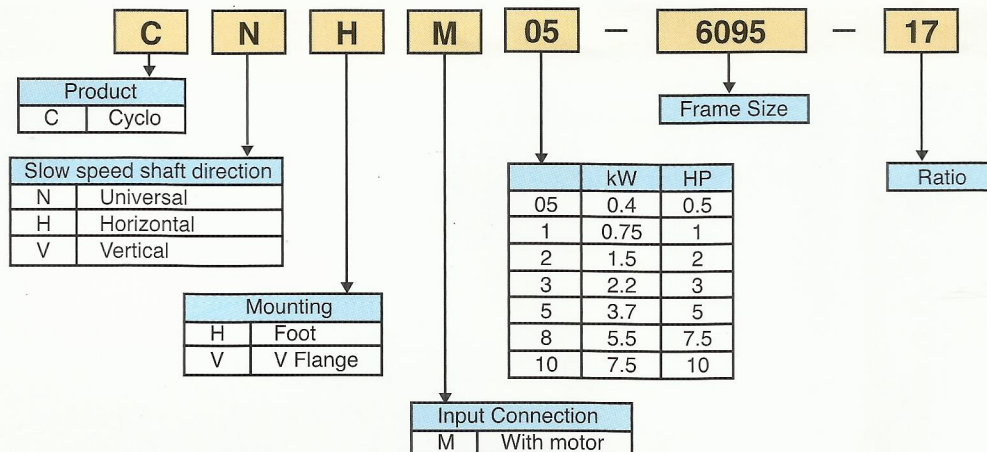
CYCLO-DRIVE	HELICAL GEARS
<p>TWO-THIRDS OF TEETH IN FULL CONTACT ALL TIME</p> <p>CYCLO SPEED REDUCER Many teeth share the shock of overload.</p>	<p>ONLY 1 OR 2 TEETH IN CONTACT</p> <p>CONVENTIONAL HELICAL GEAR. 1 or 2 teeth absorb the entire shock of overload.</p>
<p>ROLLING MOTION</p>	<p>SLIDING FRICTION MOTION</p>
<p>SHOCK LOAD 500%</p>	<p>SHOCK LOAD ONLY 200%</p>
<p>SMOOTH AND QUIET</p>	<p>NOISY</p>
<p>COMPACT SIZE</p> <p>COMPACT SIZE Reduction ratios from 6:1 to 119:1 are available for the single stage.</p>	<p>SIZE BIGGER AT THE SAME RATING AND RATIO</p> <p>Normal ratio of helical gear is 5 or 6</p>

MOUNTING POSITION

Shaft Position	Mounting	
	Foot Mounting H	V Flange Mounting V
H = Horizontal	<p>CHHM</p>	<p>CHVM</p>
V = Vertical Down	<p>CVHM</p>	<p>CVVM</p>
W = Vertical Up	<p>CWHM</p>	<p>CWVM</p>
N = Universal Mounting Maintenance - Free Size 6060-6125	<p>CNHM</p>	<p>CNVM</p>



NOMENCLATURE OF GEARMOTORS



STANDARD SPECIFICATIONS

Item	Standard Specification										
Motor	Capacity Range	1/2 HP 4P~10HP 4P Both Horizontal and Vertical Type									
	Enclosure	Totally Enclosed Fan Cooled Type									
	Degree of Protection	IP55									
	Power Source	220/380~415V 50Hz, 220/440 60Hz									
	Frame Material	Steel Plate									
	Insulation	Class F									
	Rating	Continuous									
	Connection Type	Terminal Block (6 Leads)									
	Connection Diagram	<table border="1"> <thead> <tr> <th>Construction of Lead Wires</th> <th colspan="2">Connection Diagram</th> </tr> <tr> <td></td> <th>Low Voltage (220/380)</th> <th>High Voltage (380/660)</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Construction of Lead Wires	Connection Diagram			Low Voltage (220/380)	High Voltage (380/660)			
	Construction of Lead Wires	Connection Diagram									
	Low Voltage (220/380)	High Voltage (380/660)									
Cyclo Drive	Lubrication Method	Grease Lubrication (Frame Size 6060~6125) Oil Lubrication (Frame Size 6135~6175)									
	Speed Reduction Method	Internal planetary gear mechanism with trochoidal curved tooth profile.									
Circumstance Condition	Ambient Temperature	-20°C~+40°C									
	Ambient Humidity	95% RH or less									
	Above Sea Level	1000 m. or less									
	Environment	No bursting / erosive gas or vapor									
Method of Mounting	CNHM / CHHM type : Slow speed shaft is in horizontal direction and mount horizontally on foot. CNVM / CVVM type : Slow speed shaft is in vertical direction and have vertical flange mounting.										

