



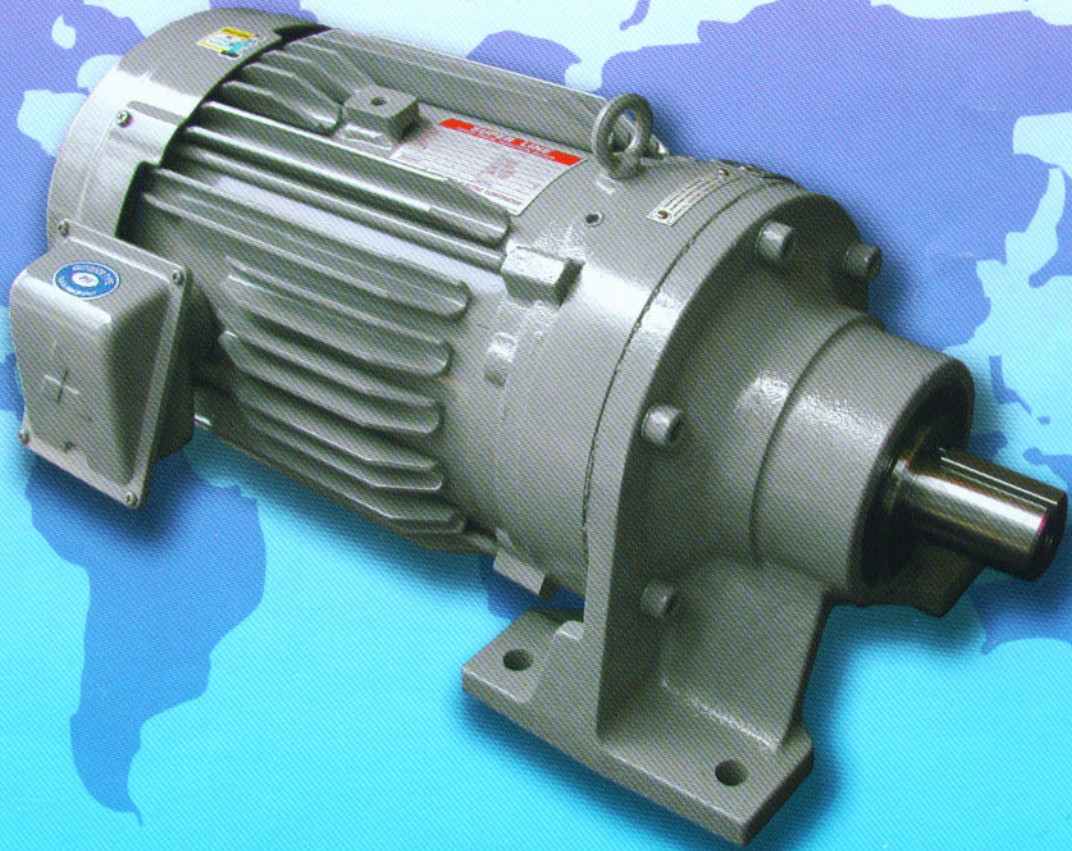
Oriental Electric Industry
Company Limited



