HYOSUNG

GEARED MOTOR

RP-Series
FN-Series
F-Series
K-Series
H-Series
P-Series

Global Top Energy, Machinery & Plant Solution Provider

About HYOSUNG

Hyosung Power & Industrial Systems PG is a division under Hyosung which consists of seven performance groups (PGs). In addition to establishing itself as a world-class manufacturer of electrical equipments, green technology and industrial machineries, Hyosung is also the largest producer of tire cords and spandex in the global market and the second largest supplier of ATMs in the USA.

01 Our Business

Brief introduction of Hyosung Power & Industrial Systems

Hyosung Power & Industrial Systems Performance Group

Hyosung Power & Industrial Systems Performance Group(PG), a comprehensive energy solution provider, boasts world-leading technology in the global power industry and has secured a competitive capability on par with that of top competitors in transformers, switchgears, motors, generators, gear units, industrial machineries, industrial pumps, and wind energy business.

With globalization as one of our top priorities, we have achieved outstanding increase in sales over the past few years thanks to the enhancement in Hyosung's quality, technology, and brand recognition among overseas clients, which include North America, Europe, the Middle East, and Asia. We expect such robust performance, marked by an increasing number of orders from the overseas market, to continue in the future.

At the heart of our capability to grow as a comprehensive energy solution provider is our global organization structure. Hyosung Power & Industrial Systems PG is divided into four business areas or performance units(PU), depending on the types of flagship products : Power Systems PU, Industrial Machinery PU, HYOSUNG GOODSPRINGS PU, and the Wind Energy Business Division.

Industrial Machinery Performance Unit

The Industrial Machinery PU plays an important role in the infrastructure industry around the globe and provides various types of motors, generators, gear units, energy solution and industrial machineries.

Hyosung has officially acquired all significant assets, patents, estates as well as orders and employees of the traditional Hanseatic company Lloyd Dynamowerke GmbH & Co. KG (LDW). LDW offers special custom-made electrical motors and generators for industrial applications.

In addition, Hyosung anticipates that efforts in innovation among rotary machinery will make significant contributions towards creating energy profitability as well as greater efficiency. With the goal to serve as a world-leading provider of industrial machinery, Hyosung will continue to focus on innovative energy conservation technology, enhanced reliability of new products, and development of new technologies.

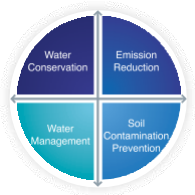
CONTENTS

02 Sustainability

Our sustainability principles are the backbone of the way we design and manufacture products

Quality Assurance

Hyosung strives for excellence. We believe excellence can only be achieved through absolute quality and value for customers. In order to create quality products, we believe that all of the actions of every single employee must be focused in the highest level of quality. In order to achieve such levels, we have implemented a quality assurance policy and programs that make our philosophy into a reality.
Our Quality Assurance Policy was founded based on the management policy of the president and meets the demands of ISO 9001. As a globally active company, we are committed to comprehensive and quality management through three quality strategies: quality mana gement system, customer-focused management system, and concentration on core competencies.
The comprehensive quality management system ensures that we completely comply with all compliances and applicable legislation, cod es, and standards in addition to implementing efficient operation of our management resources to eliminate unnecessary waste.
Our customer-focused management system clarifies and simplifies our first priority which is customer satisfaction. All of our work is aimed to exceed customer needs and provide exceptional value through quality standards, flexibility, and innovation.
Finally, we concentrate on our core competencies for strict quality control and continual improvement which provides quality products a nd cost-saving to our clients via advancement in technical capacity and technological innovation.
We implement our policy via a Quality Management Team manages research laboratories, including the Measurement Standard Labora tory, the Chemical Analysis Laboratory and the Material Analysis Laboratory to maintain a strict control over quality.



Environment Protection Policy

Hyosung understands the impact of Hyosung's activities in the environment and works to protect the environment from pollution, manag es the environmental impacts of Hyosung's products and technologies, and prevents future pollution and harmful effects in the environme nt by investing in environmentally-friendly products and solutions.
Based on this eco-philosophy of shared responsibility, Hyosung has implemented a comprehensive environmental protection program t hat aims to minimize our impact on the environment and conserve resources. Our environmental policy fulfils all requirements of the IS O 14001.

03 R&D

Inspiring innovation, creation and expertise

Hyosung R&D Center identifies innovation, creation, and expertise as core value, and concentrates on world class R&D activities in the 21st century with a philosophy aspiring after customer satisfaction, quality priority, and performance orientation. Hyosung pursues to be the world's best company in the field of heavy electrical machinery, industrial & electrical electronics engineering, and energy syste m. Ever since establishment in 1978, R&D Center had led the development of domestic technology. Along with the Anyang and Changwo n labs, the group has endeavored to produce core technology and world-class products in the areas of heavy electrical machinery, energy system, electrical electronics engineering, and industrial automation system.

Research Areas

Hyosung R&D Center engages in the activities in the field of energy system, solution & service, applied electrical and electronic technology, basic core technology, technology of improved reliability, core components, and new materials.

Energy System
- Renewable energy
  (wind system, wind turbine, wind PCS, solar system, PV PCS, fuel cell, co-generation)
- Electric Vehicle (EV charger, EV motor)

Solution & Service
- Power facility diagnosis algorithm and system
- Power facility lifecycle evaluation system
- Service solution for remote diagnosis for prevention

Applied Electrical & Electronic Technology
- Power conversion system
- Flexible AC transmission system and high voltage direct current
- Power quality solution

Basic Core Technology
- Fortified technology in structural dynamics, el ectromagnetics, heat transfer analysis, etc.
- Skills for system simulation, analysis and evaluation
- Business support technology

Technology with Improved Reliability
- Test data analysis and testing facility
- Analysis of lifecycle and cause of error
- Reliability assessment (environment-friendliness, durability, l ong-term degradation, and more)

Core Components and New Materials
- Organic and inorganic insulation materials
- Silicon forming technology
- Intelligent sensor
  (facility diagnosis, CT, PT, VT, LA, and more)

GEARED MOTOR



Selecting model based on power and gear ratio (60Hz, 4p)

Gear ratio \ HP	0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75
1 / 10	■ RP series (page 5) - Safety factor : 1.0~1.4 ■ FN series (page 16) - Safety factor : 1.4~2.0					■ F series (page 20)									
1 / 20															
1 / 30															
1 / 40															
1 / 60															
1 / 75						■ H series (page 28)									
1 / 80															
1 / 90															
1 / 100															
1 / 120															
1 / 150															
1 / 180			■ P series (page 44)												
1 / 240											■ RP series - Safety factor : 1.0~1.4				
1 / 320															
1 / 470											■ H series - Safety factor : 1.4~2.0				
1 / 600															

· For K-series models, refer to page 24.
·Custom motor is available. Please contact Hyosung for details.

RP-Series

Features

1. Light and compact
The ideal strength-distributed design allows a light and compact model, which being e asy to handle and requiring no large surface area.

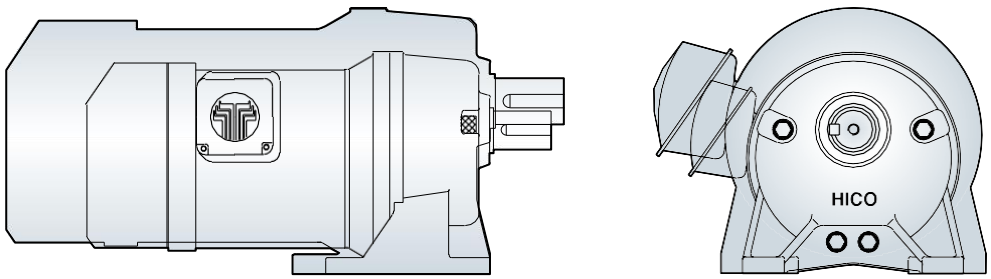
2. Smooth operation and low noise
The gear design absorbing vibration and reducing tooth meshing noise and the high- ac curacy gear made with the best-of-kind facilities result in smooth operation and low nois e.

3. 20,000 maintenance-free hours
Using grease with long service life, superior lubricability and high liquidity eliminates the need for repairing and maintenance work for 20,000 hours.

4. Free mounting position
Fully sealed grease enables free mounting position with no restriction.

5. Prompt delivery
All the standard parts are secured in the half-finished state, and demands from customers are handled quickly.

Comparison of volume with an existing model



Type Codes

RP	H	05	60	–	4	SB
Series name	Installation method	Motor capacity	Gear ratio		Number of poles of the motor	Brake type
	H : Horizontal V : Vertical	05 : 0.5HP 10 : 1HP 20 : 2HP 30 : 3HP 50 : 5HP	10, 15 20, 30 40, 45 50, 60 75, 90		4 : 4 poles 6 : 6 poles	SB : SB TYPE HB : HB TYPE Empty : No brake is included

RP-Series

Selection

Selection procedures

1) Gear ratio

Select the gear ratio from the required number of revolutions of the output shaft. Since the number of revolutions is 1,800 rpm for 60Hz, the gear ratio can be calculated easily.

i = Number of revolutions of motor / Required number of revolutions of the output shaft

2) Torque of the output shaft

Torque of the output shaft can be calculated from the load torque. If the load torque is changed, calculate with the maximum torque.

$$T_L = T_E \times Sf_1$$

T_L : Torque of the output shaft T_E : Load torque Sf_1 : Service Factor (Table1)

Table 1. Service Factor

Load state / Operating hour	Not more than 3 hours / day	3~10 hours / day	More than 10 hours / day
Uniform load	1.00	1.00	1.25
Impact load	1.00	1.25	1.50

3) Selecting output

Select the output from the characteristic table that meets torque of the output shaft and the gear ratio.

4) Load inertia (GD^2)

If the load inertia is large and the motor is running frequently, an impact torque is generated at the start of the motor. Therefore, it is required to consider GD^2 and the starting frequency.

① Calculate GD^2. Refer to Page 8 for how to calculate GD^2.

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$$GD_L^2 = \frac{GD^2}{i^2} \qquad \left(\frac{1}{i} = \text{Gear ratio}\right)$$

③ Calculate the motor shaft converted load inertia (GD_M^2) of the output selected in 3).

Table 2. GD_M^2 of the geared motor (motor shaft converted)

Motor output	0.5HP	1HP	2HP	3HP	5HP
GD_M^2(kgf·m²)	0.0079	0.0125	0.019	0.038	0.054

❣ Calculate the load inertia ratio (Z).

$$Z = \frac{GD_L^2}{GD_M^2}$$

GD_L^2 : Load inertia (motor shaft converted) GD_M^2 : Inertia of the geared motor (motor shaft converted)

⑤ Calculate the service factor (Sf_2) from Table 3 with the load inertia ratio and the starting frequency.

Table 3. Factor according to inertia ratio and starting frequency

Starting frequency / Hour	Connection method: Direct connection with coupling				Connection method: Connection with chain and belt			
	Z≤0.5	0.5<Z≤1.0	1.0<Z≤2.0	2.0<Z≤3.0	Z≤0.2	0.2<Z≤0.5	0.5<Z≤0.7	0.7<Z≤1.0
1 time	1.00	1.01	1.05	1.10	1.00	1.01	1.03	1.06
5 times	1.01	1.04	1.17	1.26	1.01	1.05	1.10	1.19
10 times	1.02	1.08	1.24	1.36	1.02	1.09	1.17	1.27
20 times	1.04	1.14	1.34	1.47	1.04	1.15	1.24	1.37
50 times	1.07	1.25	1.48	1.62	1.07	1.26	1.37	1.51
100 times	1.10	1.34	1.61	1.76	1.10	1.35	1.47	1.63
150 times	1.14	1.40	1.68	1.85	1.14	1.41	1.53	1.71

5) Required torque of the output shaft

Calculate the required torque (T) of the output shaft of the geared motor.

$$T = T_E \times Sf_1 \times Sf_2$$

T_E : Load torque Sf_1 : Factor according to the load status Sf_2 : Factor according to the load inertia

6) Overhung Load (O.H.L)

The best way to make connection between a motor and a machine is to connect them directly. If chain, belt or gear is used, O.H.L. applied to a shaft must be not more than the O.H.L allowed for the geared motor.

$$O.H.L(kgf) = \frac{2000 \times T_E \times Sf_1 \times Sf_2}{D} \times \frac{Cf}{Lf}$$

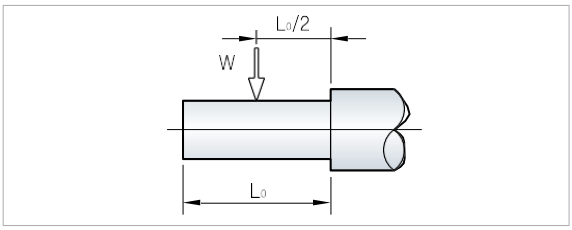
D : Pitch circle diameter of chain or pulley (mm) Cf : Factor according to the connection method (refer to Table 4)
Lf : Factor according to the center of load (refer to Table 5)

Table 4. Factor according to the connection method

Single row chain	Double row chain	Gear	V-belt
1.0	1.25	1.25	1.5

Table 5. Factor according to the center of load

$0.3L_0$	$0.5L_0$	$0.7L_0$	$0.9L_0$
1.10	1.00	0.83	0.70



Example of selection

■Operating conditions

Driving gear
- No. of poles of motor : 4 poles
- Frequency of motor : 60Hz

Driven gear
- Use : Parking facility (Impact load)
- Revolution : 30rpm
- Operating hours : 1 hour / day
- Operating frequency : 5 times / hour
- Load torque : 10.0kgf· m
- Connection with the driving gear : Chain (P.C.D=ø90)

1. Gear ratio = 1/60

2. Torque of the output shaft
   $T_L = T_E \times Sf_1 = 10.0 \times 1.00 = 10.0$kgf· m
   $Sf_1 = 1.00$ (Table 1)

3. Selection of output
   Torque at output shaft : TL = 10.0kgf· m
   Gear ratio : 1/60
   Output on the feature table : 0.5HP

4. Load inertia (GD^2)
   1) $GD^2 = 16.18$kgf· m^2
   2) $GD_L^2 = \frac{GD^2}{i^2} = \frac{16.18}{60^2} = 4.49 \times 10^{-3}$kgf·$m^2$
   3) GD_M^2 of the geared motor output 0.5HP = 7.9×10^{-3}kgf· m^2 (Table 2)
   4) $Z = \frac{GD_L^2}{GD_M^2} = \frac{4.49 \times 10^{-3}}{7.90 \times 10^{-3}} = 0.57$
   5) $Sf_2 = 1.10$ (Table 3)

5. Required torque at the output shaft
   $T = T_E \times Sf_1 \times Sf_2 = 10.0 \times 1.00 \times 1.10$
   = 11.0kgf· m
   Gear ratio : 1/60
   The geared motor that meets the above requirements is 0.5HP-1/60 on the feature table.

6. O.H.L check

$$O.H.L = \frac{2000 \times T_E \times Sf_1 \times Sf_2}{D} \times \frac{Cf}{Lf}$$

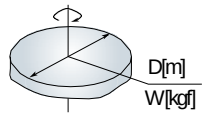
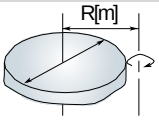
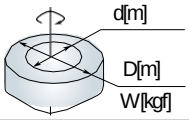
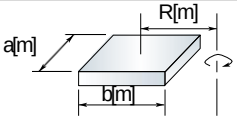
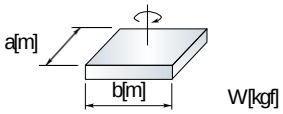
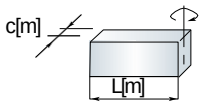
$$= \frac{2000 \times 10.0 \times 1.00 \times 1.10}{90} \times \frac{1.00}{1.00}$$

= 244.4kgf

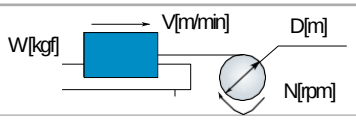
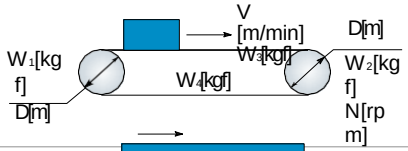
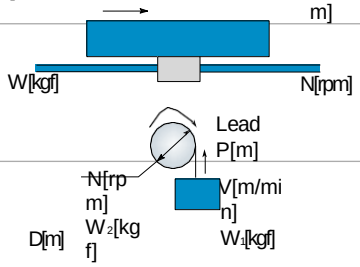
The model selected in paragraph 5 above has the O.H.L of 285kgf. Therefore this model is considered appropriate.

Calculation of GD²

Body of revolution

The axis of rotation is in the center		The axis of rotation is not in the center	
	$GD^2=1/2WD^2$ [kgf·m²]		$GD^2=W(1/2D^2+4R^2)$ [kgf·m²]
	$GD^2=1/2W(D^2+d^2)$ [kgf·m²]		$GD^2=W(\frac{a^2+b^2}{3}+4R^2)$ [kgf·m²]
	$GD^2=1/3W(a^2+b^2)$ [kgf·m²]		$GD^2=1/3W(4L^2+c^2)$ [kgf·m²]

Straight-line motion

General purpose		$GD^2=W(\frac{V}{y\cdot N})^2=WD^2$ [kgf·m²]
Horizontal motion for conveyor		$GD^2=(\frac{W_1+W_2}{2}xD^2+W_3+W_4)$ [kgf·m²]
Horizontal motion by feed screw		$GD^2=W(\frac{V}{y\cdot N})^2=W(\frac{P}{y})^2$ [kgf·m²]
Up/down motion for traction machine		$GD^2=W_1D^2+\frac{1}{2}W_2D^2$ [kgf·m²]

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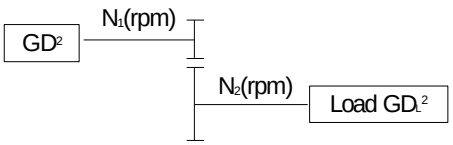
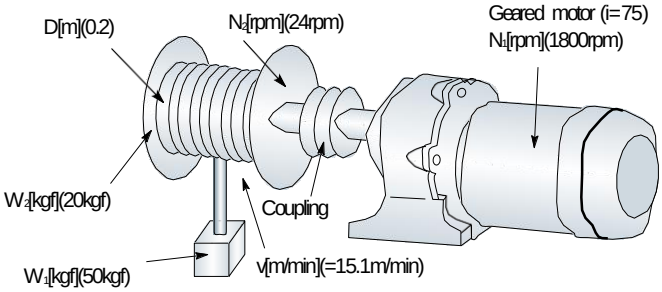


$GD^2=(\frac{N_2}{N_1})^2GD_L^2$

Example of calculation



a) Load $GD_L^2 = W_1D^2+\frac{1}{2}W_2D^2$
$= 50x\ 0.2^2+\frac{1}{2}x\ 20x\ 0.2^2$
$= 2.4$[kgf· m²]

b) Motor shaft conversion
$GD_L^2 = (\frac{N_2}{N_1})^2x$ Load GD_L^2
$= (\frac{24}{1800})^2x\ 2.4$
$= 4.267x\ 10^{-4}$[kgf· m²]

Standard Specifications

Item		Spec.
Motor	Motor output	0.5, 1, 2, 3, 5HP
	Motor type	3p, totally enclosed
	Voltage, frequency	220, 380, 440, 220/380, 220/440V, 60Hz
	Starting method	Direct On-Line
	Poles	4 poles
	Rating	Continuous
	Insulation class	Class B
Gear Reducer	Gear ratio	1/10 ~ 1/90
	Mounting	Horizontal, vertical
	Lubrication	Grease (EP GREASE R00 is filled)
	Shaft key	KS B 1311-1984
Paint color		Iron Blue 80%

Lubrication

This model is a grease-lubricating motor, and is filled with grease at the factory.
Under the normal operating conditions, replace grease every 20,000 hours.

Amount of grease (kg)

Gear ratio/Motor output	0.5HP	1HP	2HP	3HP	5HP
1/10 ~ 1/20	0.2	0.25	0.3	0.3	0.3
1/25 ~ 1/30					0.6
1/40 ~ 1/60		0.3	0.5	0.8	1.2
1/75 ~ 1/90		0.5	0.8	1.2	1.8

Comparison of Motors (4P,6P)

When a 6P motor is used other than the standard specifications, Table 6 is applied.
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5@y@!。y@jl@ q¿µ@µß¿。µ。†jl@ µ。j。y ß @Ø√WM@µj j。 jlgj 。†$HP 4P 1/Σo.

Table 6. Motor Comparison Table

Motor type	Poles	Power (HP)				
Totally enclosed (60Hz)	4P	0.5	1	2	3	5
	6P	0.25	0.5	1	2	3
FRAME SIZE		71	80	90	100L	112M

Note : Totally enclosed 60Hz, 4P is the standard motor.

RP-Series Characteristic Table

Motor output (4P)	Gear ratio	Revolutions of output shaft (rpm)	Allowable torque of the output shaft (Kgf·m)	Allowable OHL of the output shaft (Kgf)
0.5HP	1/10	180	2.1	160
	1/15	120	3.1	180
	1/20	90	4.1	200
	1/30	60	6.1	230
	1/40	45	8.1	250
	1/45	40	9.0	260
	1/50	36	10.0	270
	1/60	30	12.0	285
	1/75	24	15.0	310
	1/90	20	18.0	330
1HP	1/10	180	3.9	375
	1/15	120	5.8	430
	1/20	90	7.7	470
	1/30	60	11.5	540
	1/40	45	15.2	555
	1/45	40	19.6	580
	1/50	36	20.9	600
	1/60	30	22.5	640
	1/75	24	28.4	780
	1/90	20	33.7	830
2HP	1/10	180	7.8	375
	1/15	120	11.7	430
	1/20	90	15.5	470
	1/30	60	23.3	540
	1/40	45	30.4	635
	1/45	40	34.1	660
	1/50	36	37.8	680
	1/60	30	45.4	725
	1/75	24	56.7	1280
	1/90	20	68.2	1360
3HP	1/10	180	11.4	375
	1/15	120	17.1	430
	1/20	90	22.8	470
	1/30	60	34.1	540
	1/40	45	44.6	1040
	1/45	40	50.0	1080
	1/50	36	56.5	1120
	1/60	30	66.6	1190
	1/75	24	83.2	1520
	1/90	20	99.9	1615
5HP	1/10	180	19.2	395
	1/15	120	28.8	450
	1/20	90	38.3	500
	1/30	60	57.4	610
	1/40	45	74.8	1230
	1/45	40	84.1	1280
	1/50	36	93.4	1345
	1/60	30	112.1	1410
	1/75	24	140.1	2070
	1/90	20	167.9	2200

Note: based on 4P.