LUBRICATION

Recommended Grease

Ambient temperature (°C)	Model		
	Maintenance-free series	Other grease model	
	Shell	Cosmo Oil	Shell
-10~50	ALVANIA GREASE RA	COSMO GREASE DYNAMAX SH No.2	ALVANIA GREASE 2

Grease Quantity (litre)

	Frame size	608□	609□	610□	611□	612□
Reduction portion	Qty of grease (g)	65	90	140	200	330
Slow speed shaft bearing portion	Qty of grease (g)	70	100	100	90	120

Recommended Oil

Ambient temperature (°C)	Nisseki Mitsubishi	Idemitsu Kosan	Gulf Oil	Esso Oil	Mobil Oil	Shell Oil	BP Oil
-10~5	Bonnock M 68	Daphe Super Gear Oil 68	EP Lubricant HD 68	Spartan EP 68	Mobil Gear 626 (ISO VG 68)	Omala Oil 68	Energol GR-XP 68
0~35	Bonnock M 100, 150	Daphe Super Gear Oil 100, 150	EP Lubricant HD 100 HD 150	Spartan EP 100 EP 150	Mobil Gear 627 629 (ISO VG 100, 150)	Omala Oil 100, 150	Energol GR-XP 100 GR-XP 150
30~50	Bonnock M 220~460		EP Lubricant HD 220 HD 320 HD 460	Spartan EP 220 EP 320 EP 460	Mobil Gear 630 632 633 634 (ISO VG 220~460)	Omala Oil 220 320 460	Energol GR-XP 220 GR-XP 320 GR-XP 460

Oil Quantity (litre)

Frame size	613□	614□	616□	617□
Horizontal shaft	0.7	0.7	1.4	1.9
Vertical shaft	1.1	1.1	1.0	1.9



SERVICE FACTORS

Hours of Operation	LOAD CLASSIFICATIONS					
	U Uniform		M Moderate		H Heavy	
	Load		Shock		Shock	
(hrs/day)	AGMA	CYCLO	AGMA	CYCLO	AGMA	CYCLO
0.5	0.50	0.50	0.80	0.80	1.25	1.20
3	0.80	0.80	1.00	1.00	1.50	1.35
10	1.00	1.00	1.25	1.20	1.75	1.50
24	1.25	1.20	1.50	1.35	2.00	1.60

In case of short time intermittent operations, it may be possible to use a smaller than normal model, but please consult us in such an event.

In case of frequent start/stop operations or under heavy shock conditions, special reinforcements and other measures may be required, in which event we should be consulted.

Actual output speed (rpm) may vary slightly from output rpm shown. Please notify the factory if actual output rpm is required.