CYCLO DRIVE 6000 SERIES

SUMITOMO CYCLO-DRIVE WITH
MITSUBISHI ELECTRIC MOTOR

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



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

The quality move

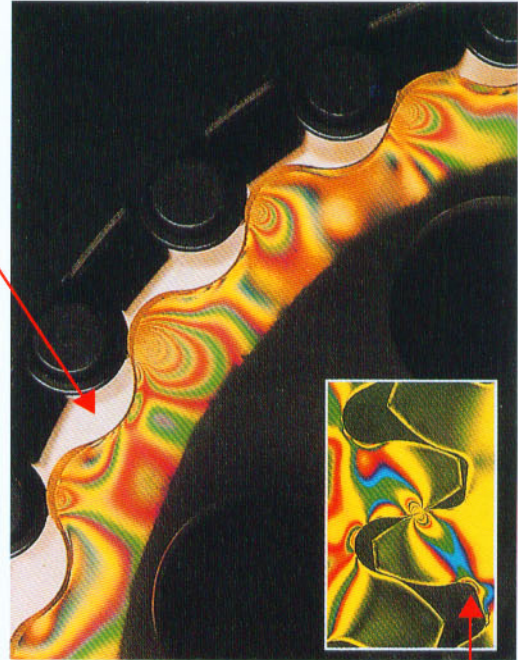
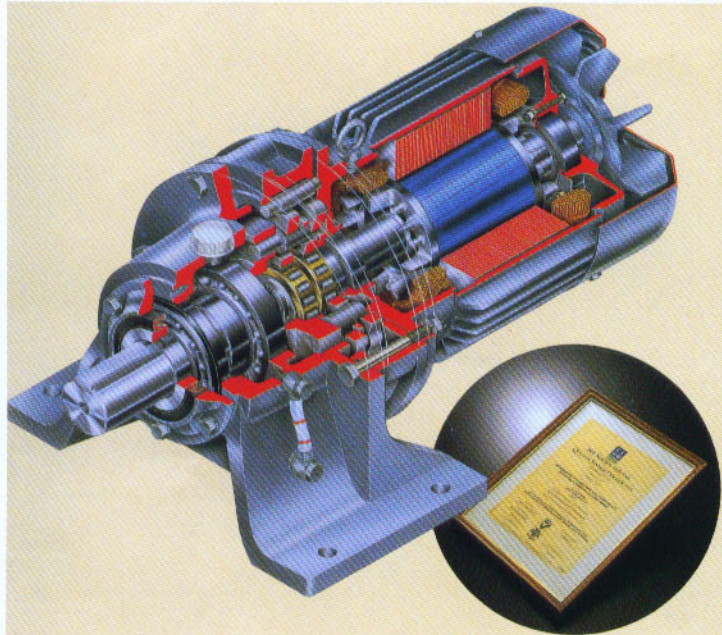




CYCLO DRIVE® Brilliant engineering with unmatched performance advantages

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

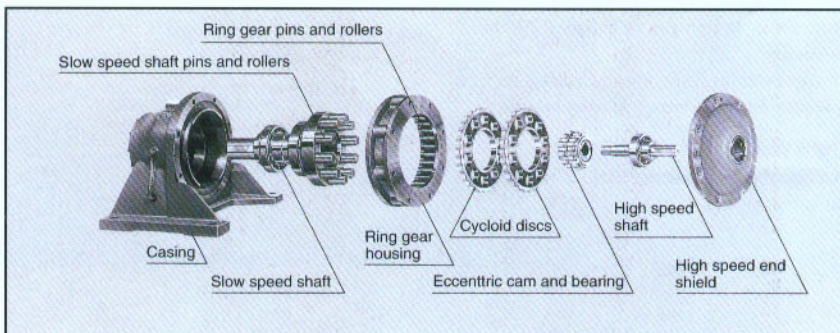
Due to the fact that the Cycloidal teeth can not break, there is no chance for the CYCLO to experience catastrophic (immediate) failure.

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.



