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CW14

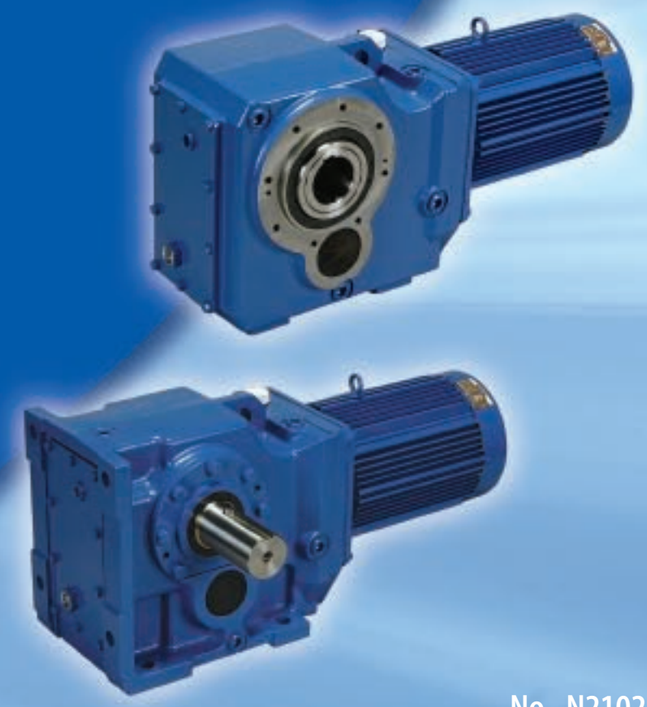
Sumitomo Heavy Industries, Ltd.

No. N2102E-1.0

Sumitomo Drive Technologies

Always on the Move

RHYTAX®



No. N2102E-1

Table of Contents

ISO 9001
Nagoya Factory

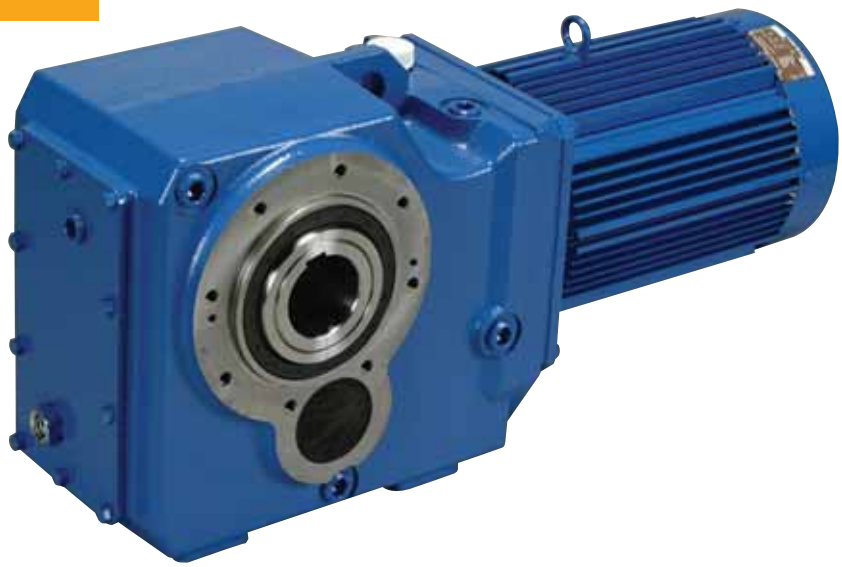
ISO 14001
Acquisition of certification
Nagoya Plant

Model change of the right-angle shaft speed reducer RHYTAX

The model of the medium size right-angle shaft speed reducer RHYTAX of Sumitomo Drive Technologies is changed.

It is newly designed to a more refined shape to use the gear cases (hollow shaft/foot mount type/flange mount type) easily with low noise, high efficiency and a variety of installing style.

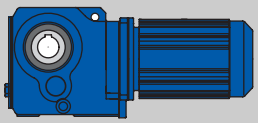
The customers will be satisfied with the merits such as the lightweight body because of the reduced part quantity and the enhanced optional installation methods.



This new model enables use for varieties of styles.

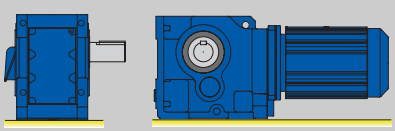
Hollow Shaft Type

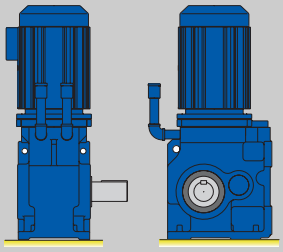
To make good use of the hollow shaft speed reducer, the gear case is specially designed.
The gear case with refined shape can be equipped with torque arm, etc. Two types of torque arm are prepared.
You can select the optimal type applicable to your purpose.