HORIZONTAL TYPE (CNHM/CHHM)

Output Speed (rpm)	MOTOR CAPACITY													
	0.4 kW (0.5 HP)	S.F.	0.75 kW (1 HP)	S.F.	1.5 kW (2 HP)	S.F.	2.2 kW (3 HP)	S.F.	3.7 kW (5 HP)	S.F.	5.5 kW (7.5 HP)	S.F.	7.5 kW (10 HP)	S.F.
250	CNHM05-6080-6	1.48	CNHM1-6090-6	1.53	CNHM2-6100-6	1.57	CNHM3-6110-6	1.61	CNHM5-6120-6	1.37	CHHM8-6130-6	1.71	CHHM10-6135-6	1.51
136	CNHM05-6080-11	1.48	CNHM1-6090-11	1.53	CNHM2-6100-11	1.57	CNHM3-6110-11	1.61	CNHM5-6120-11	1.37	CHHM8-6130-11	1.71	CHHM10-6135-11	1.51
100	CNHM05-6080-15	1.48	CNHM1-6090-15	1.53	CNHM2-6100-15	1.57	CNHM3-6110-15	1.61	CNHM5-6120-15	1.37	CHHM8-6130-15	1.41	CHHM10-6135-15	1.20
88	CNHM05-6080-17	1.48	CNHM1-6090-17	1.53	CNHM2-6100-17	1.33	CNHM3-6110-17	1.45	CNHM5-6125-17	1.53	CHHM8-6135-17	1.51	CHHM10-6145-17	1.60
71	CNHM05-6085-21	1.38	CNHM1-6095-21	2.01	CNHM2-6105-21	1.52	CNHM3-6115-21	1.41	CNHM5-6125-21	1.29	CHHM8-6135-21	1.22	CHHM10-6145-21	1.27
60	CNHM05-6090-25	1.68	CNHM1-6100-25	1.69	CNHM2-6120-25	2.06	CNHM3-6120-25	1.40	CHHM5-6135-25	1.55	CHHM8-6145-25	1.44	CHHM10-6165-25	1.79
51.7	CNHM05-6090-29	1.56	CNHM1-6100-29	1.61	CNHM2-6120-29	1.91	CNHM3-6125-29	1.58	CHHM5-6135-29	1.31	CHHM8-6145-29	1.37	CHHM10-6165-29	1.52
43	CNHM05-6090-35	1.53	CNHM1-6105-35	1.60	CNHM2-6120-35	1.58	CNHM3-6125-35	1.31	CHHM5-6145-35	1.69	CHHM8-6160-35	1.46	CHHM10-6165-35	1.28
34.9	CNHM05-6095-43	1.51	CNHM1-6105-43	1.44	CNHM2-6125-43	1.56	CHHM3-6135-43	1.52	CHHM5-6145-43	1.26	CHHM8-6165-43	1.42	CHHM10-6175-43	1.51

VERTICAL TYPE (CNVM/CVVM)

Output Speed (rpm)	MOTOR CAPACITY													
	0.4 kW (0.5 HP)	S.F.	0.75 kW (1 HP)	S.F.	1.5 kW (2 HP)	S.F.	2.2 kW (3 HP)	S.F.	3.7 kW (5 HP)	S.F.	5.5 kW (7.5 HP)	S.F.	7.5 kW (10 HP)	S.F.
250	CNVM05-6080-6	1.48	CNVM1-6090-6	1.53	CNVM2-6100-6	1.57	CNVM3-6110-6	1.61	CNVM5-6120-6	1.37	CVVM8-6130-6	1.71	CVVM10-6135-6	1.51
136	CNVM05-6080-11	1.48	CNVM1-6090-11	1.53	CNVM2-6100-11	1.57	CNVM3-6110-11	1.61	CNVM5-6120-11	1.37	CVVM8-6130-11	1.71	CVVM10-6135-11	1.51
100	CNVM05-6080-15	1.48	CNVM1-6090-15	1.53	CNVM2-6100-15	1.57	CNVM3-6110-15	1.61	CNVM5-6120-15	1.37	CVVM8-6130-15	1.41	CVVM10-6135-15	1.20
88	CNVM05-6080-17	1.48	CNVM1-6090-17	1.53	CNVM2-6100-17	1.33	CNVM3-6110-17	1.45	CNVM5-6125-17	1.53	CVVM8-6135-17	1.51	CVVM10-6145-17	1.60
71	CNVM05-6085-21	1.38	CNVM1-6095-21	2.01	CNVM2-6105-21	1.52	CNVM3-6115-21	1.41	CNVM5-6125-21	1.29	CVVM8-6135-21	1.22	CVVM10-6145-21	1.27
60	CNVM05-6090-25	1.68	CNVM1-6100-25	1.69	CNVM2-6120-25	2.06	CNVM3-6120-25	1.40	CVVM5-6135-25	1.55	CVVM8-6145-25	1.44	CVVM10-6165-25	1.79
51.7	CNVM05-6090-29	1.56	CNVM1-6100-29	1.61	CNVM2-6120-29	1.91	CNVM3-6125-29	1.58	CVVM5-6135-29	1.31	CVVM8-6145-29	1.37	CVVM10-6165-29	1.52
43	CNVM05-6090-35	1.53	CNVM1-6105-35	1.60	CNVM2-6120-35	1.58	CNVM3-6125-35	1.31	CVVM5-6145-35	1.69	CVVM8-6160-35	1.46	CVVM10-6165-35	1.28
34.9	CNVM05-6095-43	1.51	CNVM1-6105-43	1.44	CNVM2-6125-43	1.56	CVVM3-6135-43	1.52	CVVM5-6145-43	1.26	CVVM8-6165-43	1.42	CVVM10-6175-43	1.51