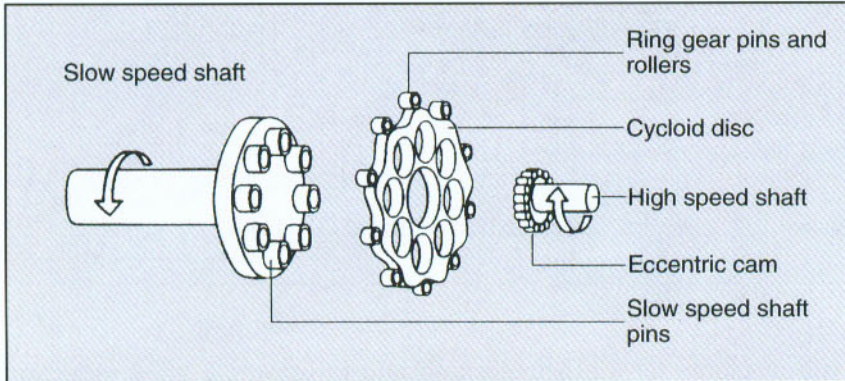
EASE OF MAINTENANCE

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

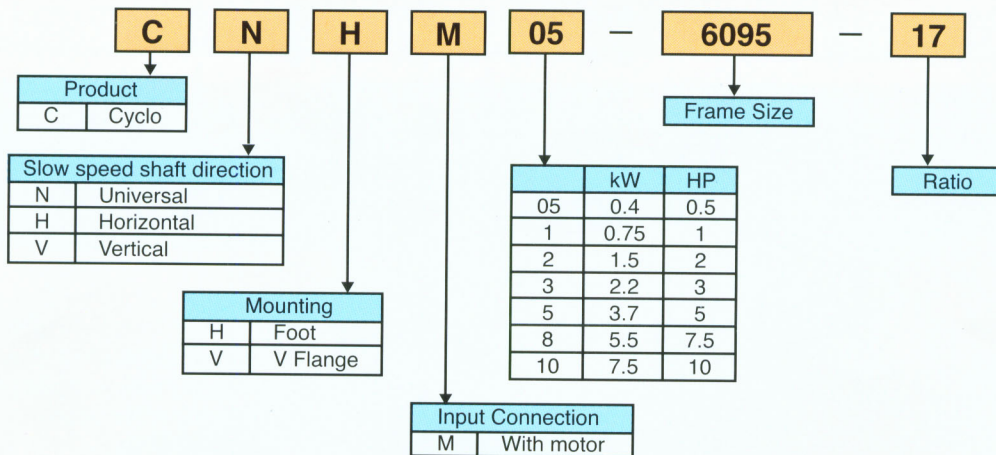
CYCLO-DRIVE	HELICAL GEARS
TWO-THIRDS OF TEETH IN FULL CONTACT ALL TIME CYCLO SPEED REDUCER Many teeth share the shock of overload.	ONLY 1 OR 2 TEETH IN CONTACT CONVENTIONAL HELICAL GEAR. 1 or 2 teeth absorb the entire shock of overload.
ROLLING MOTION 	SLIDING FRICTION MOTION
SHOCK LOAD 500%	SHOCK LOAD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

MOUNTING POSITION

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



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 rowspan="2">Construction of Lead Wires</th> <th colspan="2">Connection Diagram</th> </tr> <tr> <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 Load		M Moderate Shock		H Heavy Shock	
	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

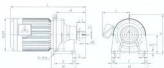
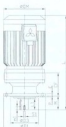
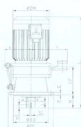
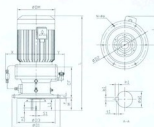
 Fig 1. Type CNHM (0.5-2 HP)
(Grease Lubrication)