Solid Shaft/Foot Mount Type

The foot for installation is provided at 2 places of gear case at intervals of 90°. Both horizontal and vertical types can be installed onto floor and wall.
The shaft direction can be selected among "left," "right" and "both sides." (Specify horizontal or vertical type when you order the speed reducer.)





1. Low Noise and High Efficiency

Helical gear is the most important element.

Low noise is realized because the helical gear with high engaging ratio is used in the input stage. The optimal crowning is applied to this helical gear. So this speed reducer is useful to drive the transportation machines, which have to operate with low noise. The high efficiency bevel gear is adopted for the right-angle shaft gear.

2. High Power and Compact Body

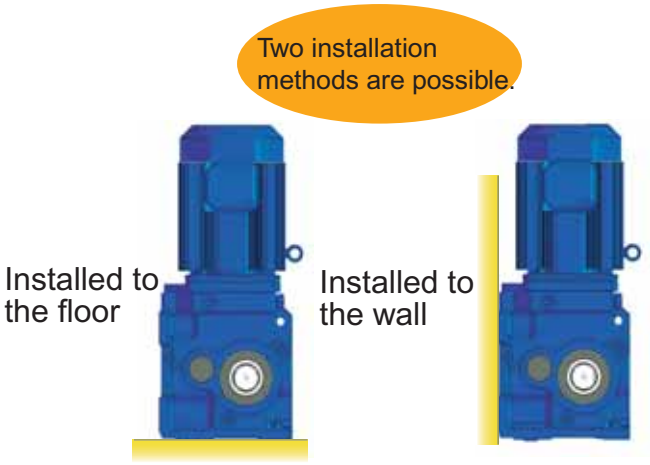
The design is optimum. CYCLO speed reducer is provided for high reduction ratio.

This speed reducer has a compact body with high power because it is designed with good balance and the rigid gear is adopted.
Even in the case of a high reduction ratio model, its body is compact because the CYCLO speed reducer is used for the input stage.

3. More Lightweight and More Refined

Newly-designed gear case is adopted.

The very lightweight body is realized because a newly-designed gear case is adopted and the part quantity is reduced. (Max. 20% compared with previous models of our company)
The hollow shaft type has a refined shape and can be installed easily with a special case. The shape of the foot mount type enables to be installed with its bottom or side. (See the right figures.)
This speed reducer is designed in consideration of neatly-installed status and easy operation.



4. A Great Variety of Models

A variety of reduction ratio and motor is spread in the world.

The standard of motor is 0.4kW ~ 45kW with reduction ratio 10 ~ 545. The reduction ratio is provided up to 1850 by using optional machines. You can select a proper model in a wide range according to your individual wishes (excluding some of the models). Many types of motors (three-phase motor, inverter motor, motor with brake, outdoor motor, explosion-proof motor, etc.) can be applied to various applications and environments. Motors complying with overseas standards can be used. Our company' s global network extending in 50 countries in the world supports the customers' business developing in a global scale.

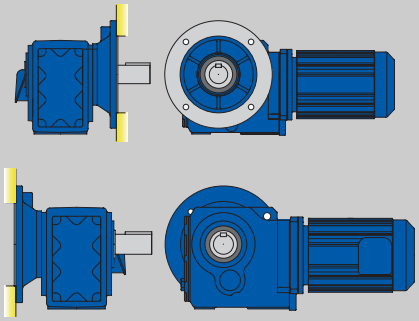
Three-phase motor
Single-phase motor
Inverter motor
Motor with brake

Outdoor motor
Increased safety explosion-proof motor
Special voltage motor
Overseas standard motor

Overseas standard motor

Solid Shaft/Flange Mount Type

This flange type speed reducer can be installed to the customer' s machine neatly in the same way as the parallel shaft speed reducer.
You can select one of the following two types: in one type, the shaft is let out from the flange, and in the other, the shaft is let out from the opposite surface of flange. The shaft direction can be selected from "left," "right," and "both sides."
The hollow shaft type can be manufactured.



- Refer to pages 7 ~ 11 for the mounting position, the type symbol. terminal box and oil filler/drain ports.
- Please specify the direction and shape to be used when ordering the speed reducer.