Brake

1. Features

1) Safety brake The demagnetized braking system (spring brake) automatically applies the braking action in case of power down.

2) Miniaturized The brake is integrated with a small motor, and there is no difference with a standard motor in terms of dimension.

3) Easy wiring A DC converter (half-wave rectifier) is installed beside the motor terminal box, and there is no need for additional wiring.

4) The gap and torque can be easily adjusted with a nut and a bolt.

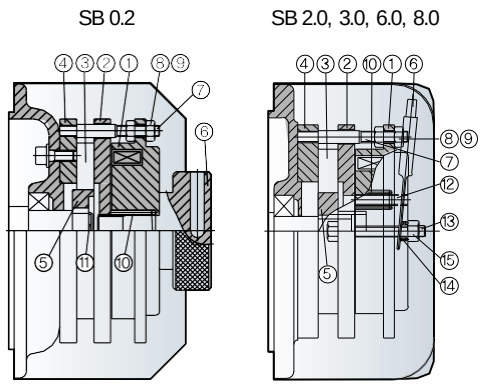
5) Simple repairing and inspection A simple structure facilitates easy replacement of lining.

2. SB Type Brake (for parking brake and on-off operation)

1) Brake specifications

Motor output (4P)		0.5HP	1HP	2HP	3HP	5HP
Brake type		SB 0.2	SB 2.0	SB 3.0	SB 6.0	SB 8.0
Operation		Demagnetized				
Brake torque (kgf·m)		0.2	2.0	3.0	6.0	8.0
Rated gap (mm)		0.8			1.0	
Operating voltage	Input AC (V)	220, 220/380, 220/440		380	440	
	Operating DC (V)	90		170	190	

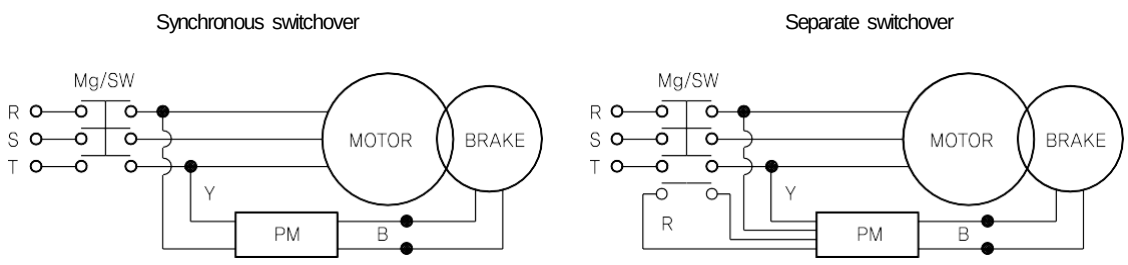
2) Sectional view



① MAGNET
② ARMATURE
③ LINING
④ FLANGE
⑤ GEAR
⑥ MANUAL HANDLE (LEVER)
⑦ STAY BOLT
⑧ GAP ADJUSTING NUT
⑨ SPRING WASHER
⑩ SPRING
⑪ SNAP RING
⑫ TORQUE ADJUSTING WRENCH
⑬ BOLT
⑭ SPRING
⑮ NUT

C Refer to Paragraph 4 in Page 15 for the details of brake.

3) Wiring diagram



Note : PM - DC power supply (B : Black, Y: Yellow, R : Red)

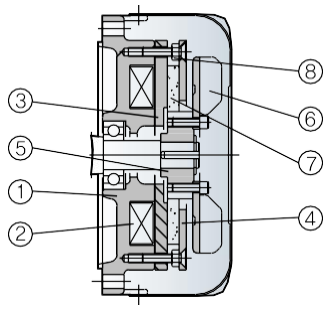
3. HB Type Brake (for continuous operation)

1) Brake specifications

Motor output (4P)		0.5HP	1HP	2HP	3HP	5HP
Brake type		SB 1.0	HB 1.2	HB 2.0	HB 6.0	HB 8.0
Operation		Demagnetized				
Brake torque (kgf·m)		1.0	1.2	2.0	6.0	8.0
Rated gap (mm)		0.2	0.3		0.4	
Gap limit (mm)		0.6	0.8		1.0	
Operating voltage	Input AC (V)	220, 220/380, 220/440		380	440	
	Operating DC (V)	90		170	190	

2) Sectional view

HHB 1.2/2.0/6.0/8.0

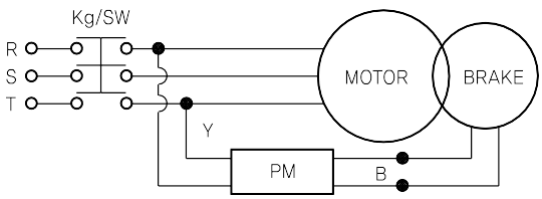


① MOTOR BRACKET
¶ BRAKE COIL
③ ARMATURE
❣ FLANGE
⑤ HUB
ˢ FAN
⑦ LINING
❧ STAY BOLT/NUT

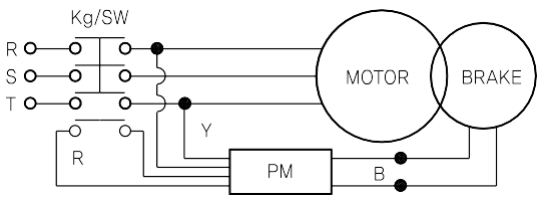
C Refer to Paragraph 4 in Page 15 for the details of brake.

3) Wiring diagram

Synchronous switchover

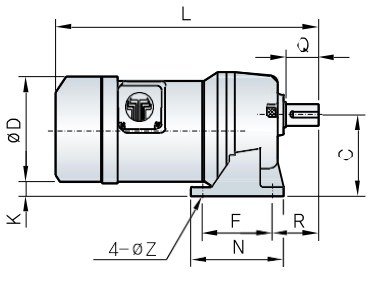


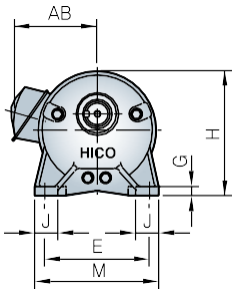
Separate switchover



Note : PM - DC power supply (B : Black, Y: Yellow, R : Red)

Specifications and Dimensions of RPH





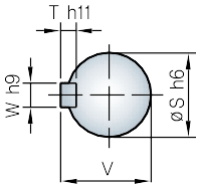
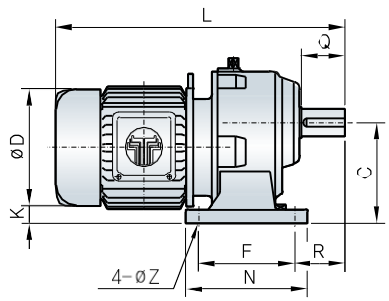


Fig. 1



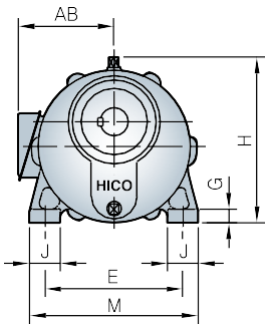


Fig. 2

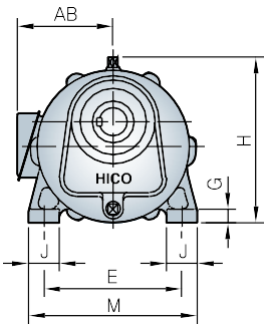


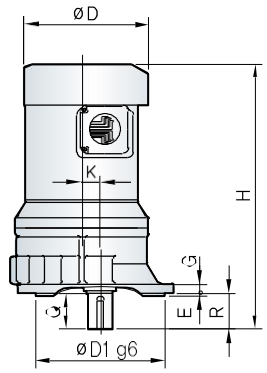
Fig. 3

UNIT : mm

HP	Ratio	Fig	Dimension														Output Shaft					Amount of grease (kg)	Weight (kg)
			C	F	N	R	E	M	J	G	Z	H	L	D	AB	K	S	W	T	V	Q		
0.5	10~90	1	105	90	120	60	135	160	30	12	11	162	339	148	130	10	28	8	7	31	42	0.2	11
1	10~30	2	115	120	145	50	155	190	35	15	12	225	400	180	142	3	25	8	7	28	35	0.25	27
	40~60	3	120	120	145	56	155	190	35	15	12	195	410	180	142	4	28	8	7	31	42	0.3	31
	70~90		135	150	190	65	190	235	45	17	14	220	450	180	142	17	32	10	8	35	55	0.5	36
2	10~30	2	135	125	155	75	190	230	40	17	12	255	470	199	158	6	32	10	8	35	55	0.3	40
	40~60	3	135	150	190	65	190	235	45	17	14	246	470	199	158	8	32	10	8	35	55	0.5	45
	70~90		165	175	220	80	215	265	50	20	19	292	525	199	158	26	42	12	8	45	65	0.8	56
3	10~30	2	160	130	170	75	215	260	45	20	14	300	505	220	160	26	38	12	8	41	58	0.3	56
	40~60	3	165	175	220	80	215	265	50	20	19	292	555	220	160	24	42	12	8	45	65	0.8	62
	70~90		180	185	235	95	240	295	55	23	19	317	585	220	160	35	48	14	9	51.5	75	1.2	77
5	10~20	2	160	130	170	75	215	260	45	20	14	300	490	244	205	4	38	12	8	41	58	0.3	59
	30		180	160	210	90	240	295	55	23	19	300	530	244	205	13	48	14	9	51.5	80	0.6	75
	40~60	3	180	185	235	95	240	295	55	23	19	317	570	244	205	15	48	14	9	51.5	75	1.2	80
	70~90		200	220	270	100	270	330	60	27	22	345	600	244	205	30	55	16	10	59	85	1.8	103

Note : 1. Based on 4P.
2. The above dimensions are when the HB type brake is mounted.

Specifications and Dimensions of RPV



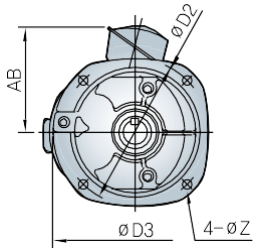
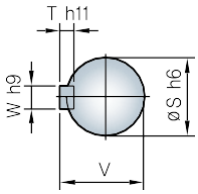


Fig. 1



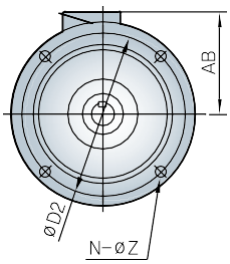


Fig. 2

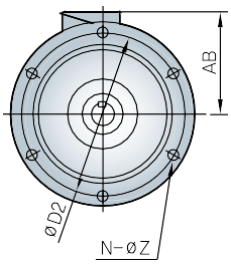
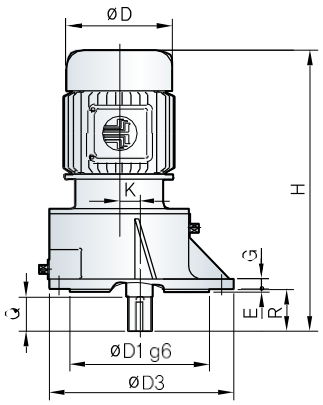


Fig. 3



UNIT : mm

HP	Ratio	Fig	Dimension												Output Shaft					Amount of grease (kg)	Weight (kg)
			D1	D2	D3	R	E	G	H	N	Z	D	AB	K	S	W	T	V	Q		
0.5	10~90	1	150	170	190	42	3	11	339	4	11	148	130	21	28	8	7	31	42	0.2	11
1	10~30	2	165	195	225	45	4	13	400	4	14	180	142	28	25	8	7	28	35	0.25	31
	40~60		175	205	235	42	4	13	410	4	14	180	142	26	28	8	7	31	42	0.3	32
	70~90		200	230	260	55	4	15	450	4	14	180	142	28	32	10	8	35	55	0.5	41
2	10~20	2	200	230	260	65	4	15	470	4	14	199	158	30	32	10	8	35	55	0.3	44
	30		200	230	260	65	4	15	470	4	14	199	158	30	32	10	8	35	55	0.3	44
	40~60		200	230	260	55	4	15	470	4	14	199	158	28	32	10	8	35	55	0.5	50
	70~90		240	280	320	65	4	17	525	4	18	199	158	39	42	12	8	45	65	0.8	63
3	10~30	2	230	270	305	70	4	17	525	4	18	203	157	34	38	12	8	41	58	0.3	61
	40~60		240	280	320	65	4	17	555	4	18	220	160	39	42	12	8	45	65	0.8	65
	70~90	3	280	320	355	75	5	19	585	6	14	220	160	43	48	14	9	51.5	75	1.2	81
5	10~20	2	230	270	305	70	4	17	490	4	18	244	205	34	38	12	8	41	58	0.3	63
	30	3	280	320	350	85	5	18	530	6	14	244	205	45	48	14	9	51.5	80	0.6	80
	40~60		280	320	355	75	5	19	570	6	14	244	205	43	48	14	9	51.5	75	1.2	84
	70~90		310	355	395	85	5	22	600	6	18	244	205	48	55	16	10	59	85	1.8	108

Note : 1. Base-04P.
2. The above dimensions are when the HB type brake is mounted.

Cautions for Use

1. Conditions of installation

1) Ambient temperature : -15°C ~ 40°C
2) Ambient humidity : 85% or lower
3) Altitude : 1,000m or lower
4) Location : Indoor
5) Environmental conditions : Well-ventilated place free from corrosive gas, explosive gas or humidity

2. Connection method

1) The output shaft is processed to h6.
2) The best way for connection is to connect the geared motor directly with a machine. A flexible coupling should be used if possible.
3) When using a chain, adjust the chain length so that it should not be loose when connected with the machine.
4) If it is required to mount a sprocket, pulley or gear at the output shaft, mount it as near as possible to the gear reducer.

3. Operation

1) Run the motor with the load torque, O.H.L and GD^2 within the tolerance.
2) When changing the direction of rotation, stop the rotation with the brake first.

4. Brake

1) Power supply

① SB TYPE (for parking facility)

[Horizontal motion] Separate switchover : This model does not adopt a non-contacting power supply system, so you should use a S/W for prompt braking action.(A synchronous switchover may be used if a delayed braking action is OK.)

[Up/down motion] Synchronous switchover (Non-contacting power supply) : This model adopts a non-contacting power supply system, so a prompt braking action is guaranteed with a synchronous switchover. Wiring work is simple since no S/W is required.

¶ HB TYPE

Separate switchover : This model does not adopt a non-contacting power supply system, so you should use a S/W for prompt braking action. (A synchronous switchover may be used if a delayed braking action is OK.)

2) Adjustment of gap

① The gap is adjusted at the factory, but long-term operation causes wearing of the lining and widens the gap between armature and magnet, causing decrease of braking force.

¶ To measure the gap, insert 3~4 gap gauges between armature and magnet in the direction of circumference. The gaps should be equal in the direction of circumference.

③ If the gap exceeds the limit, loosen the gap adjusting nut, insert 3~4 gap gauges in the direction of circumference, and adjust the gap to the rated value.

3) Manual opening device (SB TYPE)

①Horizontal motion : This model adopts a demagnetized brake, and you should maintain the lever handle loose during a normal operation. If a manual opening is required, turn the handle clockwise fully and the brake maintains the opening state.

¶Up/down motion : This model adopts a demagnetized brake, and you should separate the lever handle from the manual lever during a normal operation. If a manual opening is required, connect the handle with the manual lever, and push it to the direction of the gear reducer. Then, the brake maintains the opening state.

FN-Series

Features

1. Light and compact
DX bush is used to miniaturize and lighten the bearing of the output shaft.

2. Smooth operation and low noise
Computer-based optimum design and grinding of all gears guarantee low nose and high efficiency of 97%, and increase life and solidity.

3. Free mounting positions
Fully sealed grease enables free mounting position with no restriction.

4. Prompt delivery
All the standard parts are secured in the half-finished state, and demands from customers are handled quickly.

5. Safety factor
The safety factor is based on AGMA"Class (S.F=1.4~2.0).

6. Brake-mounted
The brake motor is mounted without change of original shape. The D.C control is installed inside the motor terminal box.

Specifications and Dimensions of FHB and FHC

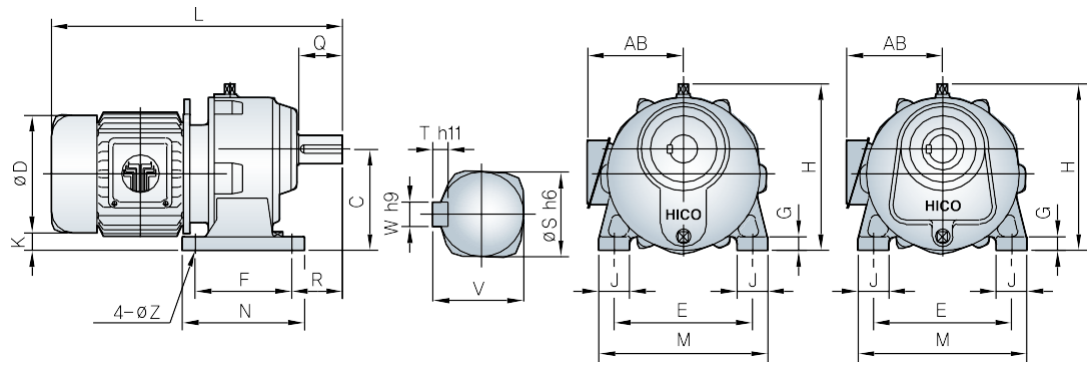


Fig. 1 Fig. 2

UNIT : mm

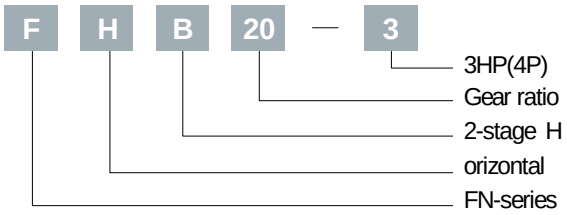
HP	Ratio	Fig	Dimension														Output Shaft					Amount of grease (kg)	Weight (kg)
			C	F	N	R	E	M	J	G	Z	H	L	D	AB	K	S	W	T	V	Q		
0.5	10~20	1	115	120	145	50	155	190	35	15	12	200	395	180	142	7	25	8	7	28	35	0.25	27
	30		135	125	155	75	190	230	40	17	12	230	415	180	142	25	32	10	8	35	55	0.3	32
1	40~60	2	135	150	190	65	190	235	45	17	14	230	445	180	142	27	32	10	8	35	55	0.5	36
	70~90		165	175	220	80	215	265	50	20	19	260	475	180	142	46	42	12	8	45	65	0.8	51
2	10~20	1	135	125	155	75	190	230	40	17	12	230	460	199	158	15	32	10	8	35	55	0.3	40
	30		160	130	170	75	215	260	45	20	14	265	465	199	158	36	38	12	8	41	58	0.3	47
	40~60	2	165	175	220	80	215	265	50	20	19	260	520	199	158	36	42	12	8	45	65	0.8	56
	70~90		180	185	235	95	240	295	55	23	19	285	545	199	158	47	48	14	9	51.5	75	1.2	68
3	10~30	1	160	130	170	75	215	260	45	20	14	265	525	203	157	26	38	12	8	41	58	0.3	56
	40~60	2	180	185	235	95	240	295	55	23	19	285	590	203	157	37	48	14	9	51.5	75	1.2	77
	70~90		200	220	270	100	270	330	60	27	22	315	610	203	157	51	55	16	10	59	85	1.8	102
5	10~20	1	180	160	210	90	240	295	55	23	19	305	520	244	205	23	48	14	9	51.5	80	0.6	75
	30		200	180	230	95	275	340	65	27	19	350	540	244	205	34	48	14	9	51.5	80	0.8	88
	40~60	2	200	220	270	100	270	330	60	27	22	315	600	244	205	39	55	16	10	59	85	1.8	103

2. The above dimensions are when the FHB type brake is mounted.

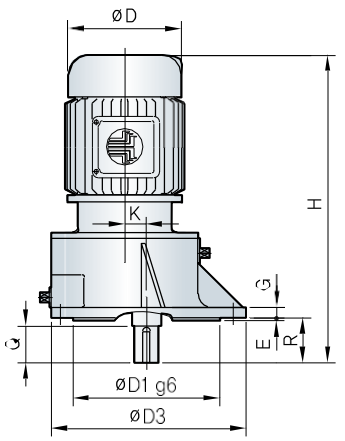
Type

Horizontal	Vertical	Line Power	Range of gear ratio
FHB	FVB	FCB	2-stage : 1/10~1/30
FHC	FVC	FCC	3-stage : 1/40~1/90

Example of Type Code



Specifications and Dimensions of FVB and FVC



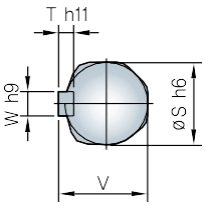
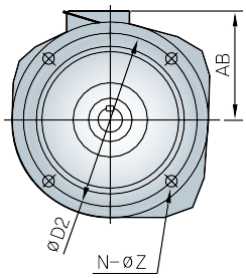


Fig. 1



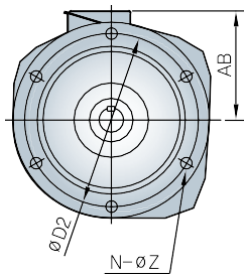


Fig. 2

UNIT : mm

HP	Ratio	Fig	Dimension												Output Shaft					Amount of grease (kg)	Weight (kg)
			D1	D2	D3	R	E	G	H	N	Z	D	AB	K	S	W	T	V	Q		
0.5	10~20	1	165	195	225	45	4	13	395	4	14	180	142	28	25	8	7	28	35	0.25	31
	30		200	230	260	65	4	15	415	4	14	180	142	30	32	10	8	35	55	0.3	36
1	40~60		200	230	260	55	4	15	445	4	14	180	142	28	32	10	8	35	55	1	41
	70~90		240	280	320	65	4	17	475	4	18	180	142	39	42	12	8	45	65	1.2	58
2	10~20	1	200	230	260	65	4	15	460	4	14	199	158	30	32	10	8	35	55	0.3	44
	30		230	270	305	70	4	17	465	4	18	199	158	34	38	12	8	41	58	0.3	52
	40~60		240	280	320	65	4	17	520	4	18	199	158	39	42	12	8	45	65	1.2	63
	70~90	2	280	320	355	75	5	19	545	6	14	199	158	43	48	14	9	51.5	75	1.2	70
3	10~30	1	230	270	305	70	4	17	525	4	18	203	157	34	38	12	8	41	58	0.3	61
	40~60	2	280	320	355	75	5	19	590	6	14	203	157	43	48	14	9	51.5	75	1.2	85
	70~90		310	355	395	85	5	22	610	6	18	203	157	48	55	16	10	59	85	1.8	96
5	10~20	2	280	320	350	85	5	18	520	6	14	244	205	45	48	14	9	51.5	80	0.6	79
	30		320	360	393	85	5	18	540	6	14	244	205	46	48	14	9	51.5	80	0.8	99
	40~60		310	355	395	85	5	22	600	6	18	244	205	48	55	16	10	59	85	1.8	108