 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						
CNHM05-608	129	90	134	75	120	52	99	144	12	13	37	9	22h6 ^{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	40	11	28h6 ^{0.013}	35	8	7	4	M8	20	248.9	147.6	145	345	18	1
CNHM1-609	156	100	150	90	150	60	135	180	15	15	40	11	28h6 ^{0.013}	35	8	7	4	M8	20	248.9	161.6	145	377	22	1
CNHM1-610	156	100	150	90	150	60	135	180	15	15	40	11	28h6 ^{0.013}	35	8	7	4	M8	20	262.9	161.6	145	391	24	1
CNHM2-610	170	120	162	90	150	70	135	180	15	15	42	11	32h6 ^{0.016}	45	10	8	5	M8	20	215.3	183.6	158	426	31	1
CNHM3-611	170	120	162	90	150	70	135	180	15	15	42	11	32h6 ^{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	55	14	38h6 ^{0.016}	55	10	8	5	M8	20	250.8	183.6	158	456	42	1
CNHM3-612	186	120	204	115	190	82	155	230	20	20	55	14	38h6 ^{0.016}	55	10	8	5	M8	20	250.8	207	170	503	47	2
CNHM5-612	186	120	204	115	190	82	155	230	20	20	55	14	38h6 ^{0.016}	55	10	8	5	M8	20	252.8	228	182	513	57	2
CHHM3-613	240	150	230	145	290	100	195	330	25	20	62	18	50h6 ^{0.016}	70	14	9	5.5	M10	18	293.8	207	170	557	66	3
CHHM5-613	240	150	230	145	290	100	195	330	25	20	62	18	50h6 ^{0.016}	70	14	9	5.5	M10	18	295.8	228	182	568	76	3
CHHM8-613	240	150	230	145	290	100	195	330	25	20	62	18	50h6 ^{0.016}	70	14	9	5.5	M10	18	304	266	210	617	82	3
CHHM10-613	240	150	230	145	290	100	195	330	25	20	62	18	50h6 ^{0.016}	70	14	9	5.5	M10	18	304	266	210	617	92	3
CHHM5-614	260	150	230	145	290	120	195	330	25	20	62	18	50h6 ^{0.016}	90	14	9	5.5	M10	18	305.8	228	182	588	79	3
CHHM8-614	260	150	230	145	290	120	195	330	25	20	62	18	50h6 ^{0.016}	90	14	9	5.5	M10	18	314	266	210	637	85	3
CHHM10-614	260	150	230	145	290	120	195	330	25	20	62	18	50h6 ^{0.016}	90	14	9	5.5	M10	18	314	266	210	637	95	3
CHHM8-616	308	160	300	150	370	139	238	410	44	20	75	18	60h6 ^{0.019}	90	18	11	7	M10	18	348.5	266	210	685	120	3
CHHM10-616	308	160	300	150	370	139	238	410	44	20	75	18	60h6 ^{0.019}	90	18	11	7	M10	18	348.5	266	210	685	128	3
CHHM10-617	352	200	340	275	380	125	335	430	30	25	30	22	70h6 ^{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 ^{0.013}	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 ^{0.013}	35	8	7	4	M8	20	147.6	138	297	15	4
CNVM1-609	94	160	134	110	48	9	3	4	11	107	-	-	28h6 ^{0.013}	35	8	7	4	M8	20	161.6	144	329	17	4
CNVM1-610	108	160	134	110	48	9	3	4	11	107	-	-	28h6 ^{0.013}	35	8	7	4	M8	20	161.6	144	343	19	4
CNVM2-610	108	160	134	110	48	9	3	4	11	107	-	-	28h6 ^{0.013}	35	8	7	4	M8	20	183.6	156	378	25	4
CNVM3-611	112	210	180	140	58	11	4	6	11	116	-	-	32h6 ^{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 ^{0.016}	55	10	8	5	M8	20	183.6	156	387	28	4
CNVM3-612	117	210	180	140	69	13	4	6	11	137	-	-	38h6 ^{0.016}	55	10	8	5	M8	20	207	169	434	32	5
CNVM5-612	117	210	180	140	69	13	4	6	11	137	-	-	38h6 ^{0.016}	55	10	8	5	M8	20	228	180	444	36	5
CVVM3-613	164	260	230	200	76	15	4	6	11	-	152	233	50h6 ^{0.016}	61	14	9	5.5	M10	18	207	169	488	64	6
CVVM5-613	164	260	230	200	76	15	4	6	11	-	152	233	50h6 ^{0.016}	61	14	9	5.5	M10	18	228	180	492	68	6
CVVM8-613	164	260	230	200	76	15	4	6	11	-	152	233	50h6 ^{0.016}	61	14	9	5.5	M10	18	266	213	541	78	6
CVVM10-613	164	260	230	200	76	15	4	6	11	-	152	233	50h6 ^{0.016}	61	14	9	5.5	M10	18	266	213	541	85	6
CVVM5-614	164	260	230	200	96	15	4	6	11	-	152	233	50h6 ^{0.016}	81	14	9	5.5	M10	18	228	180	492	72	6
CVVM8-614	164	260	230	200	96	15	4	6	11	-	152	233	50h6 ^{0.016}	81	14	9	5.5	M10	18	266	213	541	82	6
CVVM10-614	164	260	230	200	96	15	4	6	11	-	152	233	50h6 ^{0.016}	81	14	9	5.5	M10	18	266	213	541	89	6
CVVM8-616	219	340	310	270	89	20	4	6	11	-	217	200	60h6 ^{0.019}	80	18	11	7	M10	18	266	213	596	107	7
CVVM10-616	219	340	310	270	89	20	4	6	11	-	217	200	60h6 ^{0.019}	80	18	11	7	M10	18	266	213	596	113	7
CVVM10-617	258	400	360	316	94	22	5	8	14	-	222	225	70h6 ^{0.019}	84	20	12	7.5	M12	24	266	213	640	155	7