GEARED MOTOR CNHM / CHHM TYPE

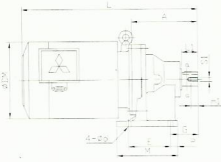


Fig 1. Type CNHM (0.5~2 HP) (Grease Lubrication)

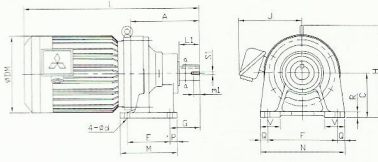


Fig 2. Type CNHM (Grease Lubrication)

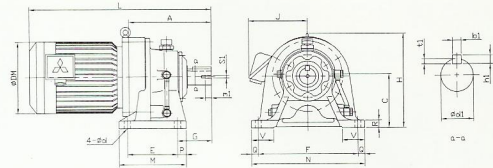


Fig 3. Type CHHM (Oil Lubrication)

FRAME SIZE	A	C	DC	E	F	G	M	N	P	Q	R	V	d	SLOW SPEED SHAFT						H	DM	J	L	Weight (kg)	FIG	
														d1	L1	b1	h1	t1	S1							m1
CNHM05-608	129	90	134	75	120	52	99	144	12	12	13	37	9	22h6 ⁰ _{-0.013}	35	6	6	3.5	M6	16	214.9	147.6	140	328	14	1
CNHM05-609	142	100	150	90	150	60	135	180	15	15	12	40	11	28h6 ⁰ _{-0.013}	35	8	7	4	M8	20	248.9	147.6	145	345	18	1
CNHM1-609																					248.9	161.6	145	377	22	
CNHM1-610	156	100	150	90	150	60	135	180	15	15	12	40	11	28h6 ⁰ _{-0.013}	35	8	7	4	M8	20	262.9	161.6	145	391	24	1
CNHM2-610																					215.3	183.6	158	426	31	
CNHM3-611	170	120	162	90	150	70	135	180	15	15	12	45	11	32h6 ⁰ _{-0.016}	45	10	8	5	M8	20	250.8	207	170	487	37	2
CNHM2-612	186	120	204	115	190	82	155	230	20	20	15	55	14	38h6 ⁰ _{-0.016}	55	10	8	5	M8	20	250.8	183.6	158	456	42	1
CNHM3-612																					250.8	207	170	503	47	
CNHM5-612																					252.8	228	182	513	57	
CHHM3-613	240	150	230	145	290	100	195	330	25	20	22	65	18	50h6 ⁰ _{-0.016}	70	14	9	5.5	M10	18	293.8	207	170	557	66	3
CHHM5-613																					295.8	228	182	568	76	
CHHM8-613																					304	266	210	617	82	
CHHM10-613																					304	266	210	617	92	
CHHM5-614	260	150	230	145	290	120	195	330	25	20	22	65	18	50h6 ⁰ _{-0.016}	90	14	9	5.5	M10	18	305.8	228	182	588	79	3
CHHM8-614																					314	266	210	637	85	
CHHM10-614																					314	266	210	637	95	
CHHM8-616	308	160	300	150	370	139	238	410	44	20	25	75	18	60h6 ⁰ _{-0.019}	90	18	11	7	M10	18	348.5	266	210	685	120	3
CHHM10-616																					348.5	266	210	685	128	
CHHM10-617	352	200	340	275	380	125	335	430	30	25	30	80	22	70h6 ⁰ _{-0.019}	90	20	12	7.5	M12	24	403	266	210	729	169	3