2. The above dimensions are when the HB type brake is mounted.

Specifications and Dimensions of FCB and FCC

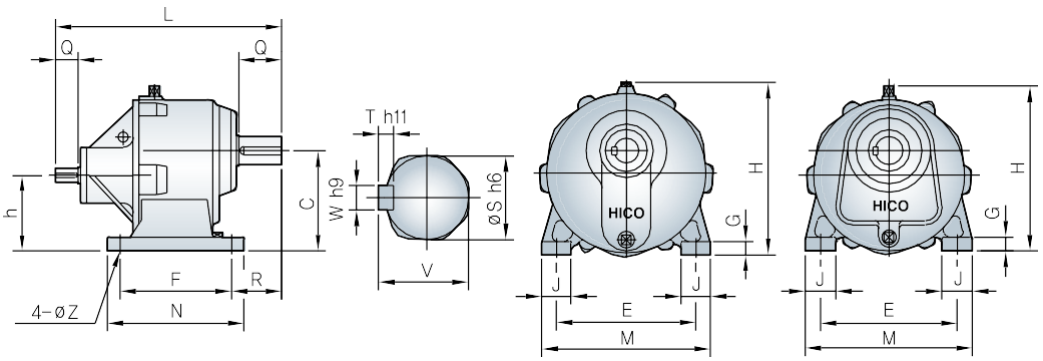


Fig. 1 Fig. 2

UNIT : mm

HP	Ratio	Fig	Dimension												Input Shaft					Output Shaft					Amount of grease (kg)	Weight (kg)
			C	F	N	R	E	M	J	G	Z	H	L	h	S	W	T	V	Q	S	W	T	V	Q		
0.5 1	10~20	1	115	120	145	50	155	190	35	15	12	200	270	87	18	6	6	20.5	30	25	8	7	28	35	0.25	18
	30		135	125	155	75	190	230	40	17	12	230	295	105	18	6	6	20.5	30	32	10	8	35	55	0.3	24
	40~60	2	135	150	190	65	190	235	45	17	14	230	320	107	18	6	6	20.5	30	32	10	8	35	55	0.5	24
	70~90		165	175	220	80	215	265	50	20	19	260	352	126	18	6	6	20.5	30	42	12	8	45	65	0.8	38
2	10~20	1	135	125	155	75	190	230	40	17	12	230	315	105	22	6	6	24.5	35	32	10	8	35	55	0.3	28
	30		160	130	170	75	215	260	45	20	14	265	320	126	22	6	6	24.5	35	38	12	8	41	58	0.3	33
	40~60	2	165	175	220	80	215	265	50	20	19	260	374	126	22	6	6	24.5	35	42	12	8	45	65	0.8	40
	70~90		180	185	235	95	240	295	55	23	19	285	396	137	22	6	6	24.5	35	48	14	9	51.5	75	1.2	46
3	10~30	1	160	130	170	75	215	260	45	20	14	265	340	126	25	8	7	28	40	38	12	8	41	58	0.3	35
	40~60	2	180	185	235	95	240	295	55	23	19	285	416	137	25	8	7	28	40	48	14	9	51.5	75	1.2	47
	70~90		200	220	270	100	270	330	60	27	22	315	449	151.5	25	8	7	28	40	55	16	10	59	85	1.8	61
5	10~20	1	180	160	210	90	240	295	55	23	19	305	375	135	28	8	7	31	45	48	14	9	51.5	80	0.6	49
	30		200	180	230	95	275	340	65	27	19	350	382	154	28	8	7	31	45	48	14	9	51.5	80	0.8	56
	40~60	2	200	220	270	100	270	330	60	27	22	315	447	151.5	28	8	7	31	45	55	16	10	59	85	1.8	62

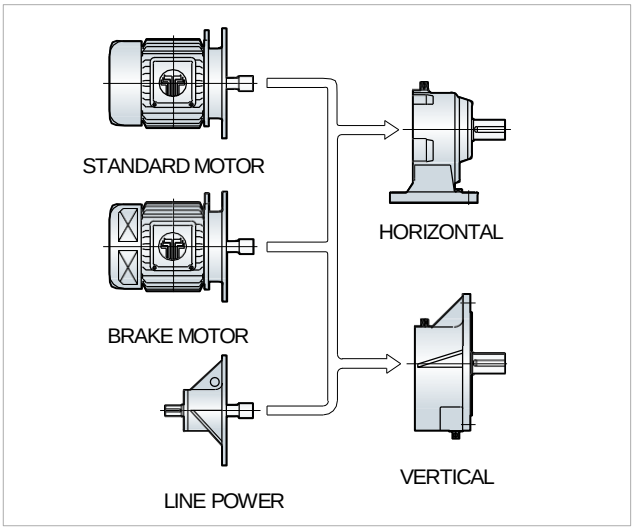
Note : 1. Based on 4P.

GD² and O.H.L table of FN Series

(Based on 4P)

H	i	Motor shaft converted GD²(kg·m²)	Output shaft O.H.L (kg)
0.5 1	1/20	0.0119	270
	1/30	0.0119	410
	1/60	0.012	470
	1/90	0.012	700
2	1/20	0.0181	350
	1/30	0.0181	600
	1/60	0.0219	800
	1/90	0.0219	1,050
3	1/30	0.0282	610
	1/60	0.0282	900
	1/90	0.0285	1,400
5	1/20	0.0526	650
	1/30	0.0526	950
	1/60	0.0526	1,400

Combination of FN Series Motors



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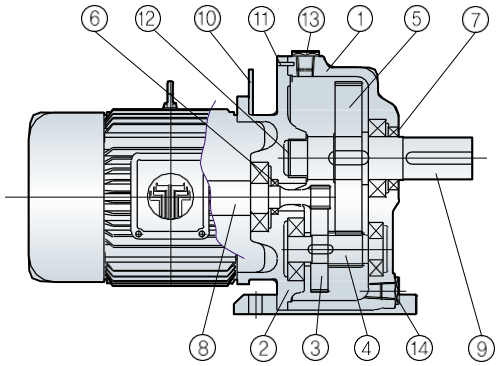
Structure (FHB 20-3)



① CASING
¶ BRACKET
③ 1st GEAR
2nd PINION
⑤ 2nd GEAR
OIL SEAL
⑦ OIL SEAL
MOTOR SHAFT(1st)
OUTPUT SHAFT
EYE PLATE
REAMER PIN
DX BUSH (e.g., lubricating bearing)
GREASE INLET PLUG
GREASE OUTLET PLUG

Cautions for Use

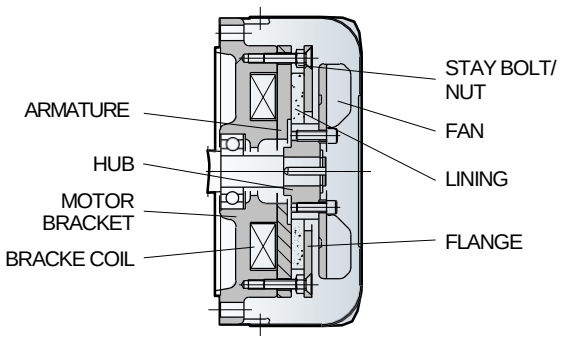
① Connection : The best way for connection is to connect the geared motor directly with a machine.
A flexible coupling should be used if possible.
When using a gear, belt or chain sprocket, make sure to follow the allowable O.H.L.
¶ Reversing : When running a geared motor reversely, stop the motor first.

Replacing Grease

① EP GREASE R ø ø is appropriate for high temperature and continuous operation. Replace the grease every 20,000 hours.
¶ When replacing grease, make sure to follow the amount of grease (Kg) indicated in the dimension table.

Brake Specifications (D.C MAGNETIC DISC B TYPE)

OUTPUT(HP)		FRAME NO	BRAKE TYPE	BRAKE TORQUE (kg·m)	RATED GAP (mm)	BRAKE OPERATING DC (V)		WEIGHT (KG)
4P	6P					INPUT AC	OPERATING DC	
0.5, 1	0.5	80	HB 1.2	1.2	0.3	220V	90V	8
2	1	90	HB 2.0	2.0	0.3	220/380V	90V	10
3	2	100	HB 6.0	6.0	0.4	220/440V	90V	11
5	3	112	HB 8.0	8.0	0.4	380V	170V	12
						440V	190V	



Features

· The brake is integrated with the motor.
· There is no difference with a standard motor in terms of dimension.
· A DC converter (half-wave rectifier) is installed beside the motor t erminal box, and there is no need for additional wiring.
· The brake is highly reliable, has a simple structure, and is easy to handle.

F-Series

Features of Hyosung Geared Motor F-Series

1. Modular system
All the standard parts are secured in the half-finished state, and demands from customers are handled quickly.

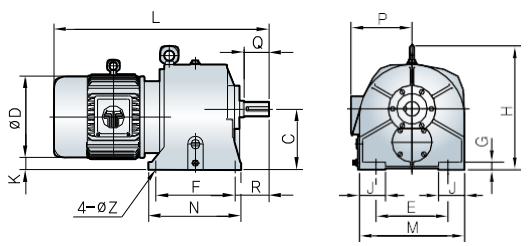
2. Enhanced impact strength
The 1-stage pinion of the geared motor is integrated with the motor shaft, and therefore, provides increased impact strength and low noise.

3. Light and compact
The 1-stage pinion is integrated with the motor shaft, and variable 2-stage distance between shafts makes the motor light and compact.

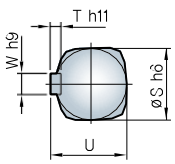
4. Reliable seal structure
In order to prevent leak of oil, the motor adopts the advanced oil seal and the self-developed special sealing device.

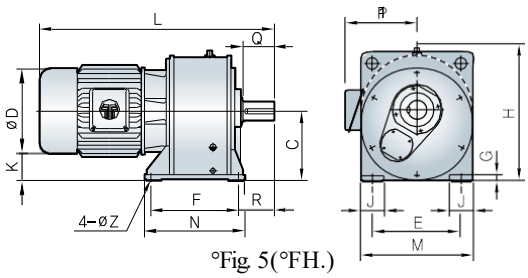
5. High-performance robust frame
Gear teeth are corrected to the ideal shape, and all gears are carburized and grinded to acquire low noise and high efficiency.
The frame has sufficient strength.

Specifications and Dimensions of FHB and FHM



°Fig. f (°FHQ)





°Fig. 5(°FH.)

UNIT : mm

Type	HP	Ratio	Fig	Dimension														Output Shaft					Weight (kg)	Amount of oil (l)
				C	D	E	F`	G	H	J	K	L	M	N	P	R	Z	Q	S	T	U	W		
FHB	7.5	10 15 20	1	200	284	236	260	25	406	85	32	716	346	305	225	113	19	82	48	9	51.5	14	130	5
	10		1	200	284	236	260	25	406	85	32	754	346	305	225	113	19	82	48	9	51.5	14	137	5
	15		1	250	337	284	282	30	462	85	45	816	384	337	280	143.5	24	105	60	11	64	18	195	9
	20		1	250	337	284	282	30	462	85	45	860	384	337	280	143.5	24	105	60	11	64	18	203	9
FHM	25		2	290	374	370	370	24	570	100	103	1030	470	420	288	145	24	130	80	14	85	22	380	10
	30		2	290	374	370	370	24	570	100	103	1030	470	420	288	145	24	130	80	14	85	22	380	10
	40		2	350	374	430	420	28	665	110	163	1105	540	480	288	145	28	130	90	14	95	25	600	15
	50		2	350	414	430	420	28	665	110	143	1155	540	480	317	145	28	130	90	14	95	25	700	15
	60		2	400	414	520	470	28	750	120	193	1222	640	550	317	170	28	165	100	16	106	28	765	22
	75		2	400	444	520	470	28	750	120	178	1243	640	550	385	170	28	165	100	16	106	28	810	22
	100		2	400	507	520	470	28	750	120	146	1337	640	550	495	170	28	165	100	16	106	28	955	22
	125		2	450	507	560	520	28	750	150	196	1403	710	610	495	200	33	180	112	18	119	32	1160	31
FHB	7.5	30	1	225	284	265	280	30	413	70	38	725	346	334	225	110	19	82	55	10	59	16	140	7
	10		1	225	284	265	280	30	413	70	38	765	346	334	225	110	19	82	55	10	59	16	147	7
	15		1	280	337	355	355	30	524	80	67.5	891	448	415	280	130	24	105	70	12	74.5	20	269	10
	20		1	280	337	355	355	30	524	80	67.5	935	448	415	280	130	24	105	70	12	74.5	20	277	10
FHM	25		2	350	374	430	420	28	665	110	163	1055	540	480	288	145	28	130	90	14	95	25	475	15
	30		2	350	374	430	420	28	665	110	163	1055	540	480	288	145	28	130	90	14	95	25	475	15
	40		2	400	374	520	470	28	750	120	213	1162	640	550	320	170	28	165	100	16	106	28	765	22
	50		2	400	414	520	470	28	750	120	193	1212	640	550	317	170	28	165	100	16	106	28	865	22
	60		2	450	414	560	520	28	805	150	243	1288	710	610	355	200	33	180	112	18	119	32	1015	31
	75		2	450	444	560	520	28	805	150	228	1310	710	610	385	200	33	180	112	18	119	32	1078	31
	100		2	450	507	560	520	28	805	150	196	1403	710	610	495	200	33	180	112	18	119	32	1160	31

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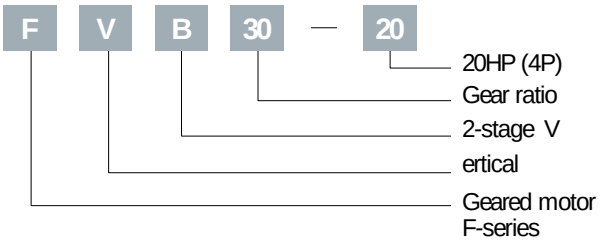
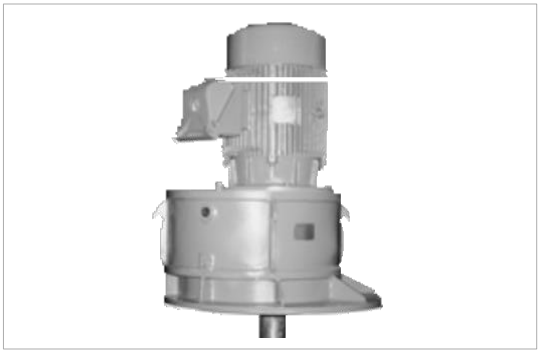
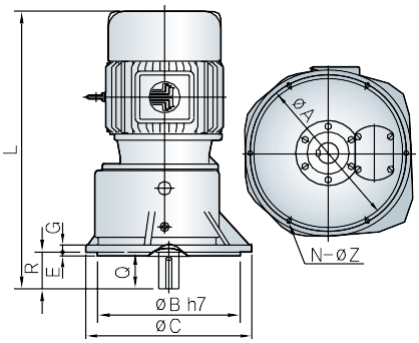
Example of Type Code

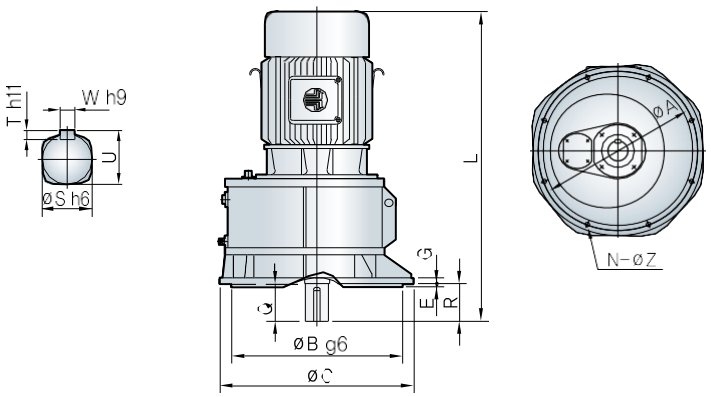




Specifications and Dimensions of FVB and FVM



°Fig. f(°FVQ)



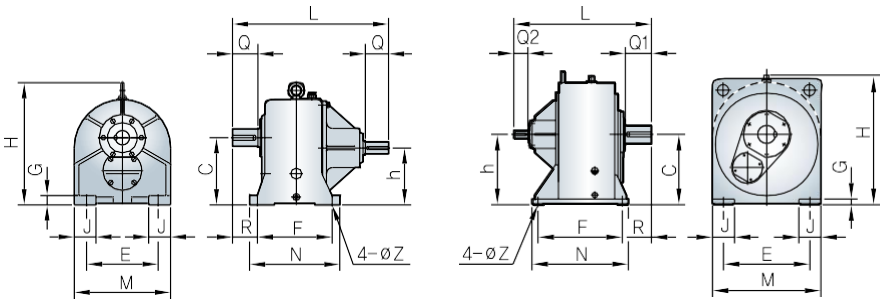
°Fig. 5(°FV.)

UNIT : mm

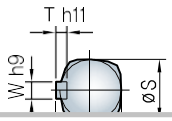
Type	HP	Ratio	Fig	Dimension									Output Shaft					Weight (kg)	Amount of oil (l)
				A	B	C	E	G	L	N	R	Z	Q	S	T	U	W		
FVB	7.5	10 15 20	1	370	340	395	4	22	716	6	88.5	12	82	48	9	51.5	14	143	7.5
	10		1	370	340	395	4	22	750	6	88.5	12	82	48	9	51.5	14	150	7.5
	15		1	455	420	485	4	25	847	6	121.3	15	105	60	11	64	18	215	14
	20		1	455	420	485	4	25	890	6	121.3	15	105	60	11	64	18	225	14
FVM	25		2	630	590	670	5	20	1085	8	130	18	130	80	14	85	22	440	16
	30		2	630	590	670	5	20	1085	8	130	18	130	80	14	85	22	440	16
	40		2	715	675	755	5	20	1152	8	130	18	130	90	14	95	25	674	24
	50		2	715	675	755	5	20	1202	8	130	18	130	90	14	95	25	774	24
	60		2	810	760	860	6	22	1270	8	165	22	165	100	16	106	28	909	35
	75		2	810	760	860	6	22	1290	8	165	22	165	100	16	106	28	972	35
	100		2	810	760	860	6	22	1383	8	165	22	165	100	16	106	28	1117	35
	125		2	900	840	960	6	26	1457	8	180	26	180	112	18	119	32	1210	50
FVB	7.5	30	1	410	390	435	4	22	746	6	92	12	82	55	10	59	16	155	11
	10		1	410	390	435	4	22	785	6	92	12	82	55	10	59	16	162	11
	15		1	515	480	545	4	25	950	6	118	15	105	70	12	74.5	20	300	15
	20		1	515	480	545	4	25	994	6	118	15	105	70	12	74.5	20	305	15
FVM	25		2	715	675	755	5	20	1102	8	130	18	130	90	14	95	25	530	24
	30		2	715	675	755	5	20	1102	8	130	18	130	90	14	95	25	530	24
	40		2	810	760	860	6	22	1210	8	165	22	165	100	16	106	28	864	35
	50		2	810	760	860	6	22	1260	8	165	22	165	100	16	106	28	964	35
	60		2	900	840	960	6	26	1340	8	180	26	180	112	18	119	32	1210	50
	75		2	900	840	960	6	26	1360	8	180	26	180	112	18	119	32	1273	50
	100		2	900	840	960	6	26	1459	8	180	26	180	112	18	119	32	1418	50

Note : 1. Based on 4P.

Specifications and Dimensions of FCB and FHL



°Fig. f (°F(Q)



°Fig. 5 (°FH-)

UNIT : mm

Type	HP	Ratio	Fig	Dimension												Output Shaft					Input Shaft					Weight (kg)	Amount of oil (l)
				C	E	F	G`	H	J	L	M	N	R	Z	h	S	W	T	U	Q	S	W	T	U	Q		
FCB	7.5	10 15 20	1	200	236	260	25	406	85	551	346	305	113	19	174	48	14	9	51.5	82	38	10	8	41	75	96	5
	10		1	200	236	260	25	406	85	551	346	305	113	19	174	48	14	9	51.5	82	38	10	8	41	75	96	5
	15		1	250	284	282	30	461	85	633	384	337	144	24	214	60	18	11	64	105	45	14	9	48.5	95	127	9
	20		1	250	284	282	30	461	85	633	384	337	144	24	214	60	18	11	64	105	45	14	9	48.5	95	127	9
FHL	25		2	290	370	370	24	535	100	635	470	420	145	24	290	80	22	14	85	130	40	12	8	43	70	141	10
	30		2	290	370	370	24	535	100	635	470	420	145	24	290	80	22	14	85	130	40	12	8	43	70	230	10
	40		2	350	430	420	28	630	110	705	540	480	145	28	350	90	25	14	95	130	50	14	9	53.5	80	365	15
	50		2	350	430	420	28	630	110	705	540	480	145	28	350	90	25	14	95	130	50	14	9	53.5	80	365	15
	60		2	400	520	470	28	715	120	805	640	550	170	28	400	100	28	16	106	165	60	18	11	64	90	480	22
	75		2	400	520	470	28	715	120	805	640	550	170	28	400	100	28	16	106	165	60	18	11	64	90	480	22
	100		2	400	520	470	28	715	120	805	640	550	170	28	400	100	28	16	106	165	60	18	11	64	90	480	22
	125		2	450	560	520	28	765	150	880	710	610	200	33	450	112	32	18	119	180	60	18	11	64	90	650	31
FCB	7.5	30	1	225	265	280	30	413	70	609	346	334	110	19	180	55	16	10	59	82	38	10	8	41	75	115	7
	10		1	225	265	280	30	413	70	609	346	334	110	19	180	55	16	10	59	82	38	10	8	41	75	115	7
	15		1	280	355	355	30	513	80	682	448	415	130	24	236	70	20	12	74.5	105	45	14	9	48.5	95	189	10
	20		1	280	355	355	30	513	80	682	448	415	130	24	236	70	20	12	74.5	105	45	14	9	48.5	95	189	10
FHL	25		2	350	430	420	28	630	110	685	540	480	145	28	350	90	25	14	95	130	40	12	8	43	70	370	15
	30		2	350	430	420	28	630	110	685	540	480	145	28	350	90	25	14	95	130	40	12	8	43	70	370	15
	40		2	400	520	470	28	715	120	785	640	550	170	28	400	100	28	16	106	165	50	14	9	53.5	80	480	22
	50		2	400	520	470	28	715	120	785	640	550	170	28	400	100	28	16	106	165	50	14	9	53.5	80	480	22
	60		2	450	560	520	28	765	150	880	710	610	200	33	450	112	32	18	119	180	60	18	11	64	90	650	31
	75		2	450	560	520	28	765	150	880	710	610	200	33	450	112	32	18	119	180	60	18	11	64	90	650	31
	100		2	450	560	520	28	765	150	880	710	610	200	33	450	112	32	18	119	180	60	18	11	64	90	650	31

Note : 1. Based on 4P.

(Based on 4P)

H	i	Motor shaft converted GD²(kg·m²)	Output shaft O.H.L (kg)
7.5	1/20	0.1	1150
	1/30	0.1	1300
10	1/20	0.145	1070
	1/30	0.145	1200
15	1/20	0.281	1300
	1/30	0.28	1800
20	1/20	0.419	1200
	1/30	0.418	1700
25	1/20	0.573	1900
	1/30	0.588	2900

H	i	Motor shaft converted GD²(kg·m²)	Output shaft O.H.L (kg)
30	1/20	0.720	1800
	1/30	0.735	2700
40	1/20	1.253	2400
	1/30	1.279	3900
50	1/20	1.337	2200
	1/30	1.363	3600
60	1/20	2.387	3300
	1/30	2.427	4300
75	1/20	2.994	3000
	1/30	3.034	4000

Load Inertia (GD^2)

Connection method	Starting frequency	Inertia (GD^2) of the machine and connection
Direct connection	Within 1 time/hour	1xmotor inertia (GD^2) or lower as the motor shaft converted value
	Within 60 times/hour	1/2xmotor inertia (GD^2) or lower as the motor shaft converted value Chain
Chain	Within 1 time/hour	1/2xmotor inertia (GD^2) or lower as the motor shaft converted value
	Within 60 times/hour	1/4xmotor inertia (GD^2) or lower as the motor shaft converted value

If the load torque varies by time, use the maximum torque in the load cycle. The start frequency and inertia (GD^2) of the machine shall be within the above conditions.

Cautions for Use

1. Connection with a machine

A. Direct connection

The best way for connection is to connect the geared motor directly with a machine. A flexible coupling should be used if possible

B. When a gear or chain sprocket is used

1) Gear or chain sprocket

If a gear or chain sprocket is connected, select the diameter of the gear or sprocket with the following formula so that the load should be applied to the center of the output shaft. Insert the gear as much as possible to the protruded part of the shaft.

Dia. of the pitch circle of the gear of chain sprocket ≥ 4xDia. of the output shaft

2) Chain length

When using a chain, adjust the chain length so that it should not be loose when connected with the machine.

When operating the motor with other methods than A and B above, and if the starting frequency varies severely or the load inertia (GD^2) is too high, contact Hyosung.

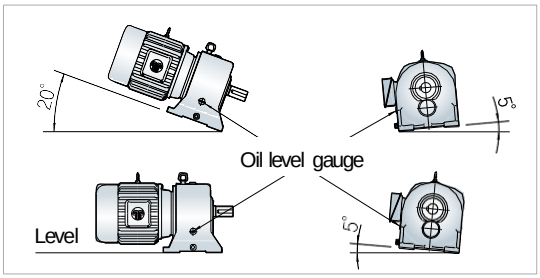
2. Reversing

When running a geared motor reversely, stop the motor first.

3. Installation

Make sure to install the geared motor on a level surface.

If it is required to install the motor on a severe slope, contact Hyosung.



Selection and Maintenance of Lubricant

1. Filling lubricant

Lubricant must be filled so that the level should be at the center of the level gauge.

Too much or too little lubricant can damage gears and bearings.

2. Replacing lubricant

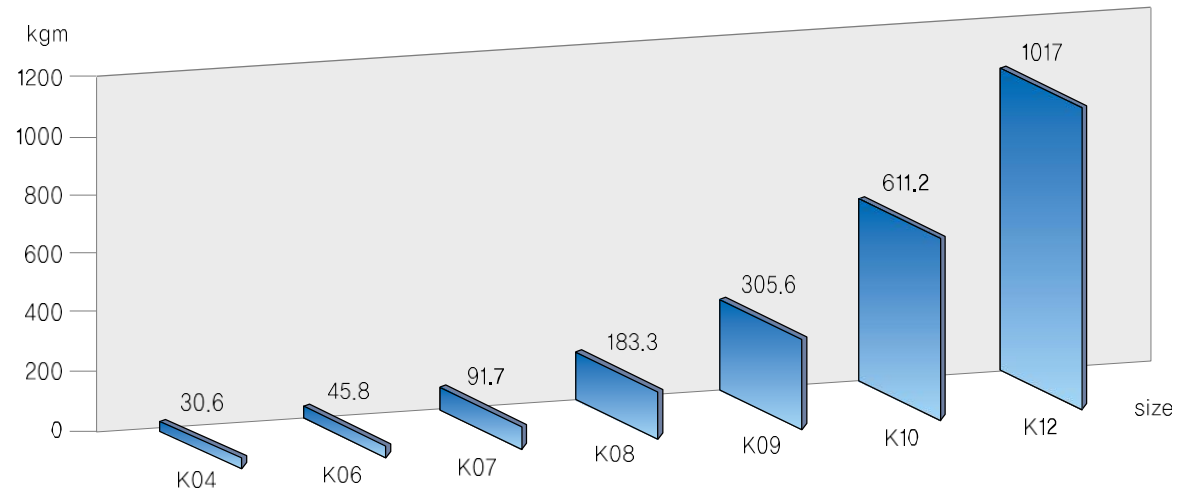
At initial operation, oil is contaminated by metal dust from the gear. Please replace oil initially in 500 hours of operation, and then, every 2,500 hours.

3. Selecting lubricant

Ambient temperature	Viscosity (40℃) ISOVG	Recommended manufacturer			
		SK(GULF)	Hyundai(SHELL)	MOBIL	HOUGHTON
31℃~50℃	320	EP LUBRICANT 320	SHELL OMALA 320	MOBIL GEAR 632	MP GEAR OIL 320
0℃~30℃	220	EP LUBRICANT 220	SHELL OMALA 220	MOBIL GEAR 630	MP GEAR OIL 220
Lower than 0℃	150	EP LUBRICANT 150	SHELL OMALA 150	MOBIL GEAR 629	MP GEAR OIL 150
Higher than 50℃	Contact Hyosung				

K-Series

Allowable Torque by Model Number



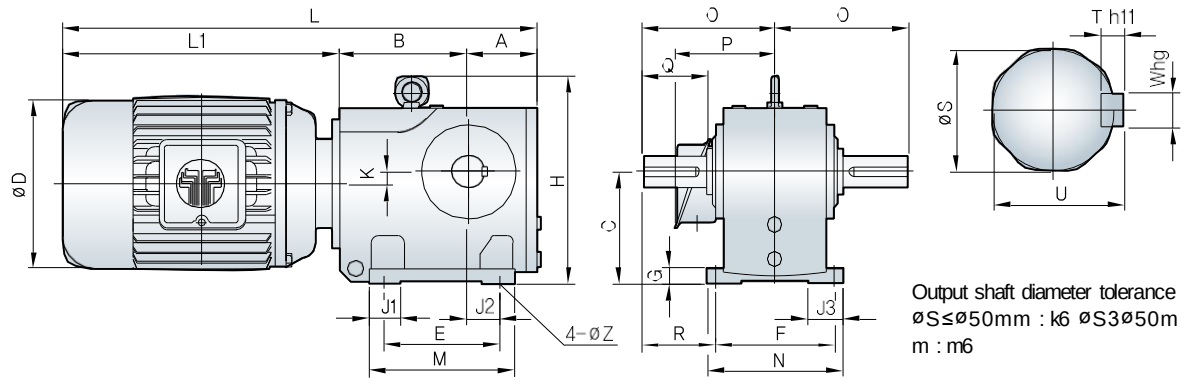
Specifications

1. **Power** : 0.5HP ~ 75HP
2. **Gear Ratio** : 1/10 ~ 1/120
3. **Mounting Type** : Foot, Flange, Shaft Mounted

Features

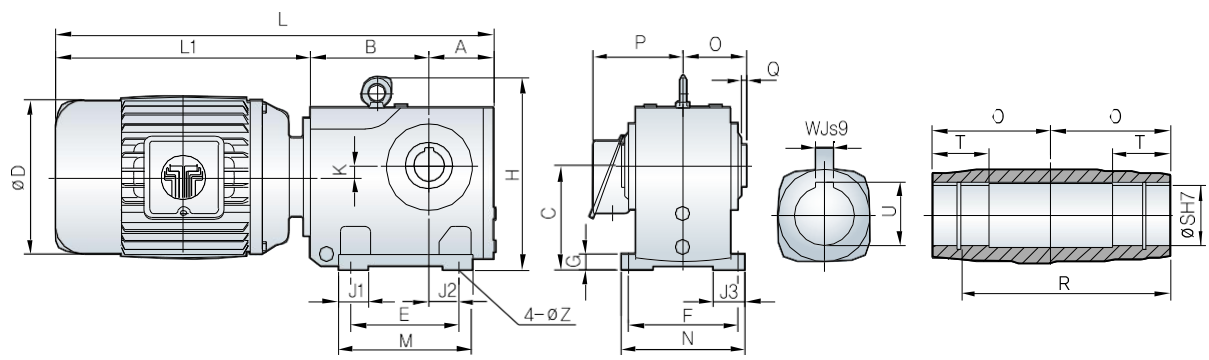
1. **Solid and Robust Heavy Cast Iron Housings**
2. **Unicase Design with Increased Concentricity**
3. **Generously Sized Output Bearings Considering Overhung Load**
4. **High Quality Seal System**
5. **Oil Leaks Reduced to a Minimum**
6. **Quiet Gearing with Long Bearing Life**
7. **Units Filled with Oil at the Factory**
8. **Auto Vent Breather Plug Preventing Moisture Absorption**
9. **Quality Paint**
10. **Various Output Possibilities including Solid Shaft and Hollow Shaft**
11. **Energy Saving**

Specifications and Dimensions of KHM



SIZE TYPE	FRAME	A B	C Z	D	E F	G H	jf j3 j	K O	L1	L	M N	P	Q R	S T	U W
K04	80 90 100 112M	71 149	112 11	180 199 222 244	130 120	16 192	45 35 -	16.4 135	255 315 345 330	475 535 565 550	172 145	158 172 180 205	60 75	30 7	33 8
K06	80 90 100 112M 132S	89 163	140 14	180 199 222 244 284	120 140	22 261	55 30 45	12.2 161	258 313 348 328 383	510 565 600 580 635	185 170	158 172 180 205 220	70 91	35 8	38 10
K07	80 90 100 112M 132S 132M 160M	108 198	173 18	180 199 222 244 284 284 337	150 165	25 321	70 40 55	19 196	259 314 344 329 384 419 474	565 620 650 635 690 725 780	230 200	158 172 180 205 220 220 272	90 113.5	45 9	48.5 14
K08	90 100 112M 132S 132M 160M 160L 180M	124 230	212 22	199 222 244 284 284 337 337 374	180 180	32 388	80 55 55	20.4 240	316 346 331 381 416 476 521 561	670 700 685 735 770 830 875 915	260 230	172 180 205 220 220 272 272 288	120 150	60 11	64 18
K09	112M 132S 132M 160M 160L 180M 180L 200L 225S	150 280	265 26	244 284 284 337 337 374 374 414 444	240 240	38 475	100 75 70	28 291	330 380 420 475 520 560 595 650 675	760 810 850 905 950 990 1025 1080 1105	330 290	205 220 220 272 272 288 288 317 385	140 171	70 12	74.5 20
K10	132S 132M 160M 160L 180M 180L 200L 225S 225M	190 321	315 33	284 284 337 337 374 374 414 444 444	280 270	42 560	110 95 90	50 347	384 419 474 519 559 594 654 674 704	895 930 985 1030 1070 1105 1165 1185 1215	390 340	220 220 272 272 288 288 317 385 385	170 212	90 14	95 25
K12	160M 160L 180M 180L 200L 225S 225M	213 390	375 39	337 337 374 374 414 444 444	350 330	45 670	120 115 90	58 418	477 517 557 597 652 672 702	1080 1120 1160 1200 1255 1275 1305	470 400	272 272 288 288 317 385 385	210 253	110 16	116 28

Specifications and Dimensions of KHHM



SIZE TYPE	FRAME	A B	C Z	D	E F	G H	jf j3 j	K O	L1	L	M N	P	Q R	S T	U W
K04	80 90 100 112M	71 149	112 11	180 199 222 244	130 120	16 192	45 35 -	16.4 74	255 315 345 330	475 535 565 550	172 145	158 172 180 205	3 130	35 50	38.3 10
K06	80 90 100 112M 132S	89 163	140 14	180 199 222 244 284	120 140	22 261	55 30 45	12.2 90	258 313 348 328 383	510 565 600 580 635	185 170	158 172 180 205 220	4 156	40 60	43.3 12
K07	80 90 100 112M 132S 132M 160M	108 198	173 18	180 199 222 244 284 284 337	150 165	25 321	70 40 55	19 105	259 314 344 329 384 419 474	565 620 650 635 690 725 780	230 200	158 172 180 205 220 220 272	4.5 183	50 70	53.8 14
K08	90 100 112M 132S 132M 160M 160L 180M	124 230	212 22	199 222 244 284 284 337 337 374	180 180	32 388	80 55 55	20.4 120	316 346 331 381 416 476 521 561	670 700 685 735 770 830 875 915	260 230	172 180 205 220 220 272 272 288	5.5 210	60 80	64.4 18
K09	112M 132S 132M 160M 160L 180M 180L 200L 225S	150 280	265 26	244 284 284 337 337 374 374 414 444	240 240	38 475	100 75 70	28 150	330 380 420 475 520 560 595 650 675	760 810 850 905 950 990 1025 1080 1105	330 290	205 220 220 272 272 288 288 317 385	5.5 270	70 100	74.9 20
K10	132S 132M 160M 160L 180M 180L 200L 225S 225M	190 321	315 33	284 284 337 337 374 374 414 444 444	280 270	42 560	110 95 90	50 175	384 419 474 519 559 594 654 674 704	895 930 985 1030 1070 1105 1165 1185 1215	390 340	220 220 272 272 288 288 317 385 385	6 313	80 120	85.4 22
K12	160M 160L 180M 180L 200L 225S 225M	213 390	375 39	337 337 374 374 414 444 444	350 330	45 670	120 115 90	58 205	477 517 557 597 652 672 702	1080 1120 1160 1200 1255 1275 1305	470 400	272 272 288 288 317 385 385	8 373	100 140	106.4 28

Specifications and Dimensions of KFM

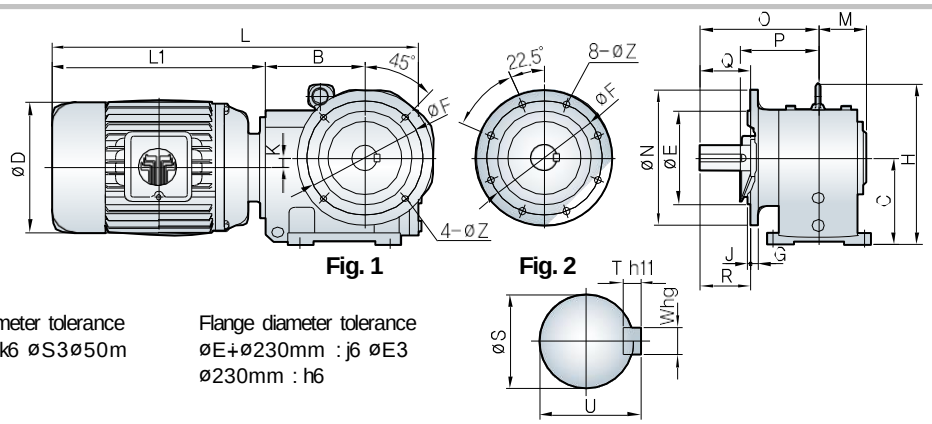


Fig. 1 Fig. 2

Output shaft diameter tolerance
øS≤ø50mm : k6 øS3ø50m
m : m6

Flange diameter tolerance
øE÷ø230mm : j6 øE3
ø230mm : h6

SIZE TYPE	FRAME	FIG	B C	D	E F	G H	J Z	K O	L1	L	M N	P	Q R	S T	U W
K04	80 90 100 112M	1	149 112	180 199 222 244	130 165	12 192	3.5 11	16.4 154	255 315 345 330	475 535 565 550	71 200	158 172 180 205	60 60	30 7	33 8
K06	80 90 100 112M 132S	1	163 140	180 199 222 244 284	180 215	15 261	4 14	12.2 183	258 313 348 328 383	510 565 600 580 635	89 250	158 172 180 205 220	70 70	35 8	38 10
K07	80 90 100 112M 132S 132M 160M	1	198 173	180 199 222 244 284 284 337	180 215	15 321	4 14	19 232	259 314 344 329 384 419 474	565 620 650 635 690 725 780	104 250	158 172 180 205 220 220 272	90 90	45 9	48.5 14
K08	90 100 112M 132M 132S 160M 160L 180M	1	230 212	199 222 244 284 284 337 337 374	250 300	20 388	5 18	20.4 267	316 346 331 381 416 476 521 561	670 700 685 735 770 830 875 915	113 350	172 180 205 220 220 272 272 288	120 120	60 11	64 18
K09	112M 132S 132M 160M 160L 180M 180L 200L 225S	2	280 265	244 284 284 337 337 374 374 414 444	350 400	22 475	5 18	28 332	330 380 420 475 520 560 595 650 675	760 810 850 905 950 990 1025 1080 1105	142 450	205 220 220 272 272 288 288 317 385	140 140	70 12	74.5 20
K10	132S 132M 160M 160L 180M 180L 200L 225S 225M	2	321 315	284 284 337 337 374 374 414 444 444	350 400	22 560	5 18	50 386	384 419 474 519 559 594 654 674 704	895 930 985 1030 1070 1105 1165 1185 1215	168 450	220 220 272 272 288 288 317 385 385	170 170	90 14	95 25
K12	160M 160L 180M 180L 200L 225S 225M	2	390 375	337 337 374 374 414 444 444	450 500	25 670	5 18	58 466	477 517 557 597 652 672 702	1080 1120 1160 1200 1255 1275 1305	224 550	272 272 288 288 317 385 385	210 210	110 16	116 28

H-Series

Features

1. UNI-CASE
The bearing housing is integrated in the motor.

2. High strength and robustness
There is no cover at the output side which must be fixed with bolts. Instead, the casing fully supports the overhung load or the thrust load.

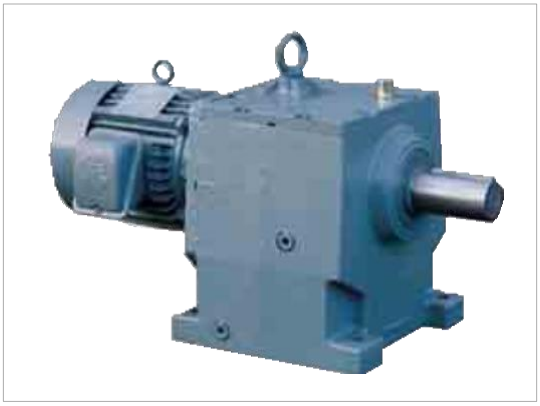
3. Smooth operation and low noise
The gear design absorbing vibration and reducing tooth meshing noise and the high- accuracy gear made with the best-of-kind facilities result in smooth operation and low noise.

4. High accuracy
Machine-processing of all bearing housings with a single setting enables high accuracy.

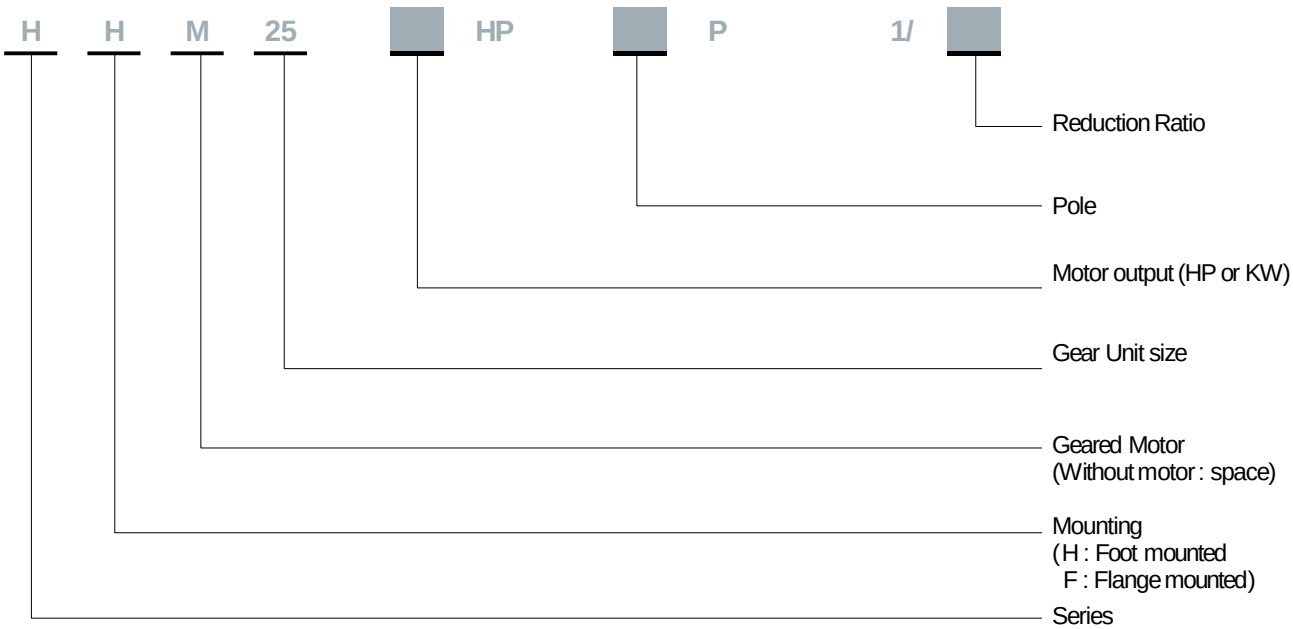
5. Free mounting position
Fully sealed grease enables free mounting position with no restriction.