GEARED MOTOR CNVM / CVVM TYPE

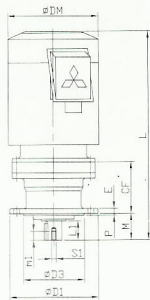


Fig 4. Type CNVM (0.5~2 HP) (Grease Lubrication)

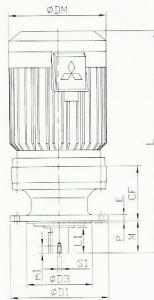


Fig 5. Type CNVM (Grease Lubrication)

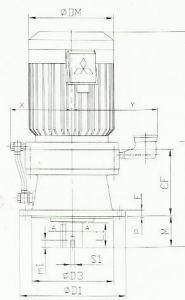


Fig 6. Type CVVM (Oil Lubrication)

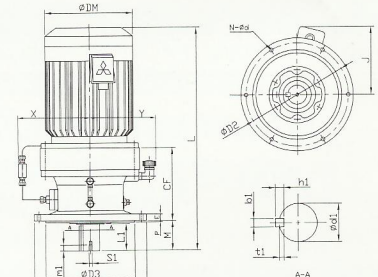
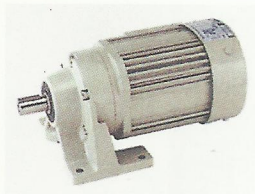


Fig 7. Type CVVM (Oil Lubrication with circulating pump)

FRAME SIZE	CF	D1	D2	D3	M	E	P	N	d	H	X	Y	SLOW SPEED SHAFT						DM	J	L	Weight (kg)	FIG	
													d1	L1	b1	h1	t1	S1						m1
CNVM05-608	94	160	134	110	48	9	3	4	11	-	-	-	22h6 ⁰ _{-0.013}	35	6	6	3.5	M6	16	147.6	138	297	15	4
CNVM05-609	94	160	134	110	48	9	3	4	11	107	-	-	28h6 ⁰ _{-0.013}	35	8	7	4	M8	20	147.6	138	297	15	4
CNVM1-609																				161.6	144	329	17	
CNVM1-610	108	160	134	110	48	9	3	4	11	107	-	-	28h6 ⁰ _{-0.013}	35	8	7	4	M8	20	161.6	144	343	19	4
CNVM2-610																				183.6	156	378	25	
CNVM3-611	112	210	180	140	58	11	4	6	11	116	-	-	32h6 ⁰ _{-0.016}	45	10	8	5	M8	20	207	169	418	30	5
CNVM2-612	117	210	180	140	69	13	4	6	11	137	-	-	38h6 ⁰ _{-0.016}	55	10	8	5	M8	20	183.6	156	387	28	4
CNVM3-612																				207	169	434	32	
CNVM5-612																				228	180	444	36	
CVVM3-613	164	260	230	200	76	15	4	6	11	-	152	233	50h6 ⁰ _{-0.016}	61	14	9	5.5	M10	18	207	169	488	64	6
CVVM5-613																				228	180	492	68	
CVVM8-613																				266	213	541	78	
CVVM10-613																				266	213	541	85	
CVVM5-614	164	260	230	200	96	15	4	6	11	-	152	233	50h6 ⁰ _{-0.016}	81	14	9	5.5	M10	18	228	180	492	72	6
CVVM8-614																				266	213	541	82	
CVVM10-614																				266	213	541	89	
CVVM8-616	219	340	310	270	89	20	4	6	11	-	217	200	60h6 ⁰ _{-0.019}	80	18	11	7	M10	18	266	213	596	107	7
CVVM10-616																				266	213	596	113	
CVVM10-617	258	400	360	316	94	22	5	8	14	-	222	225	70h6 ⁰ _{-0.019}	84	20	12	7.5	M12	24	266	213	640	155	7