6. Low maintenance cost
Much reduced number of parts considerably reduces running troubles.

7. Prompt delivery

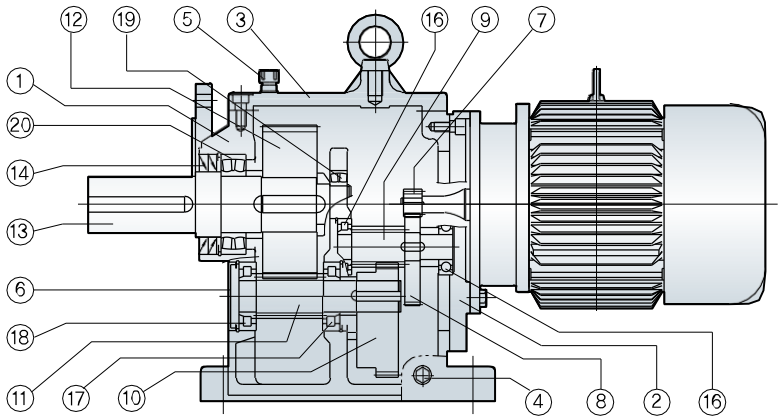


Example of Type Code Structure



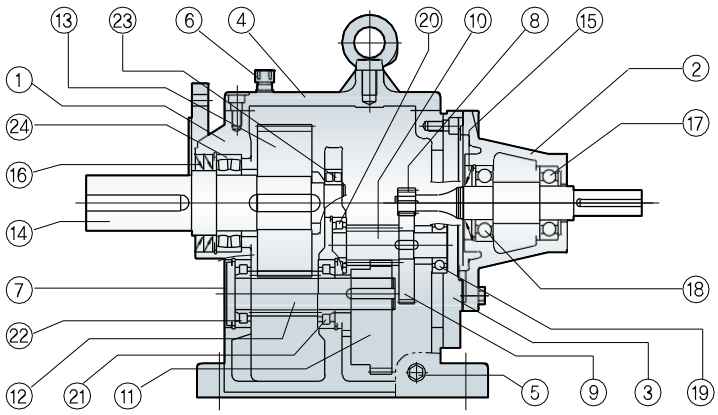
Structure

HHM, HFM



NO	NAME	NO	NAME	NO	NAME	NO	NAME
1	CASING	6	SEALING COVER	11	3RD PINION	16	BEARING
2	INPUT FLANGE	7	INPUT PINION	12	3RD GEAR	17	BEARING
3	CASING COVER	8	1ST GEAR	13	OUTPUT SHAFT	18	BEARING
4	PLUG	9	2ND PINION	14	OILSEAL	19	BEARING
5	AIRVENT	10	2ND GEAR	15	BEARING	20	BEARING

HH, HF



NO	NAME	NO	NAME	NO	NAME	NO	NAME
1	CASING	7	SEALING COVER	13	3RD GEAR	19	BEARING
2	INPUT BRACKET	8	INPUT PINION	14	OUTPUT SHAFT	20	BEARING
3	INPUT FLANGE	9	1ST GEAR	15	OILSEAL	21	BEARING
4	CASING COVER	10	2ND PINION	16	OILSEAL	22	BEARING
5	PLUG	11	2ND GEAR	17	BEARING	23	BEARING
6	AIRVENT	12	3RD PINION	18	BEARING	24	BEARING

Selection

Selection procedure

1. Reduction ratio

$$i = n_1/n_2$$

2. Output torque

Torque of the output shaft can be calculated from the load torque. If the load torque is changed, calculate with the maximum torque.

$$T_L = T_e \times Sf$$

3. Selection of gear unit type

Find the type, from the characteristic table, that meets the gear ratio and the following formula.

$$T_a \geq T_L$$

4. Overhung load(O.H.L)

The best way to make connection between a motor and a machine is to connect them directly. If chain, belt or gear is used, O.H.L. applied to a shaft must be not more than the permissible O.H.L of the selected model. The permissible overhung loads on the characteristic table are based on the nominal output torque.

$$F_R = \frac{2000 \times T_L}{d_O} \times \frac{C_f}{L_f} \leq F_{Ra}$$

Where, i = reduction ratio
n_1 = input speed (rpm)
n_2 = output speed (rpm)
Sf = application factor
T_e = load torque (kg· m) T
$_L$ = output torque (kg· m)
T_a = Max. permissible output torque (kg· m)
F_R = equivalent overhung load (kg)
F_{Ra} = permissible overhung load (kg)
Cf = transmission element factor
Lf = load applied point factor
d_0 = diameter of the driving element (mm)

Table 1. Matching of driven machines to the load classification

Driven machines	Load classification
Elevator	
Freight	M
Passeng	C
er Bucket	U/M
Dredge	
Bucket Conveyor	M
Jig Drives	M
Screen Drives	M
Cable Reels	M
Stackers	M
Pumps	M
Cutter Head Drives	H
Bucket Pipe Press	M
Construction M/C	
Concrete mixer	M
Stone Press	M
Brick Press	M
Concrete Pipe Press	M
Mining	
Hoist Conveyor(drift)	U
Crusher	M
Briquette M/C	M
Conveyor(gallery)	M
Coal Mill	M
Rotary Bander	M
Sinter Bander	M
Screen	U
Cutting M/C	M
Chemical industry	
Thickener	U
Calenders	M
Reactor	M
Pure Liquids Agitator	U
Variable Density Liquids Agitator	M
Spinners	U
Dryers	M
Centrifug	M
al	U
Sprayer	
Conveyors	
Rubber Belt	U/M
Band Elevator	U/M
Chain	U/M
Bucket	U/M
Apron	U/M
Roller	U/M
Screw	U/M
Blower and Fan	
Rotary Piston Blower	M
Axial-Radial Blower	U
Cooling Tower Fan	U
Forced Draft Fan	U
Turbo Fan	U
Generator	
Frequency-transformer	U
Heat Generator	U
Welding Generator	M
Rubber M/C	
Calend	M
er	M
Kneader	H
Mixer	M
Roll Mill	
Crusher	H
Hoist-Crane	
Luffing	U
Travelling	M
Hoisting	U
Slewing	U
Levelling	U
Wood Working M/C Barkers-	M
Drum Type	U
Planer	U
General Wood working Gang Saw	M
Iron and Steel Industry	
Furnace Hoist	U
Blast Furnace Blowing Engine Converter	U
Lance Lifter	M
Mixing Dumper	U
Steel Wagon	U
drive	U
Continuous Casting Plant	U
Compressor	
Axial Compressor	U
Rotary Piston	U
Compressor Piston Compressor	M
Degree of irregularity≥1:00 Degree of irregularityc1:100	H
Metal Working M/C	M
Bending and Cutting	U
M/C Wire Drawing M/C	U
Wire Winding	M
M/C Hammer	M
Press(Crank and Eccentric) Sheering	M
Forging	M
Press	M
Punching	U
M/C Tool. Main Drive M/C Tool. Auxiliary Drive	U
Food M/C	U
Filling M/C	U
Brewing M/C	U
	U
Kneader Packing M/C	H
Sprayer	M
Sugar Cane	H
Crusher Sugar	M
Cane Cutter	M
Sugar Cane Mill	
Sugar Beet Cutter Sugar	M
Beet Washer	M
	M
Paper M/C	H
Coucher	M
Willower	M
Suction	M
press	M
Suction Roll	M
Drying Cylinder	
Pump	
Drainage Pump	U
Reciprocating Single Acting 1 or 2 Cylinder	M
Reciprocating Double Acting 1 Cylinder	M
2 or more Cylinder	M
Plunger Pump	M
Rotary Centrifugal Gear Pump Constant Density	U
Variable	M
Density	M
Sludge Pump Feed Water Pump	U
Feed Pump	U
Rope Way	
Passenger Transport Main Drive	M
Auxiliary and emergency Drive for Fleight	U
Stone-Soil-Ore-Cement	
Crusher	H
Rotary oven Main Drive	M
Auxiliary Drive	U
Hammer mill	M
Ball Mill-Tube Mill Main Drive	M
Auxiliary Drive	U
Pebble	M
Cooler Drive	U
Kilns	U
Roll Mill	H
Roll M/C Main Drive	
Strip Mill	M
Block-and Slab Mill	H
Wire Mill, Finishing Stand	M
Small Section Mill	M
Plate Mill	H
Cold Strip Mill	M
Billet Rolling Mill	H
Medium Section Mill	M
Pilger Rolling Mill	H
Auxiliary Drive Ingot Pusher	H
Billet Transporter	H
Reel	U
Roll Table	U
Cutting M/C	M
Shear	M
Tractor	U
Colling Bed Drive	U
Shunting Installer	H
Rotary Adjusting Installer	U
Mainipulator	M
Textile M/C General	U

U : Uniform M : Moderate Sock H : Heavy Shock
C : Reference to IEC

Table 2. Application factor(Sf)

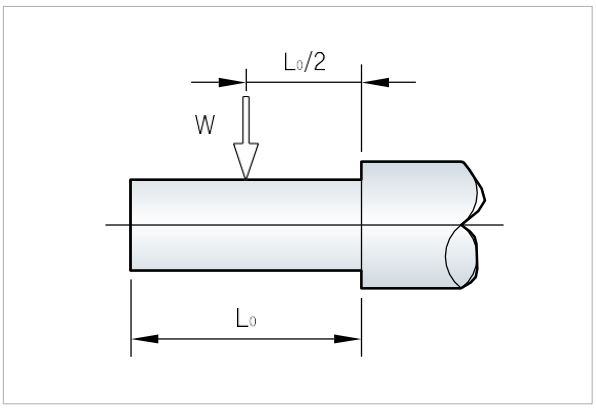
Operating time / day (hours)	Load condition								
	E-motor driver						Engine driver		
	Operation frequency : 10 times or less / hour			Operation frequency : exceeding 10 times/ hour					
	Uniform	Moderate Shock	Heavy Shock	Uniform	Moderate Shock	Heavy Shock	Uniform	Moderate Shock	Heavy Shock
Below 0.5	0.8	0.8	1.0	0.8	1.0	1.25	-	-	-
0.5 ~ 2	1.0	1.0	1.25	1.0	1.25	1.5	-	-	-
2 ~ 10	1.0	1.25	1.5	1.25	1.5	1.75	1.25	1.5	2.0
10 ~ 24	1.25	1.5	1.75	1.5	1.75	2.0	1.5	1.75	2.0

Table 3. Transmission element factor(Cf)

Transmission element	Factor	Remarks
Gears	1.1	Z≤17 teeth
Chain sprockets	1.4	Z≤13 teeth
Chain sprockets	1.2	Z≤20 teeth
V-belt pulleys	1.7	Pre-tension
Flat belt pulleys	2.5	Pre-tension

Table 4. Load applied point factor(Lf)

Load applied point	Factor
0.3 L_0	1.10
0.5 L_0	1.00
0.7 L_0	0.83
0.9 L_0	0.70



Standard Specifications

Item		Spec.
Motor	Capacity	5HPx4P ~ 20HPx4P
	Enclosure	TEFC (Totally enclosed)
	Rating	Continuous
	Insulation class	Class B
	Protection method	IP44
	Voltage and frequency	220, 380, 440, 220/380, 220/440V 60Hz
	Number of lead wires	Single voltage : 220, 380, 440V - Direct On-Line(3 lines) : Lower than 15HP, Y-oStart (6 lines) : 15HP or higher
		Dual voltage: 220/380V - Direct On-Line (6 lines)
		Double voltage : 220/440V - Direct On-Line (9 lines) : Lower than 15HP, Y-oStart (12 lines) : 15HP or higher
	Location of terminal box	Left from the position of load
Gear Reducer	Gear ratio	40, 60, 80, 90, 100, 120
	Lubrication	Oil Bath
	Mounting	Foot mounting, Flange mounting
	Shaft key	KS B 1311-1984
Mounting conditions	Location	Indoor
	Ambient temperature	-15℃ ~ 40℃
	Ambient humidity	85% or lower
	Altitude	1,000m or lower
	Environmental conditions	Well-ventilated place free from corrosive gas, explosive gas or humidity
Paint color		Munsell No. 7.5 BG 5/2

Tolerance

Item		Applied tolerance
Center height (KS B 0407)	25 ~ 50	0 ~ -0.4
	50 ~ 250	0 ~ -0.5
	250 ~ 630	0 ~ -1.0
	630 ~ 1000	0 ~ -1.5
	Over 1000	0 ~ -2.0
Shaft diameter (DIN 748)	ϕD ≤ ϕ50	k6
	ϕD ≥ ϕ50	m6
Flange diameter (DIN 42948)	ϕD ≤ ϕ230	j6
	ϕD > ϕ230	h6
Key width (KS B 1311)		h9

Lubrication

Oil is filled at the factory, and there is no need to fill oil in the motor for initial operation.
Before starting operation, in order to prevent leakage caused due to sudden change of internal pressure, replace the plug with a vent plug.
At initial operation, oil is contaminated by metal dust from the gear. Please replace oil initially in 500 hours of operation, and then, every 2,500 hours.

Recommend lubrication

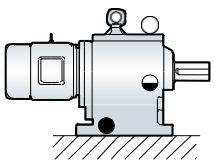
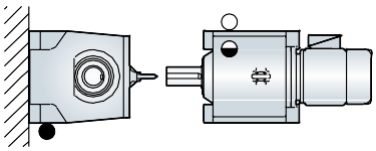
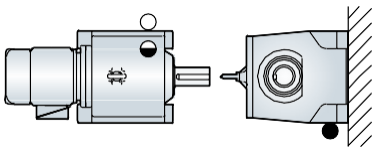
Ambient temperature	ISO viscosity class	SK(Gulf)	HYUNDAI	MOBIL	HOUGHTON
30℃ ~ 50℃	ISO VG 320	EP LUBRICANT 320	SHELL OMALA 320	MOBIL GEAR 632	MP GEAR OIL 320
-15℃ ~ 40℃	ISO VG 220	EP LUBRICANT 220	SHELL OMALA 220	MOBIL GEAR 630	MP GEAR OIL 220
Others	Contact Hyosung				

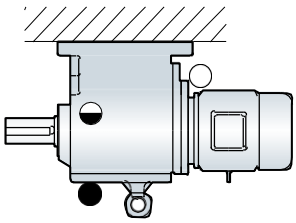
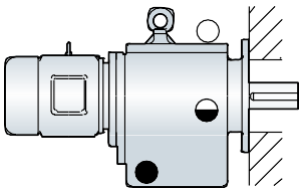
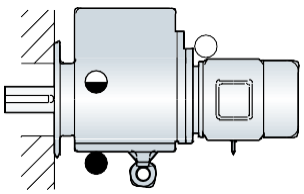
Lubricant filling quantity(approx.)

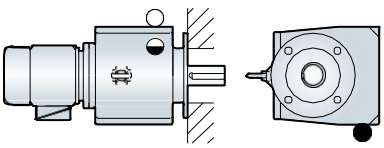
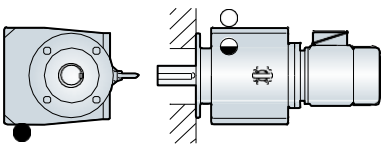
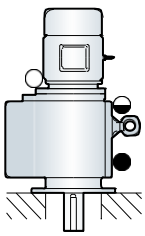
UNIT : liter

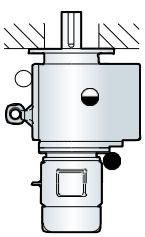
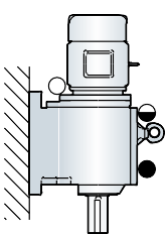
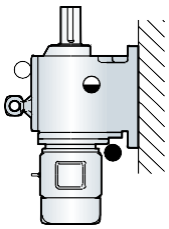
TYPE	Mounting Position											
	B3	B6	B7	B8	B5	B5$	B5□	B5ϕ	V1	V3	V5	V6
H25	10	13	13	11	11	12	14	14	18	14	16	15
H28	14	20	20	18	14	18	20	20	28	23	27	20
H32	22	33	33	26	23	27	34	34	40	34	37	31
H39	55	67	67	55	55	59	67	67	99	78	97	71

Mounting position

B3	B6	B7
		

B8	B5	B5 /
		

B5 ''	B5 Ǐ	V1
		

V3	V5	V6
		

Symbols : O Vent plug ○Oil level ◆ Drain plug ////// Mounting surface

Brake

1. Features

1) Safety brake (B-TYPE BRAKE)

The demagnetized braking system (spring brake) automatically applies the braking action in case of power down.

2) Compact size

The brake coil is embedded in the bracket of the unloaded side of the motor. The brake-motor integrated system maintains the size of the standard geared motor.

3) Easy to wiring

A DC converter (half-wave rectifier) is installed to convert AC into DC. The customer only needs to connect the power to the motor because t he motor, rectifier and brake are wired at the factory.

4) Easy to repair and maintain

A simple structure facilitates easy replacement of lining. In case of a trouble in the voltage, the rectifier is burnt. Therefore, it is required to repla ce the rectifier only. The brake [x3]coil can be used semi-permanently unless a short occurs due to an impact from outside of the motor.

5) Braking speed

A standard rectifier slows down the braking action. Depending on the use of the brake (e.g., lift, any equipment requiring accurate stop), co ntact A of the magnetic switch may be used. If it is impossible to use the contact A of the magnetic switch due to the field conditions, a rec tifier with faster braking time may be used (optional).

6) The brake runs regardless of the frequency of input power.

2. Specifications

Motor output (HPX4P)		1	2	3	5	7.5	10	15	20
Frame No.		80	90L	100L	112M	132S	132M	160M	160L
Brake type		HB 1.2	HB 2.0	HB 6.0	HB 8.0	HB 12.0		HB 20.0	
Braking method		Demagnetized							
Brake torque (kg·m)		1.2	2.0	6.0	8.0	12.0		20.0	
Rated gap (mm)		$0.3^{\pm 0.1}$			$0.4^{\pm 0.1}$	$0.5^{\pm 0.1}$		$0.6^{\pm 0.1}$	
Gap limit (mm)		0.8				1.0			
Brake speed	Standard (sec)	0.3 ~ 0.5 (HB 20.0 : 0.3 ~ 0.8)							
	Contact A is used (sec)	0.1 ~ 0.15							
Operating voltage	Input AC (V)	220, 220/380, 220/440				380		440	
	Operating DC (V)	90				170		190	

Note) The standard braking speed is set at the factory. (Separate switchover wiring)

3. Power supply

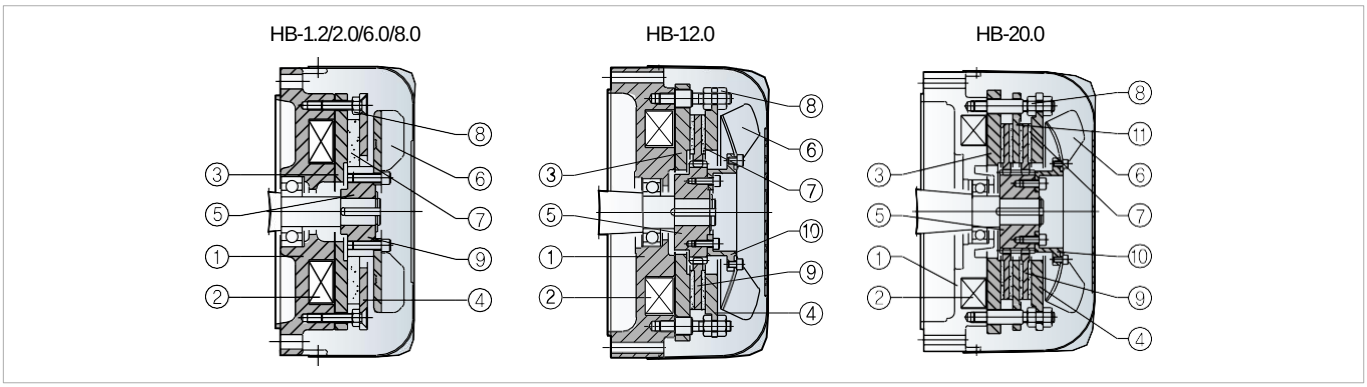
For DC B type brake, if AC is shut off, DC stays in the power supply, causing delayed braking action (approx. 0.3~0.5(0.8) sec). This type of brake may be used for the machine which requires slip (for buffering). For the machine that requires sudden braking action, the contact A of the magnetic switch can be used so that DC should be also shut down when AC is shut down, and that braking action is performed quickly (approx. 0.1~0.15 sec). If it is impossible to use the contact A due to the field conditions, the power supply with the contact A of the magnet switch embedded (non-contacting switch embedded) can be used (optional).

4. Adjustment of gap

The gap is adjusted at the factory, but long-term operation causes wearing of the lining and widens the gap between armature and magnet, causing decrease of braking force.

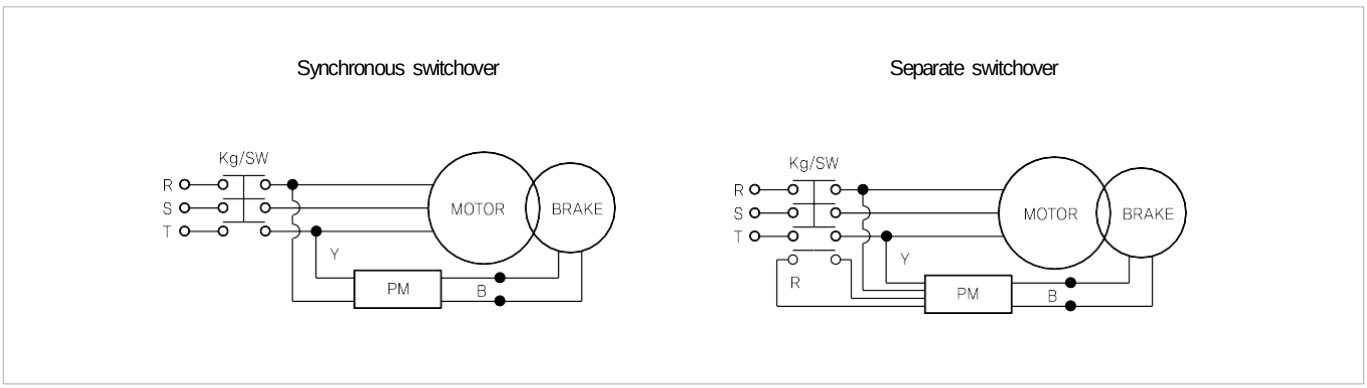
To measure the gap, insert 3~4 gap gauges between armature and magnet in the direction of circumference. The gap should be equal in the direction of circumference. If the gap exceeds the limit, loosen the gap adjusting nut, insert 3~4 gap gauges in the direction of circumference, and adjust the gap to the rated value.

5. Structure



NO	NAME	NO	NAME	NO	NAME	NO	NAME
1	MOTOR BRACKET	2	BRAKE COIL	3	ARMATURE	4	FLANGE
5	HUB	6	FAN	7	LINING	8	STAY BOLT/NUT
9	GEAR	10	FAN FLANGE	11	DISK		

6. Wiring



Note : PM- DC power supply (B : Black, Y: Yellow, R : Red)

7. Troubleshooting

Problem	Cause	Solution
Malfunction	·No power is fed ·Defective wiring ·Power supply (rectifier) fault ·Insecure power contact ·Snapping or short of brake coil ·Gap exceeding the limit ·Voltage drop ·Burn-out of brake coil during operation	·Check the wiring ·Check the wiring ·Replace the rectifier ·Adjust the contact ·Replace the brake coil ·Adjust the gap with the gap adjusting bolt ·Adjust the voltage to the rated voltage ·Check the voltage and load capacity
Delayed braking and slip	·Excessive load GD^2 ·Foreign substance between the friction plate and the lining ·Oil or water on the lining surface ·Excessive gap due to wearing of lining	·Reselect the type appropriate for the load capacity ·Remove the foreign substance ·Disassemble and grind the lining surface ·Adjust the gap with the gap adjusting bolt
Excessive mechanical impact at braking action	·Excessive brake torque	·Reselect the type appropriate for the load capacity
Overload and noise at opening	·Foreign substance between the friction plate and the magnet ·Widened stay bolt hole of the friction plate due to long-term operation	·Remove the foreign substance ·Replace the friction plate
Continuous slip after brake is applied	·Lack of brake torque ·Gap exceeding the limit	·Reselect the type appropriate for the load capacity ·Adjust the gap with the gap adjusting bolt

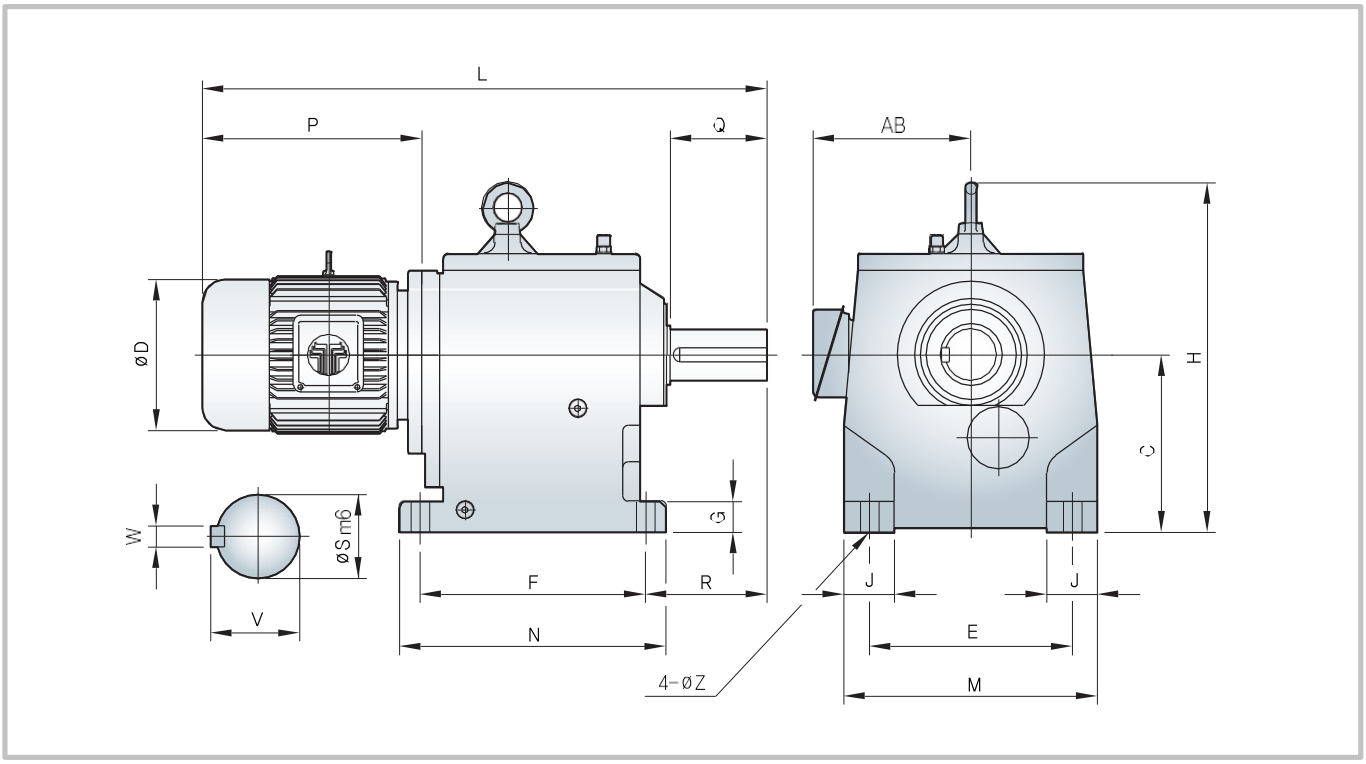
Selection of Type (HHM, HFM)

Type	Power (HP)	Ratio	Output speed (rpm) 4P/60Hz	Max. Permissible output torque (kg·m)	Permissible overhung load[1](kg)	Weights approx. (kg)
HHM25 HFM25	5	120	15	302	3500	188
	5	100	18	295	3390	188
	5	90	20	299	3330	188
	5	80	22.5	294	3250	188
	7.5	60	30	298	2890	205
	7.5	40	45	279	2780	205
	10	40	45	291	2570	215
HHM28 HFM28	7.5	120	15	486	4350	300
	7.5	100	18	410	4200	300
	7.5	90	20	420	4110	300
	7.5	80	22.5	411	4010	300
	10	60	30	401	3640	310
	15	60	30	486	3400	340
	15	40	45	413	3160	340

Type	Power (HP)	Ratio	Output speed (rpm) 4P/60Hz	Max. Permissible output torque (kg·m)	Permissible overhung load[1](kg)	Weights approx. (kg)
HHM32 HFM32	10	120	15	583	5790	420
	10	100	18	602	5580	420
	10	90	20	597	5470	420
	10	80	22.5	572	5330	420
	15	80	22.5	597	5010	450
	20	60	30	583	4520	475
	20	40	45	572	4210	475
HHM39 HFM39	15	120	15	1001	9710	640
	15	100	18	1054	9420	640
	20	100	18	1004	9110	670
	15	90	20	1000	9200	640
	20	90	20	1000	8910	670
	20	80	22.5	1026	8690	670

1) Application of load at midpoint of shaft

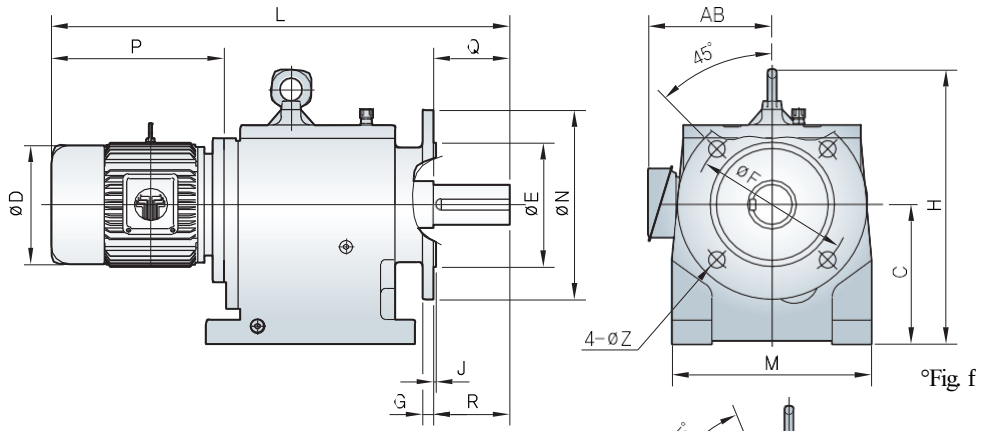
Specifications and Dimensions of HHM



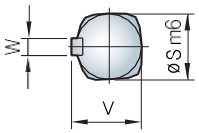
UNIT : mm

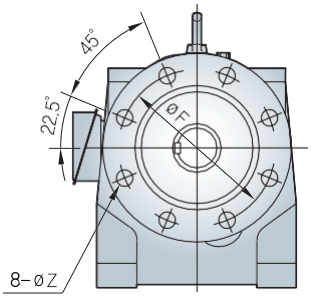
Type	Frame No.	Dimension														Output Shaft			
		C	F	N	R	E	M	J	G	Z	H	L	P	D	AB	S	V	W	Q
HHM 25	112M	250	295	345	163	260	330	70	45	22	480	779	321	224	205	65	69	18	127
	132S											837	379	284	225				
	132M											875	417	284	225				
	160M											916	458	337	280				
	160L											960	502	337	280				
HHM 28	132S	280	330	385	179	325	400	70	55	26	550	883	352	284	225	76	81	22	140
	132M											921	390	284	225				
	160M											991	460	337	280				
	160L											1035	504	337	280				
HHM 32	132M	315	400	472	216	360	450	90	55	33	620	1002	390	284	225	90	95	25	172
	160M											1072	460	337	280				
	160L											1116	504	337	280				
HHM 39	160M	390	450	540	271	440	550	110	70	33	780	1168	460	337	280	110	116	28	216
	160L											1212	504	337	280				

Specifications and Dimensions of HFM



°Fig. f





°Fig. 5

°FBng@ QBm@|@r †∘ |@Bnc@
øH+ø 3§¡¡ :j§
øH3ø 3§¡¡ :l§

UNIT : mm

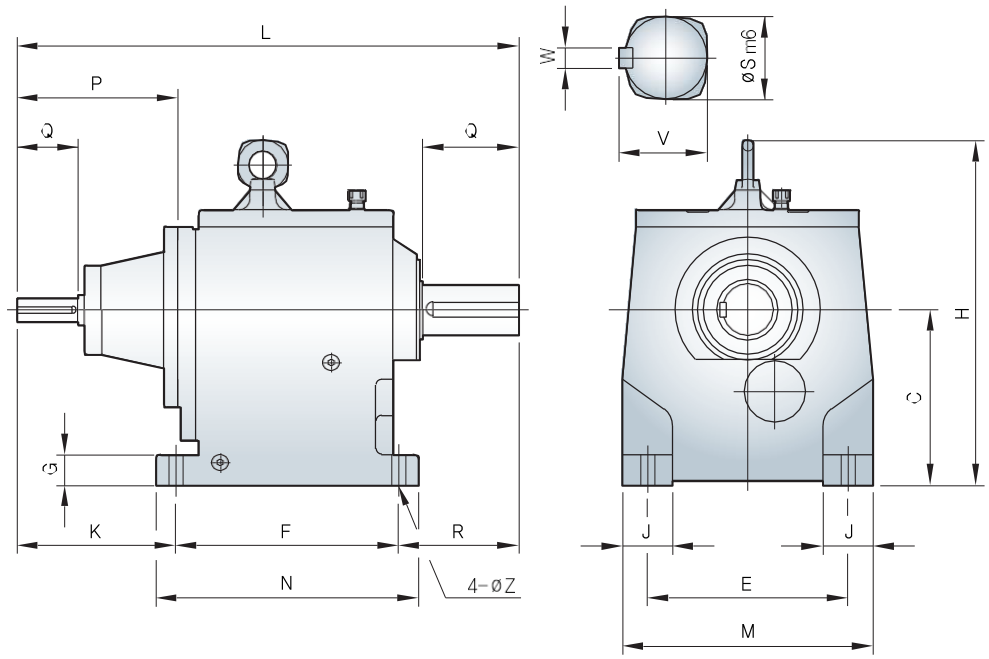
Type	Frame No.	Fig	Dimension														Output Shaft			
			C	F	N	R	E	M	J	G	Z	H	L	P	D	AB	S	V	W	Q
HFM25	112M	|	245	265	300	127	230	330	4	24	14	475	823	321	224	205	65	69	18	127
	132S												881	379	284	225				
	132M												919	417	284	225				
	160M												960	458	337	280				
	160L												1004	502	337	280				
HFM28	132S	|	275	300	350	140	250	400	5	24	18	545	948	352	284	225	76	81	22	140
	132M												986	390	284	225				
	160M												1056	460	337	280				
	160L												1100	504	337	280				
HFM32	132M	"	307	400	450	172	350	450	5	26	18	630	1078	390	284	225	90	95	25	172
	160M												1148	460	337	280				
	160L												1192	504	337	280				
HFM32	160M	"	383	400	450	216	350	550	5	26	18	775	1239	460	337	280	110	116	28	216
	160L												1283	504	337	280				

Selection of Type (HH, HF)

Type	Input Power (HP)	Ratio	Output speed (rpm) 4P/60Hz	Max. Permissible output torque (kg·m)	Permissible overhung (kg)		Weights approx. (kg)
					Output	Input	
HH25 HF25	5	120	15	302	3500	191	155
	5	100	18	295	3390	191	
	5	90	20	299	3330	191	
	5	80	22.5	294	3250	191	
	7.5	60	30	298	2890	149	
	7.5	40	45	279	2720	149	
	10	40	45	291	2570	194	
HH28 HF28	7.5	120	15	486	4350	236	250
	7.5	100	18	410	4200	236	
	7.5	90	20	420	4110	236	
	7.5	80	22.5	411	4010	236	
	10	60	30	401	3640	267	
	15	60	30	486	3400	221	
	15	40	45	413	3160	252	
HH32 HF32	10	120	15	583	5790	316	360
	10	100	18	602	5580	316	
	10	90	20	597	5470	316	
	10	80	22.5	572	5330	316	
	15	80	22.5	597	5010	237	
	20	60	30	583	4520	270	
	20	40	45	572	4210	320	
HH39 HF39	15	120	15	1001	9710	360	550
	15	100	18	1054	9420	360	
	20	100	18	1004	9110	297	
	15	90	20	1000	9200	360	
	20	90	20	1000	8910	297	
	20	80	22.5	1026	8690	297	

1) Application of load at midpoint of shaft

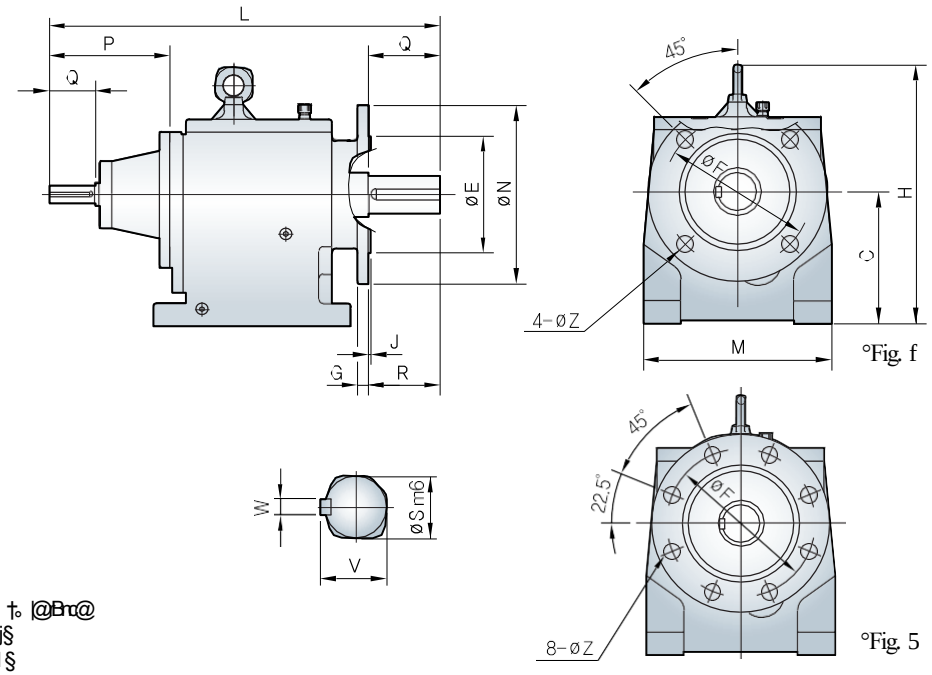
Specifications and Dimensions of HH



UNIT : mm

Type	Dimension													Output Shaft				Input Shaft			
	C	F	N	R	K	E	M	J	G	Z	H	L	P	S	V	W	Q	S	V	W	Q
HH25	250	295	345	163	214	260	330	70	45	22	480	670	212	65	69	18	127	38	41	10	79
HH28	280	330	385	179	311	325	400	70	55	26	550	820	289	76	81	22	140	42	45	12	110
HH32	315	400	472	216	285	360	450	90	55	33	620	901	289	90	95	25	172	42	45	12	110
HH39	390	450	540	271	276	440	550	110	70	33	780	997	289	110	116	28	216	42	45	12	110

Specifications and Dimensions of HF



°FBng@ QBm@t@ †. |@Bnc@
øH+ø 3§¡¡ :j§
øH3ø 3§¡¡ :I§

UNIT : mm

Type	Fig	Dimension												Output Shaft				Input Shaft			
		C	F	N	R	E	M	J	G	Z	H	L	P	S	V	W	Q	S	V	W	Q
HF25	|	245	265	300	127	230	330	4	24	14	475	714	212	65	69	18	127	38	41	10	79
HF28	|	275	300	350	140	250	400	5	24	18	545	885	289	76	81	22	140	42	45	12	110
HF32	"	307	400	450	172	350	450	5	26	18	630	977	289	90	95	25	172	42	45	12	110
HF39	"	383	400	450	216	350	550	5	26	18	775	1068	289	110	116	28	216	42	45	12	110

P-Series

Features

1. Light and compact
Multiple planetary gears distribute the force, and casing is miniaturized and lightened. Hyosung Type B motor with superior insulation capacity makes the casing smaller.

2. High accuracy and efficiency
Gear teeth are corrected to the ideal shape, carburized and grinded with high-quality alloy steel to reduce loss of transmission and to guarantee high efficiency.

3. Long service life and low noise
The strength of a sun gear is equivalent to that of the general geared motor of the same power. However, the power is distributed by numbers of planetary gears, it has longer service life and lower noise.

4. Easy to assemble/disassemble and handle
The motor can be easily assembled/disassembled without special tools, due to concentric input and output in a symmetric structure.

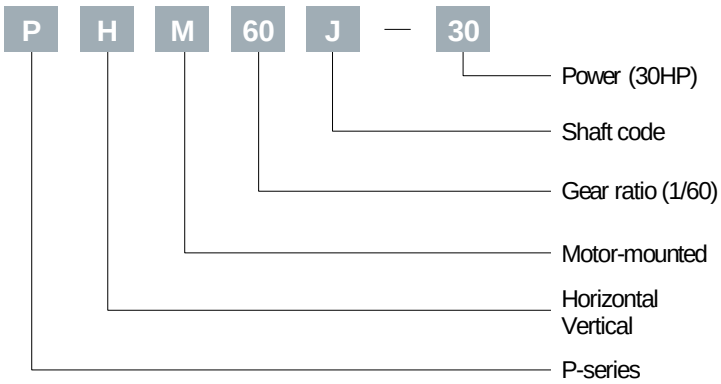
5. Light, compact and highly reliable
Deceleration by planetary gears makes the motor with the gear ratio of as high as 1/1,000,000 compact and light. The computer-based design guarantees high reliability.

Type

TYPE	MODEL		GEAR RATIO
PHM	MOTOR-mounted	Horizontal	1/40~1/∞
PVM		Vertical	
PH	MOTORLESS (LINE POWER)		

Example of Type Code

The type code is based on horse power (HP) and 4P (1800 RPM). If the power, revolution or gear ratio is not standard, select the model by comparing the allowable torque of the low-speed shaft.



Standard Shaft Code Table according to Power and Gear Ratio

UNIT : HP

Gear ratio / Power	40	60	80	120	150	180	240	320	470	600
1/2	RP-series FN-series			B	B	B	B	C	D	E
1				B	C	C	D	E	F	G
2				D	E	E	F	G	H	I
3				E	G	G	H	H	I	J
5					H	H	I	I	J	J
7.5	H-series				I	I	J	J	L	N
10					J	J	J	L	N	
15					J	J	L	N		
20				J	L	L	N			
25			J	L	L	N				
30			J	L	N					
40		J	L	N						
50		L	N							
60	J	L	N							
75	L	N								

For Gear Reducer with a higher allowable torque than N,
a Gearbox or a Planetary Gear Reducer RPS-series can be selected.

Note : 1. The above table is based on S.F=1.4, and 60Hz, 4P motor.
2. For RP, FN or H-series, refer to the appropriate dimension table of the series.

Selection of Non-Standard

·Calculate the allowable torque of the low-speed shaft from power, gear ratio, rpm, S.F, and select the model number on the table.

·|† †t@ g@Br ıBţ¡• ¡ç l ¡ g l CV† †t@ r@dVr@¢ †• rdV@ ¡ç |• X, • r ¡† †t@ r@dVr@¢ ç@vd@ †Bc†• r ¡ç l¡gl@r †lBn f.4, • r ¡† †t@ ¡• †• r ¡ç C¡gg@r †lBn †t@ ç†Bn¢Br¢ †ıBi@ çz@, c• m†Bc† Hy• çVng.

·Gear reducers with the same shaft code have the same dimensions regardless of gear ratio and stage numbers.