ALMAX[®] GEARMOTOR

Power 90W ~ 2.2 kW
Ratio 3/1 ~ 1003/1



ASTERO[™] GEARMOTOR

Power 6 ~ 90 W
Ratio 3/1 ~ 200/1



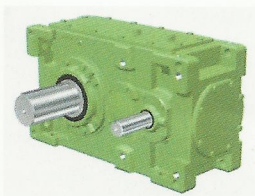
CYCLO[®] DRIVE 6000 SERIES

Power 0.1 ~ 132 kW
Ratio 6/1 ~ 1000000/1



COMPOWER[®] PLANETARY GEAR

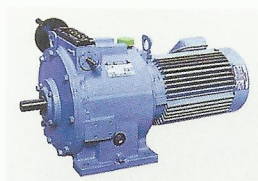
Torque 150 ~ 75000 kgf.m
Ratio 5/1 ~ 1768/1



PARAMAX[®] 9000 SERIES

Parallel

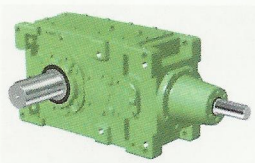
Torque 260 ~ 52200 kgf.m
Ratio 6.3/1 ~ 500/1



BEIER[®] VARIATOR

E series 0.1 ~ 0.75 kW
Speed range ratio 6/1

NA, A series 0.2 ~ 150 kW
Speed range ratio 4/1



PARAMAX[®] 9000 SERIES

Right Angle

Torque 260 ~ 52200 kgf.m
Ratio 6.3/1 ~ 450/1



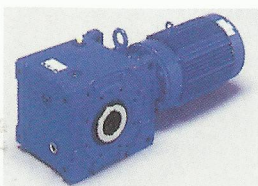
NB series 0.2 ~ 75 kW
Speed range ratio 4/1

D series 0.4 ~ 0.75 kW
Speed range ratio 10/1



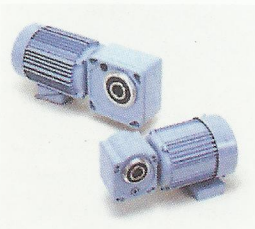
HELICAL[®] BUDDY BOX (HBB)

Power 0.1 ~ 30 kW
Ratio 11/1 ~ 26500/1



HELICAL[®] BUDDY BOX (HBB)

Power 0.1 ~ 30 kW
Ratio 11/1 ~ 26500/1



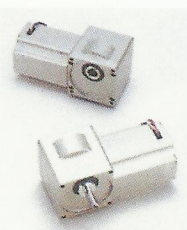
HYPONIC[®] DRIVE NEO SERIES

Power 90 W ~ 5.5 kW
Ratio 5/1 ~ 1440/1



HSM[®] Shaft Mounted Speed Reducer

Torque 2.6 ~ 4490 kgf.m
Ratio 5/1, 13/1, 20/1 25/1



HYPONIC[®] DRIVE NEO SERIES

Power 15 ~ 90 W
Ratio 3/1 ~ 240/1



HEDCON[®] WORM GEAR

Solid/Hollow shaft

Torque 60 ~ 8400 kgf.m
Ratio 5/1 ~ 100/1



EXAMPLE OF APPLICATION