Allowable Torque for Low-Speed Shaft according to Shaft Code

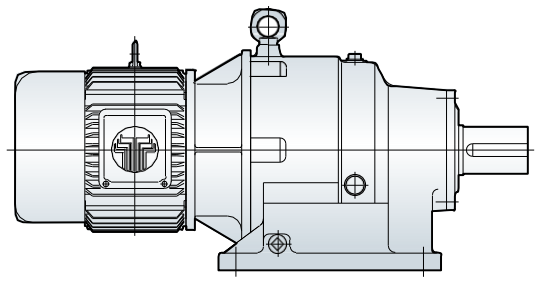
UNIT : kg· m

Shaft code	Q	(	þ	[	°F	¶	H	|	j	-	Ll
Torque	§§	f§§	f $	f§§	§	34§	4$§	§g§	f3$§	f7$§	3$§

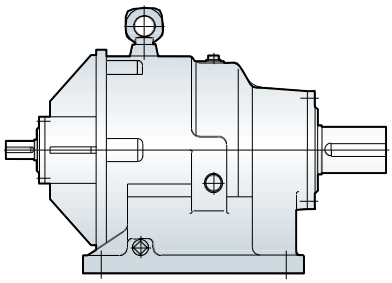
P-Series

Type

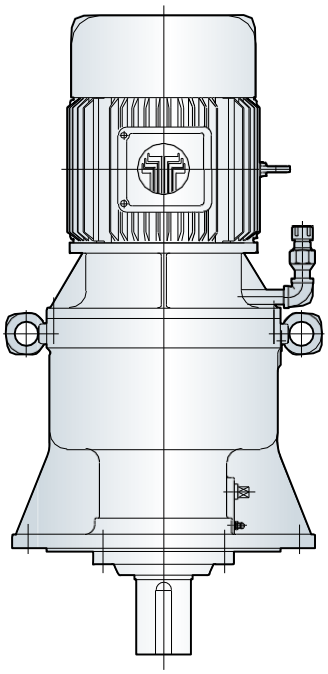
PHM



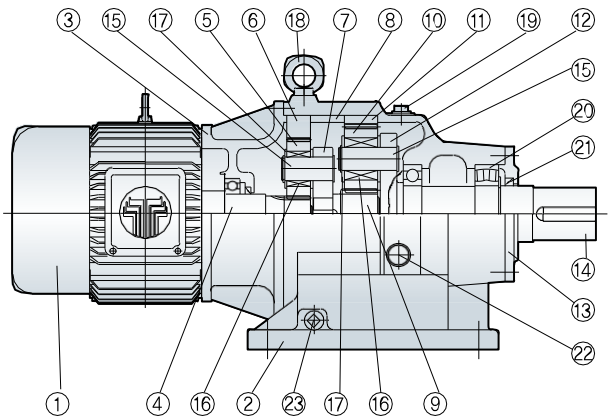
PH



PVM

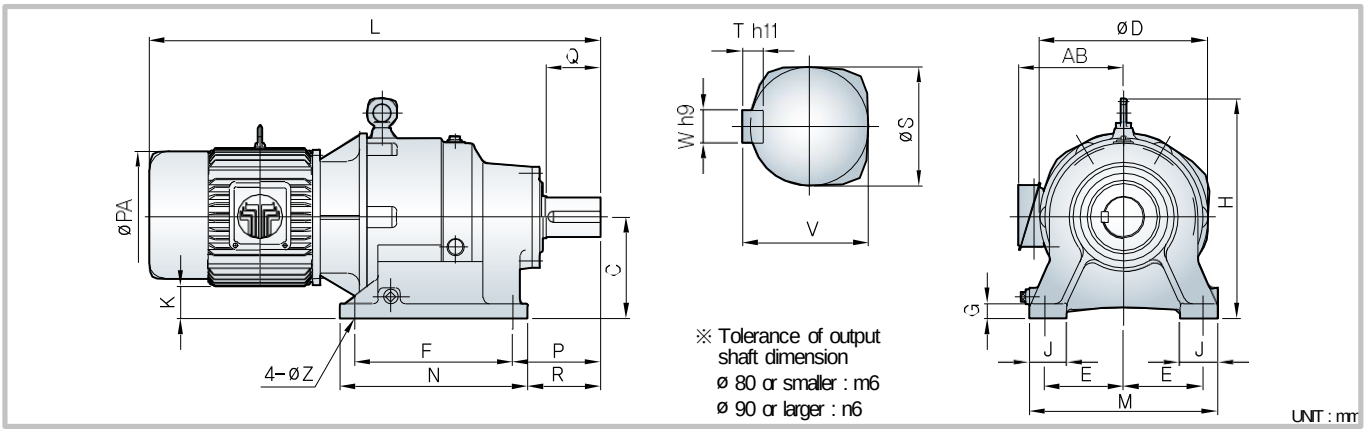


Structure



NO	NAME	NO	NAME	NO	NAME	NO	NAME
1	Motor	7	1-stage carrier	13	Output cover	19	Air vent
2	Casing	8	Annular gear fixing ring	14	Output shaft	20	Bearing
3	Motor bracket	9	2-stage pinion	15	Planetary shaft	21	Oil seal
4	Motor shaft pinion	10	2-stage planetary gear	16	Metal bearing	22	Level gauge
5	1-stage planetary gear	11	2-stage annular gear	17	Planetary ring	23	Plug
6	1-stage annular gear	12	Output carrier	18	Eye bolt		

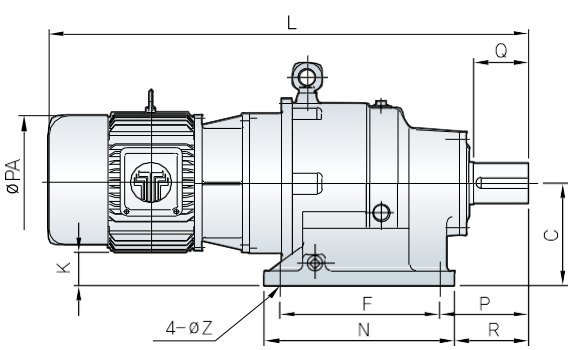
Specifications and Dimensions of PHM

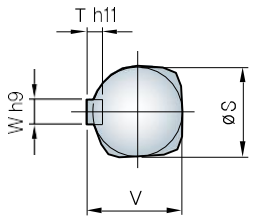


Gear ratio	Type	C	D	E	F	G	H	J	L	M	N	P	R	Z	PA	AB	K	S	W	T	V	Q	Amount of oil(*l*)	Weight (kg)
1/40	PHM 40E-7.5	180	280	135	240	25	375	70	830	330	300	172	142	22	284	225	48	65	18	11	69	95	3	165
	40F-10	180	280	135	240	25	375	70	865	330	300	172	142	22	284	225	48	65	18	11	69	95	3	175
	40G-15	205	340	160	320	30	445	75	975	380	380	178	148	22	337	280	45	80	22	14	85	110	4	285
	40I-20	240	390	190	360	35	520	100	1090	450	430	195	160	26	337	280	80	90	25	14	95	125	6.5	340
	40I-25	240	390	190	360	35	520	100	1105	450	430	195	160	26	374	305	60	90	25	14	95	125	6.5	361
	40I-30	240	390	190	360	35	520	100	1132	450	430	195	160	26	374	305	60	90	25	14	95	125	6.5	370
	40J-40	270	440	215	400	40	575	115	1315	510	480	271	231	33	432	338	70	112	32	18	119	165	10	682
	40J-50	270	440	215	400	40	575	115	1370	510	480	271	231	33	432	338	70	112	32	18	119	165	10	707
	40J-60	270	440	215	400	40	575	115	1385	510	480	271	231	33	486	410	45	112	32	18	119	165	10	814
	40L-75	300	470	240	480	45	620	135	1460	580	560	270	230	39	486	410	75	125	32	18	132	185	13	1084
1/60	PHM 60F-7.5	180	280	135	240	25	375	70	830	330	300	172	142	22	284	225	48	65	18	11	69	95	3	170
	60G-10	205	340	160	320	30	445	75	910	380	380	178	148	22	284	225	73	80	22	14	85	110	4	230
	60I-15	240	390	190	360	35	520	100	1045	450	430	195	160	26	337	280	80	90	25	14	95	125	6.5	335
	60I-20	240	390	190	360	35	520	100	1090	450	430	195	160	26	337	280	80	90	25	14	95	125	6.5	345
	60J-25	270	440	215	400	40	575	115	1270	510	480	271	231	33	374	305	90	112	32	18	119	165	10	591
	60J-30	270	440	215	400	40	575	115	1283	510	480	271	231	33	374	305	90	112	32	18	119	165	10	600
	60J-40	270	440	215	400	40	575	115	1315	510	480	271	231	33	432	338	70	112	32	18	119	165	10	685
	60L-50	300	470	240	480	45	620	135	1420	580	560	270	230	39	432	338	100	125	32	18	132	185	13	945
	60L-60	300	470	240	480	45	620	135	1435	580	560	270	230	39	486	410	75	125	32	18	132	185	13	1052
	60N-75	420	670	400	660	50	900	150	1605	880	810	372	297	39	486	410	195	140	36	20	148	230	17	1300
1/80	PHM 80F-5	180	280	135	240	25	375	70	780	330	300	172	142	22	244	205	68	65	18	11	69	95	3	145
	80G-7.5	205	340	160	320	30	445	75	875	380	380	178	148	22	284	225	73	80	22	14	85	110	4	220
	80H-10	205	340	160	320	30	445	75	910	380	380	178	148	22	284	225	73	80	22	14	85	110	4	235
	80I-15	240	390	190	360	35	520	100	1045	450	430	195	160	26	337	280	80	90	25	14	95	125	6.5	340
	80J-20	270	440	215	400	40	575	115	1235	510	480	271	231	33	337	305	90	112	32	18	119	165	10	605
	80J-25	270	440	215	400	40	575	115	1270	510	480	271	231	33	374	305	90	112	32	18	119	165	10	594
	80J-30	270	440	215	400	40	575	115	1305	510	480	271	231	33	374	305	90	112	32	18	119	165	10	605
	80L-40	300	470	240	480	45	620	135	1370	580	560	270	230	39	432	338	100	125	32	18	132	185	13	920
	80N-50	420	670	400	660	50	900	150	1570	880	810	372	297	39	432	338	220	140	36	20	148	230	17	1163
	80N-60	420	670	400	660	50	900	150	1580	880	810	372	297	39	486	410	195	140	36	20	148	230	17	1270
1/120	PHM 120B-0.5	130	200	105	190	18	275	50	655	250	230	120	100	14	180	142	50	40	12	8	43	55	1.7	82
	120B-1	130	200	105	190	18	275	50	655	250	230	120	100	14	180	142	50	40	12	8	43	55	1.7	82
	120D-2	150	235	120	240	20	320	60	780	290	280	134	114	18	199	158	60	50	14	9	53.5	70	2.2	105
	120E-3	180	280	135	240	25	375	70	850	330	300	172	142	22	244	205	68	65	18	11	69	95	3.2	150
	120G-5	205	340	160	320	30	445	75	910	380	380	178	148	22	244	205	93	80	22	14	85	110	4.3	214
	120H-7.5	205	340	160	320	30	445	75	935	380	380	178	148	22	284	225	73	80	22	14	85	110	4.3	241
	120I-10	240	390	190	360	35	520	100	1050	450	430	195	160	26	284	225	108	90	25	14	95	125	6.8	318
	120J-15	270	440	215	400	40	575	115	1265	510	480	271	231	33	337	280	110	112	32	18	119	165	12	634
	120J-20	270	440	215	400	40	575	115	1310	510	480	271	231	33	337	280	110	112	32	18	119	165	12	642
	120L-25	300	470	240	480	45	620	135	1380	580	560	270	230	39	374	305	120	125	32	18	132	185	15	934
	120L-30	300	470	240	480	45	620	135	1420	580	560	270	230	39	374	305	120	125	32	18	132	185	15	944
	120N-40	420	670	400	660	50	900	150	1505	880	810	372	297	39	432	338	220	140	36	20	148	230	20	1279

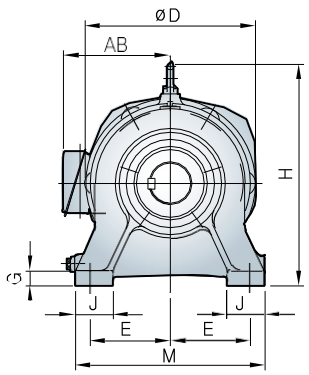
Based on 60Hz, 4P.

Specifications and Dimensions of PHM





※ Tolerance of output shaft dimension
ø 80 or smaller : m6
ø 90 or larger : n6



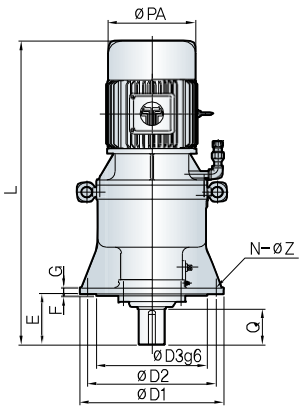
UNIT : mm

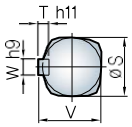
Gear ratio	Type	C	D	E	F	G	H	J	L	M	N	P	R	Z	PA	AB	K	S	W	T	V	Q	Amount of oil(l)	Weight (kg)
1/150	PHM 150B-0.5	130	200	105	190	18	275	50	655	250	230	120	100	14	180	142	50	40	12	8	43	55	1.7	82
	150C-1	150	235	120	240	20	320	60	710	290	280	134	114	18	180	142	70	50	14	9	53.5	70	2.2	95
	150E-2	180	280	135	240	25	375	70	840	330	300	172	142	22	199	158	90	65	18	11	69	95	3.2	133
	150G-3	205	340	160	320	30	445	75	905	380	380	178	148	22	203	157	105	80	22	14	85	110	4.3	205
	150H-5	205	340	160	320	30	445	75	910	380	380	178	148	22	244	205	93	80	22	14	85	110	4.3	214
	150I-7.5	240	390	190	360	35	520	100	1030	450	430	195	160	26	284	225	108	90	25	14	95	125	6.8	310
	150J-10	270	440	215	400	40	575	115	1180	510	480	271	231	33	284	225	138	112	32	18	119	165	12	583
	150J-15	270	440	215	400	40	575	115	1265	510	480	271	231	33	337	280	110	112	32	18	119	165	12	634
	150L-20	300	470	240	480	45	620	135	1320	580	560	270	230	39	337	280	140	125	32	18	132	185	15	913
	150L-25	300	470	240	480	45	620	135	1380	580	560	270	230	39	337	305	120	125	32	18	132	185	15	973
	150N-30	420	670	400	660	50	900	150	1480	880	810	372	297	39	374	305	240	140	36	20	148	230	20	1197
1/180	PHM 180B-0.5	130	200	105	190	18	275	50	655	250	230	120	100	14	180	142	50	40	12	8	43	55	1.7	82
	180C-1	150	235	120	240	20	320	60	710	290	280	134	114	18	180	142	70	50	14	9	53.5	70	2.2	95
	180F-2	180	280	135	240	25	375	70	840	330	300	172	142	22	199	158	90	65	18	11	69	95	3.2	133
	180G-3	205	340	160	320	30	445	75	905	380	380	178	148	22	244	205	93	80	22	14	85	110	4.3	211
	180H-5	205	340	160	320	30	445	75	910	380	380	178	148	22	244	205	93	80	22	14	85	110	4.3	215
	180I-7.5	240	390	190	360	35	520	100	1015	450	430	195	160	26	284	225	108	90	25	14	95	125	6.8	310
	180J-10	270	440	215	400	40	575	115	1180	510	480	271	231	33	284	225	138	112	32	18	119	165	12	580
	180J-15	270	440	215	400	40	575	115	1265	510	480	271	231	39	337	280	110	112	32	18	132	165	12	583
	180L-20	300	470	240	480	45	620	135	1320	580	560	270	230	39	337	280	140	125	32	18	132	185	15	916
	180N-25	420	670	400	660	50	900	150	1445	880	810	372	297	39	374	305	240	140	36	20	148	230	20	1188
1/240	PHM 240B-0.5	130	200	105	190	18	275	50	660	250	230	120	114	14	180	142	50	40	12	8	43	55	1.7	82
	240D-1	150	235	120	240	20	320	60	710	290	280	134	142	18	180	142	70	50	14	9	53.5	70	2.2	95
	240F-2	180	280	135	240	25	375	70	840	330	300	172	148	22	199	158	90	65	18	11	69	95	3.2	135
	240H-3	205	340	160	320	30	445	75	905	380	380	178	148	22	244	205	93	80	22	14	85	110	4.3	211
	240I-5	240	390	190	360	35	520	100	980	450	430	195	160	26	244	205	123	90	25	14	95	125	6.8	283
	240J-7.5	270	440	215	400	40	575	115	1140	510	480	271	231	33	284	225	138	112	32	18	119	165	12	576
	240J-10	270	440	215	400	40	575	115	1180	510	480	271	231	39	284	225	138	112	32	18	119	165	15	583
	240L-15	300	470	240	480	45	620	135	1275	580	560	270	230	39	337	280	140	125	32	18	132	185	15	906
	240N-20	420	670	400	660	50	900	150	1470	880	810	372	297	39	337	280	260	140	36	20	148	230	20	1167
1/320	PHM 320C-0.5	150	235	120	240	20	320	60	710	290	280	134	114	18	180	142	70	50	14	9	53.5	70	2.2	93
	320E-1	180	280	135	240	25	375	70	775	330	300	172	142	22	199	158	90	65	18	11	69	95	3.2	1350
	320G-2	205	340	160	320	30	445	75	890	380	380	178	148	22	199	158	115	80	22	14	85	110	4.3	196
	320H-3	205	340	160	320	30	445	75	905	380	380	178	148	22	244	205	93	80	22	14	85	110	4.3	211
	320I-5	240	390	190	360	35	520	100	980	450	430	195	160	26	244	205	128	90	25	14	95	125	6.8	283
	320J-7.5	270	440	215	400	40	575	115	1140	510	480	271	231	33	284	225	138	112	32	18	119	165	12	576
	320L-10	300	470	240	480	45	620	135	1235	580	560	270	230	39	284	225	168	125	32	18	132	185	15	854
	320N-15	420	670	400	660	50	900	150	1425	880	810	372	297	39	337	280	260	140	36	20	148	230	20	1160
1/470	PHM 470D-0.5	150	235	120	240	20	320	60	710	290	280	134	114	18	180	142	70	50	14	9	53.5	70	2.2	94
	470F-1	180	280	135	240	25	375	70	775	330	300	172	142	22	180	142	100	65	18	11	69	95	3.2	130
	470H-2	205	340	160	320	30	445	75	890	380	380	178	148	22	199	158	115	80	22	14	85	110	4.3	196
	470I-3	240	390	190	360	35	520	100	995	450	430	195	160	26	244	205	128	90	25	14	95	125	6.8	280
	470J-5	270	440	215	400	40	575	115	1095	510	480	271	231	33	244	205	158	112	32	18	119	165	12	548
	470L-7.5	300	470	240	480	45	620	135	1200	580	560	270	230	39	284	225	168	125	32	18	132	185	15	848
	470N-10	420	670	400	660	50	900	150	1330	880	810	372	297	39	284	225	288	140	36	20	148	230	20	1108
1/600	PHM 600E-0.5	180	280	135	240	25	375	70	775	330	300	172	142	22	180	142	100	65	18	11	69	95	3.2	130
	600G-1	205	340	160	320	30	445	75	820	380	380	178	148	22	180	158	125	80	22	14	85	110	4.3	193
	600I-2	240	390	190	360	35	520	100	965	450	430	195	160	26	199	158	150	90	25	14	95	125	6.8	263
	600J-3	270	440	215	400	40	575	115	1165	510	480	271	231	33	244	205	158	112	32	18	119	165	12	546
	600J-5	270	440	215	400	40	575	115	1210	510	480	271	231	33	244	205	158	112	32	18	119	165	12	550
	600N-7.5	420	670	400	660	50	900	150	1290	880	810	372	297	39	284	225	228	140	36	20	148	230	20	1100

Based on 60Hz, 4P

HYOSUNG

Specifications and Dimensions of PVM





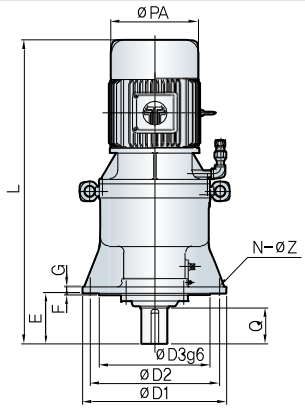
※ Tolerance of output shaft dimension
ø 80 or smaller : m6
ø 90 or larger : n6

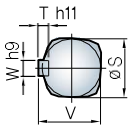
UNIT : mm

Gear ratio	Type	D1	D2	D3	E	F	G	L	N	Z	PA	S	W	T	V	Q	Amount of oil(*l*)	Weight (kg)
1/40	PVM 40C-3	315	275	230	110	5	16	720	6	14	244	50	14	9	53.5	70	3.3	117
	40E-5	370	330	275	140	5	16	805	6	14	244	65	18	11	69	95	5.5	145
	40E-7.5	370	330	275	140	5	16	845	6	14	284	65	18	11	69	95	5.5	175
	40F-10	370	330	275	140	5	16	885	6	14	284	65	18	11	69	95	5.5	185
	40H-15	440	395	340	155	5	20	1000	6	18	337	80	22	14	85	110	10	301
	40I-20	495	445	390	170	5	20	1110	6	18	337	90	25	14	95	125	15	367
	40I-25	495	445	390	170	5	20	1120	6	18	374	90	25	14	95	125	15	388
	40I-30	495	445	390	170	5	20	1160	6	18	374	90	25	14	95	125	15	397
	40J-40	560	510	455	215	8	25	1335	8	22	432	112	32	18	119	165	23	712
	40J-50	560	510	455	215	8	25	1370	8	22	432	112	32	18	119	165	23	737
	40J-60	560	510	455	215	8	25	1405	8	22	486	112	32	18	119	165	23	844
	40L-75	620	570	515	245	8	25	1485	8	22	486	125	32	18	132	185	30	1160
1/60	PVM 60D-3	315	275	230	110	5	16	720	6	14	244	50	14	9	53.5	70	3.3	122
	60E-5	370	330	275	140	5	16	805	6	14	244	65	18	11	69	95	5.5	150
	60F-7.5	370	330	275	140	5	16	845	6	14	284	65	18	11	69	95	5.5	180
	60G-10	440	395	340	155	5	20	925	6	18	284	80	22	14	85	110	10	246
	60I-15	495	445	390	170	5	20	1060	6	18	337	90	25	14	95	125	15	362
	60I-20	495	445	390	170	5	20	1110	6	18	337	90	25	14	95	125	15	372
	60J-25	560	510	455	215	8	25	1240	8	22	374	112	32	18	119	165	23	621
	60J-30	560	510	455	215	8	25	1280	8	22	374	112	32	18	119	165	23	630
	60J-40	560	510	455	215	8	25	1320	8	22	432	112	32	18	119	165	23	716
	60L-50	620	570	515	245	8	25	1425	8	22	432	125	32	18	132	185	30	1010
	60L-60	620	570	515	245	8	25	1460	8	22	486	125	32	18	132	185	30	1130
	60N-75	690	640	585	290	8	30	1560	8	26	486	140	36	20	148	230	40	1400
1/80	PVM 80C-2	315	275	230	110	5	16	690	6	14	199	50	14	9	53.5	70	3.3	102
	80D-3	315	275	230	110	5	16	720	6	14	244	50	14	9	53.5	70	3.3	127
	80F-5	370	330	275	140	5	16	805	6	14	244	65	18	11	69	95	5.5	155
	80G-7.5	440	395	340	155	5	20	890	6	18	284	80	22	14	85	110	10	236
	80H-10	440	395	340	155	5	20	925	6	18	284	80	22	14	85	110	10	251
	80I-15	495	445	390	170	5	20	1060	6	18	337	90	25	14	95	125	15	367
	80J-20	560	510	455	215	8	25	1250	8	22	337	112	32	18	119	165	23	600
	80J-25	560	510	455	215	8	25	1240	8	22	374	112	32	18	119	165	23	624
	80J-30	560	510	455	215	8	25	1280	8	22	374	112	32	18	119	165	23	632
	80L-40	620	570	515	245	8	25	1390	8	22	432	125	32	18	132	185	30	970
	80N-50	690	640	585	290	8	30	1505	8	26	432	140	36	20	148	230	40	1240
	80N-60	690	640	585	290	8	30	1540	8	26	486	140	36	20	148	230	40	1350
1/120	PVM 120B-0.5	275	235	190	95	5	16	660	6	14	180	40	12	8	43	55	2.4	87
	120B-1	275	235	190	95	5	16	660	6	14	180	40	12	8	43	55	2.4	89
	120D-2	315	275	230	110	5	16	790	6	14	199	50	14	9	53.5	70	4	110
	120E-3	370	330	275	140	5	16	870	6	14	244	65	18	11	69	95	6.2	164
	120G-5	440	395	340	155	5	20	935	6	18	244	80	22	14	85	110	13	234
	120H-7.5	440	395	340	170	5	20	960	6	18	284	80	22	14	85	110	13	262
	120I-10	495	445	390	215	5	20	1085	6	18	284	90	25	14	95	125	18	349
	120J-15	560	510	455	215	8	25	1290	8	22	337	112	32	18	119	165	27	664
	120J-20	560	510	455	215	8	25	1335	8	22	337	112	32	18	119	165	27	672
	120L-25	620	570	515	245	8	25	1350	8	22	374	125	32	18	132	185	38	1010
	120L-30	620	570	515	245	8	25	1390	8	22	374	125	32	18	132	185	38	1020
	120N-40	690	640	585	290	8	30	1600	8	26	432	140	36	20	148	230	50	1368

Based on 60Hz, 4P

Specifications and Dimensions of PVM





※ Tolerance of output shaft dimension
ø 80 or smaller : m6
ø 90 or larger : n6

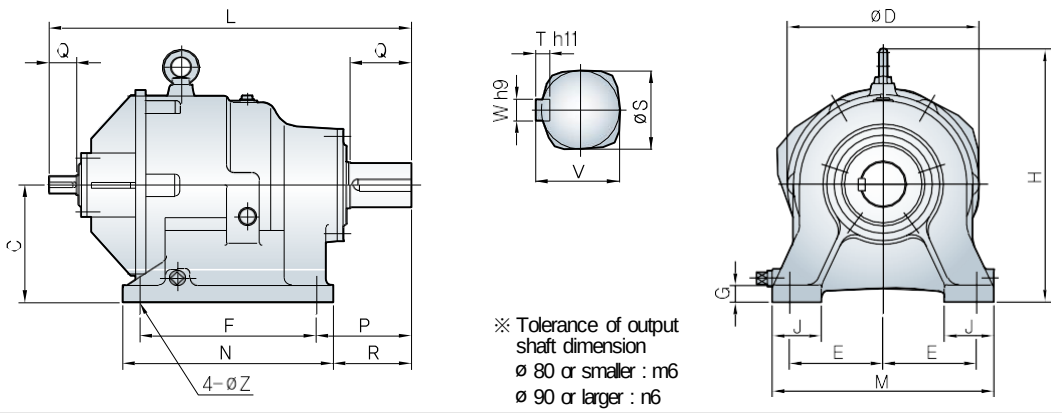
UNIT : mm

Gear ratio	Type	D1	D2	D3	E	F	G	L	N	Z	PA	S	W	T	V	Q	Amount of oil(*l*)	Weight (kg)
1/150	PVM 150B-0.5	275	235	190	95	5	16	660	6	14	180	40	12	8	43	55	2.4	87
	150C-1	315	275	230	110	5	16	730	6	14	180	50	14	9	53.5	70	4	102
	150E-2	370	330	275	140	5	16	850	6	14	199	65	18	11	69	95	6.2	150
	150G-3	440	395	340	155	5	20	930	6	18	244	80	22	14	85	110	13	236
	150H-5	440	395	340	155	5	20	910	6	18	244	80	22	14	85	110	13	236
	150I-7.5	495	445	390	170	5	20	1050	6	18	284	90	25	14	95	125	18	342
	150J-10	560	510	455	215	8	25	1200	8	22	284	112	32	18	119	165	27	613
	150J-15	560	510	455	215	8	25	1290	8	22	337	112	32	18	119	165	27	664
	150L-20	620	570	515	245	8	25	1340	8	22	337	125	32	18	132	185	38	989
	150L-25	620	570	515	245	8	25	1350	8	22	374	125	32	18	132	185	38	1015
	150N-30	690	640	585	290	8	30	1550	8	26	374	140	36	20	148	230	50	1286
1/180	PVM 180B-0.5	275	235	190	95	5	16	660	6	14	180	40	12	8	43	55	2.4	88
	180C-1	315	275	230	110	5	16	730	6	14	180	50	14	9	53.5	70	4	102
	180F-2	370	330	275	140	5	16	850	6	14	199	65	18	11	69	95	6.2	150
	180G-3	440	395	340	155	5	20	930	6	18	244	80	22	14	85	110	13	232
	180H-5	440	395	340	155	5	20	910	6	18	244	80	22	14	85	110	13	236
	180I-7.5	495	445	390	170	5	20	1050	6	18	284	90	25	14	95	125	18	342
	180J-10	560	510	455	215	8	25	1200	8	22	284	112	32	18	119	165	27	613
	180J-15	560	510	455	215	8	25	1290	8	22	337	112	32	18	119	185	27	666
	180L-20	620	570	515	245	8	25	1340	8	22	337	125	32	18	132	185	38	990
	180N-25	690	640	585	290	8	30	1510	8	26	374	140	36	20	148	230	50	1277
1/240	PVM 240B-0.5	275	235	190	95	5	16	660	6	14	180	40	12	8	43	55	2.4	90
	240D-1	315	275	230	110	5	16	730	6	14	180	50	14	9	53.5	70	4	102
	240F-2	370	330	275	140	5	16	850	6	14	199	65	18	11	69	95	6.2	150
	240H-3	440	395	340	155	5	20	930	6	18	244	80	22	14	85	110	13	234
	240I-5	495	445	390	170	5	20	975	6	18	244	90	25	14	95	125	18	314
	240J-7.5	560	510	455	215	8	25	1160	8	22	284	112	32	18	119	125	27	607
	240J-10	560	510	455	215	8	25	1200	8	22	284	112	32	18	119	165	27	615
	240L-15	620	570	515	245	8	25	1300	8	22	337	125	32	18	132	185	38	981
	240N-20	690	640	585	290	8	30	1420	8	26	337	140	36	20	148	230	50	1256
1/320	PVM 320C-0.5	315	275	230	110	5	16	730	6	14	180	50	14	9	53.5	70	4	100
	320E-1	370	330	275	140	5	16	795	6	14	180	65	18	11	69	95	6.2	147
	320G-2	440	395	340	155	5	20	930	6	18	199	80	22	14	85	110	13	218
	320H-3	440	395	340	155	5	20	930	6	18	244	80	22	14	85	110	13	234
	320I-5	495	445	390	170	5	20	975	6	18	244	90	25	14	95	125	18	314
	320J-7.5	560	510	455	215	8	25	1160	8	22	284	112	32	18	119	165	27	607
	320L-10	620	570	515	245	8	25	1260	8	22	284	125	32	18	132	185	38	930
	320N-15	690	640	585	290	8	30	1380	8	26	337	140	36	20	148	230	50	1248
1/470	PVM 470D-0.5	315	275	230	110	5	16	730	6	14	180	50	14	9	53.5	70	4	100
	470F-1	370	330	275	140	5	16	795	6	14	180	65	18	11	69	95	6.2	147
	470H-2	440	395	340	155	5	20	930	6	18	199	80	22	14	85	110	13	220
	470I-3	495	445	390	170	5	20	1010	6	18	244	90	25	14	95	125	18	312
	470J-5	560	510	455	215	8	25	1110	8	22	244	112	32	18	119	165	27	578
	470L-7.5	620	570	515	245	8	25	1220	8	22	284	125	32	18	132	185	38	923
	470N-10	690	640	585	290	8	30	1320	8	26	284	140	36	20	148	230	50	1198
1/600	PVM 600E-0.5	370	330	275	140	5	16	795	6	14	180	65	18	11	69	95	6.2	144
	600G-1	440	395	340	155	5	20	870	6	18	180	80	22	14	85	110	13	214
	600I-2	495	445	390	170	5	20	1000	6	18	199	90	25	14	95	125	18	294
	600J-3	560	510	455	215	8	25	1165	8	22	244	112	32	18	119	165	27	576
	600J-5	560	510	455	215	8	25	1110	8	22	244	112	32	18	119	165	27	580
	600N-7.5	690	640	585	290	8	30	1280	8	26	284	140	36	20	148	230	50	1190

Based on 60Hz, 4P

HYOSUNG

Specifications and Dimensions of PH



UNIT : mm

Gear ratio	Type	C	D	E	F	G	H	J	L	M	N	P	R	Z	High-speed shaft					Low-speed shaft					Amount of oil(*l*)	Weight (kg)
															S	W	T	V	Q	S	W	T	V	Q		
1/40	PH 40A-1	120	200	90	190	15	265	45	455	220	230	108	88	11	20	6	6	22.5	35	35	10	8	38	50	1.6	40
	40B-2	130	200	105	190	18	275	50	475	250	230	120	100	14	20	6	6	22.5	35	40	12	8	43	55	1.6	53
	40C-3	150	235	120	240	20	320	60	540	290	280	134	114	18	25	8	7	28	40	50	14	9	53.5	70	2	69
	40E-5	180	280	135	240	25	375	70	615	330	300	172	142	22	25	8	7	28	40	65	18	11	69	95	3	100
	40E-7.5	180	280	135	240	25	375	70	630	330	300	172	142	22	30	8	7	33	45	65	18	11	69	95	3	105
	40F-10	180	280	135	240	25	375	70	630	330	300	172	142	22	30	8	7	33	45	65	18	11	69	95	3	107
	40G-15	205	340	160	320	30	450	75	705	380	380	178	148	22	35	10	8	38	55	80	22	14	85	110	4	173
	40I-20	240	390	190	360	35	520	100	765	450	430	195	160	26	35	10	8	38	55	90	25	14	95	125	6.5	234
1/60	PH 60A-1	120	200	90	190	15	265	45	455	220	230	108	88	11	20	6	6	22.5	35	35	10	8	38	50	1.6	42
	60C-2	150	235	120	240	20	320	60	530	290	280	134	114	18	20	6	6	22.5	35	50	14	9	53.5	70	2	67
	60D-3	150	235	120	240	20	320	60	540	290	280	134	114	18	25	8	7	28	40	50	14	9	53.5	70	2	73
	60E-5	180	280	135	240	25	375	70	615	330	300	172	142	22	25	8	7	28	40	65	18	11	69	95	3	104
	60F-7.5	180	280	135	240	25	375	70	630	330	300	172	142	22	30	8	7	33	45	65	18	11	69	95	3	108
	60G-10	205	340	160	320	30	450	75	685	380	380	178	148	22	30	8	7	33	45	80	22	14	85	110	4	166
	60I-15	240	390	190	360	35	520	100	760	450	430	195	160	26	35	10	8	38	55	90	25	14	95	125	6.5	230
	60I-20	240	390	190	360	35	520	100	765	450	430	195	160	26	35	10	8	38	55	90	25	14	95	125	6.5	237
1/80	PH 80B-1	130	200	105	190	18	275	50	475	250	230	120	100	14	20	6	6	22.5	35	40	12	8	43	55	1.6	49
	80C-2	150	235	120	240	20	320	60	530	290	280	134	114	18	20	6	6	22.5	35	50	14	9	53.5	70	2	70
	80D-3	150	235	120	240	20	320	60	530	290	280	134	114	18	20	6	6	22.5	35	50	14	9	53.5	70	2	77
	80F-5	180	280	135	240	25	375	70	615	330	300	172	142	22	20	6	6	22.5	35	65	18	11	69	95	3	107
	80G-7.5	205	340	160	320	30	450	75	675	380	380	178	148	22	25	8	7	28	40	80	22	14	85	110	4	164
	80H-10	205	340	160	320	30	450	75	675	380	380	178	148	22	25	8	7	28	40	80	22	14	85	110	4	170
	80I-15	240	390	190	360	35	520	100	745	450	430	195	160	26	30	8	7	33	45	90	25	14	95	125	6.5	232
	80J-20	270	440	215	400	40	575	115	875	510	480	271	231	33	30	8	7	33	45	112	32	18	119	165	10	465

Based on input of 1800rpm

GD² and O.H.L of Planetary Geared Motor

GD²	Motor shaft converted kg m²
O.H.L	Output shaft kg

HP / Gear ratio	0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75
1/40	-	-	-	0.0384	0.0534	0.1003	0.1455	0.2785	0.4227	0.547	0.694	1.2379	1.3219	2.2819	2.943
	-	-	-	1260	1740	1740	1740	2510	3150	3150	3150	4030	4030	4030	4120
1/60	-	-	-	0.0384	0.0524	0.1003	0.1456	0.2841	0.4227	0.5969	0.7439	1.2379	1.376	2.336	3.461
	-	-	-	1440	1990	1990	2870	3600	3600	4610	4610	4610	4720	4720	4320
1/80	-	-	0.0187	0.0384	0.0534	0.1014	0.1456	0.2841	0.4726	0.5969	0.7439	1.292	1.894	2.854	-
	-	-	1590	1590	2190	3160	3160	3970	5070	5070	5070	5190	4760	4760	-
1/120	0.0112	0.0112	0.0184	0.0384	0.0535	0.1004	0.1458	0.2993	0.4378	0.5838	0.7308	1.4194	-	-	-
	1280	1280	1820	2500	3610	3610	4550	5800	5800	5950	5950	5450	-	-	-
1/150	0.0112	0.0112	0.0187	0.0384	0.0535	0.1016	0.1458	0.2993	0.4595	0.5838	0.9254	-	-	-	-
	1380	1380	2700	2700	3890	4900	4900	6250	6410	6410	5870	-	-	-	-
1/180	0.0112	0.0124	0.0187	0.039	0.0535	0.1016	0.1664	0.2993	0.4595	0.7784	-	-	-	-	-
	1460	2080	2870	4140	4140	5200	6640	6640	6810	6230	-	-	-	-	-
1/240	0.0112	0.0124	0.0187	0.039	0.0547	0.1221	0.1664	0.3209	0.6541	-	-	-	-	-	-
	1610	2290	3150	4550	5730	7310	7310	7500	6860	-	-	-	-	-	-
1/320	0.0124	0.0127	0.0193	0.039	0.0547	0.1221	0.188	0.5155	-	-	-	-	-	-	-
	2520	3470	5010	5010	6300	8050	8250	7550	-	-	-	-	-	-	-
1/470	0.0124	0.0127	0.0193	0.0402	0.0753	0.1438	0.3826	-	-	-	-	-	-	-	-
	2860	3940	5700	7160	9150	9370	8580	-	-	-	-	-	-	-	-
1/600	0.0127	0.0133	0.0205	0.0608	0.0753	0.3384	-	-	-	-	-	-	-	-	-
	4280	6180	7770	9920	9920	9310	-	-	-	-	-	-	-	-	-

Cautions for Use

1. Connection with a machine

A. Direct connection

The best way for connection is to connect the geared motor directly with a machine. For coupling, a 'flexible coupling' is recommended.

B. When a gear or chain sprocket is used

1) Gear or chain sprocket

If a gear or chain sprocket is connected, select the diameter of the gear or sprocket with the following formula so that the load should be applied to the center of the output shaft. Insert the gear as much as possible to the protruded part of the shaft.

Dia. of the pitch circle of the gear of chain sprocket ⁄ 4 x Dia. of the output shaft

2) Chain length

When using a chain, adjust the chain length so that it should not be loose when connected with the machine.
When operating the motor with other methods than A and B above, and if the starting frequency varies severely or the load inertia (GD²) is too high, contact Hyosung.

2. Reversing

When running a geared motor reversely, stop the motor first.

3. Installation

Make sure to install the geared motor on a level surface. If it is required to install the motor on a severe slope, contact Hyosung.

Selection and Maintenance of Lubricant

1. Filling lubricant

Lubricant must be filled so that the level should be at the center of the level gauge. Too much or too little lubricant can damage gears and bearings.

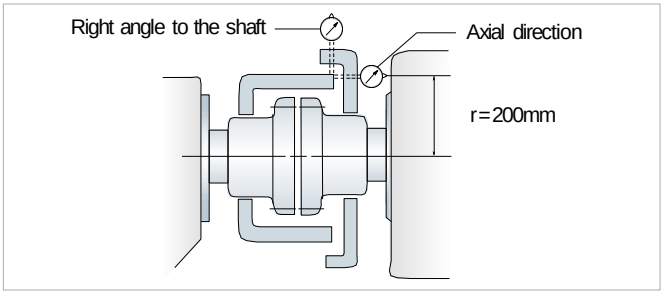
2. Replacing lubricant

At initial operation, oil is contaminated by metal dust from the gear. Please replace oil initially in 500 hours of operation, and then, every 2,500 hours.

3. Selecting lubricant

Ambient temperature	Viscosity(40°C) ISO VG	Recommended manufacturer			
		SK(GULF)	HYUNDAI(SHELL)	MOBIL	HOUGHTON
31°C~50°C	320	EP LUBRICANT 320	SHELL OMALA 320	MOBIL GEAR 632	MP GEAR OIL 320
0°C~30°C	220	EP LUBRICANT 220	SHELL OMALA 220	MOBIL GEAR 630	MP GEAR OIL 220
Lower than 0°C	150	EP LUBRICANT 150	SHELL OMALA 150	MOBIL GEAR 629	MP GEAR OIL 150
Higher than 50°C	Contact Hyosung				

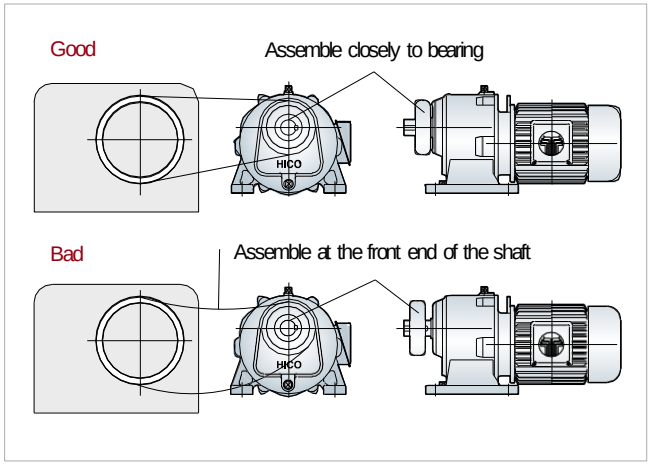
Installing Motor and Connecting Shaft



Type of coupling	Scale in the right angle to the shaft	Scale in the axial direction r=200mm
Rigid coupling	0.03	0.02
Gear coupling	0.05	0.05
Flexible coupling	0.1	0.1

* If the scale in the axial direction is larger or smaller than r=200mm, size of the coupling grows or reduces.
* After installation of the motor with the best conditions, fix the gear reducer with knok pins.

Chain or Belt Connecting



Troubleshooting

Problem	Cause	Solution
Heat	·Overloaded operation	·Operate with appropriate load
	·Short or excess of lubricant	·Adjust to the indicator of the level gauge
	·Defective or inappropriate lubricant	·Replace aged or stained lubricant
	·Too little bearing gap (taper roller)	·Adjust the gap of the bearing
	·Oil seal defective	·Replace the oil seal
	·Ventilation is obstructed	·Remove the obstacle
	·1 out of 3 phases is open or incompletely closed	·Check the contact and close firmly
	·Short circuit of the stator coil	·Repair the coil
	·Unbalanced voltage	·Check the transformer and the circuit
	·Coil grounded	·Check the transformer and the circuit
	·Shaft is bent or tension is high in the connector	·Check the shaft and adjust tension
	·Defective bearing (worn, coarse)	·Replace
	·Friction of part	·Overhaul and correct
Severe noise or strange sound	·Regular noise - Defective gear or damaged bearing	·Replace gear, bearing or lubricant
	·High metallic sound - Short of lubricant	·Fill or replace lubricant
	·Irregular noise - Foreign substance, damaged bearing	·Remove foreign substance (bearing), and replace bearing
	·The rotator touched with the stator	·Repair
	·The fan touched with the hood	·Repair (Disassemble/assemble the fan.)
	·3p motor run with 1p	·Check the circuit.
	·Loose fixed part (shaft, gear and flange joint)	·Overhaul, remove the cause, and replace

Problem	Cause	Solution
Severe vibration	·Worn-out tooth	·Replace the gear
	·Foreign substance	·Remove the foreign substance and replace lubricant
	·Worn and damaged bearing	·Replace the bearing
	·Loose bolt	·Fasten bolt
	·Loose assembled part (shaft, gear)	·Overhaul and reassemble
	·Shaft not in a straight line (poor balance)	·Check the connection of load and reconnect the load
	·End play of the motor too wide	·Check the bearing and reassemble with washers
	·Case and joint damaged	·Replace
Leak of oil	·Oil seal damaged	·Replace the oil seal
	·Defective packing (joint)	·Replace packing and reseal
	·Loose oil drainage plug	·Fasten tight (Teflon tape)
	·Damaged or loose oil level gauge	·Replace
	·Leak from other welded parts	·Reweld or replace
	·Leak from output shaft (sealing parts)	·Replace the output shaft
	·Short grease in the output cover (grease ring: vertical)	·Fill the cover with grease
	·Inappropriate mounting of product	·Contact Hyosung
Motor inactive or not started	·Short circuit of fuse	·Check the capacity of fuse, or replace the fuse
	·Short starting torque	·Change the starting mode or extend capacity
	·Circuit open or incompletely closed	·Check the overload relay and the starter push button
	·Short of coil	·Repair
	·Power down or defective power supply	·Check power supply
	·Overload	·Measure current and check load
	·Bearing or part stuck	·Reassemble or replace

How to place orders

Please specify the details on the following order form. Then, you can receive the product of the optimum design economically.

Type of driven equipment	Type of driving gear			
Required power (actual power)	kw	Input revolutions	RPM	Accessories and special requirements
Operating hours	Hours/day	Output revolutions	RPM	
Operating (starting) frequency	Times/hour	Gear ratio		
Starting torque (vs. regular torque)	%	Connection method	Input side Output side	
Max. torque (vs. regular torque)	%	Ambient temperature	℃	

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