■List of RHYTAX Speed Reducers

Table 1

Ratio		10	12	15	20	25	30	40	50	60	80	100	120
Output Speed [r/min]	50 Hz	145	121	96.7	72.5	58.0	48.3	36.3	29.0	24.2	18.1	14.5	12.1
	60 Hz	175	146	117	87.5	70.0	58.3	43.8	35.0	29.2	21.9	17.5	14.6
Motor [kW x P]	1.1 x 4											●	●
	1.5 x 4										●	●	●
	2.2 x 4								●	●	●	●	●
	3.0 x 4							●	●	●	●	●	●
	3.7 x 4						●	●	●	●	●	●	●
	5.5 x 4	●	●	●	●	●	●	●	●	●	●	●	●
	7.5 x 4	●	●	●	●	●	●	●	●	●	●	●	●
	11 x 4	●	●	●	●	●	●	●	●	●	●	●	●
	15 x 4	●	●	●	●	●	●	●	●	●			
	18.5 x 4	●	●	●	●	●	●	●	●	●			
	22 x 4	●	●	●	●	●	●	●	●				
	30 x 4	●	●	●	●	●	●	●					
	37 x 4	●	●	●	●	●	●	●					
	45 x 4	●	●	●	●	●	●						

Table 2

Ratio		170	200	235	265	330	390	450	545
Output Speed [r/min]	50 Hz	8.53	7.25	6.17	5.47	4.39	3.72	3.22	2.66
	60 Hz	10.3	8.75	7.45	6.60	5.30	4.49	3.89	3.21
Motor [kW x P]	0.4 x 4			●	●	●	●	●	●
	0.55 x 4	●	●	●	●	●	●	●	●
	0.75 x 4	●	●	●	●	●	●	●	●
	1.1 x 4	●	●	●	●	●	●	●	●
	1.5 x 4	●	●	●	●	●	●	●	●
	2.2 x 4	●	●	●	●	●	●	●	●
	3.0 x 4	●	●	●	●	●	●		
	3.7 x 4	●	●	●	●	●			
	5.5 x 4	●	●						

Consult us for the following reduction ratios.
They may be available by special production.

Table 3

Ratio		670	800	920	1100	1350	1600	1850
Ouput Speed [r/min]	50Hz	2.16	1.81	1.58	1.32	1.07	0.91	0.78
	60Hz	2.61	2.19	1.90	1.59	1.30	1.09	0.95

■Type and Standard Specifications of Gearmotor

Type K H H M 5 — 72 R — K1 — B — 60

- K: Symbol of Model
- H: Symbol of Output Shaft Direction

H	Horizontal
V	Vertical, Down
W	Vertical, Up

- H: Symbol of Mounting

Y	Hollow Shaft
H	Foot Mount
F	Flange Mount

- H: Type Coupled Directly with Motor
- M: Type Coupled Directly with Motor
- 5: Type Coupled Directly with Motor
- 72: Frame Size

72, 72DA
82, 82DA
92, 95, 92DA
102, 105, 102DA
112, 115, 112DA

- R: Shaft Direction (When viewed from motor side)

L	Left
R	Right
T	Both Sides

- K1: Motor Type and Mounting Position

Type of Mmotor	Mounting Position
Blank: Three-phase Motor	Refer to
AV: With Inverter Motor	Pages 7 ~ 11.

- B: Symbol of Brake

Blank	Without Brake
B	With Brake

- 60: Reduction Ratio

■Standard Specifications

Table 4 Standard Specifications of Type Coupled Directly with Motor

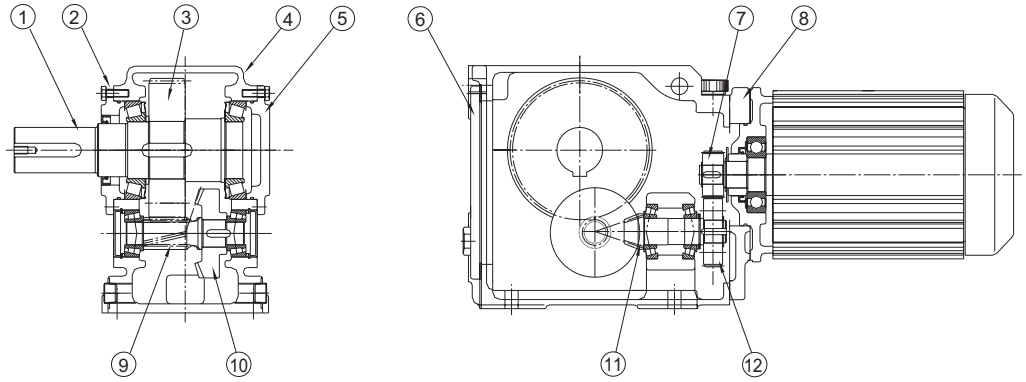
Item		Standard Specifications		Standard Specifications with Built-in Brake	
Motor	Capacity Range	0.4kW x 4P ~ 45kW x 4P		0.4kW x 4P ~ 30kW x 4P · FB Brake (Non-asbestos lining)	
	External Structure	Fully-closed external fan type		Fully-closed external fan type	
	Power Supply	45kW or less 200V50/60Hz, 220V 60Hz		15kW or less 200V50/60Hz, 220V 60Hz	
	Heat-resistant Class	Class \ P	4	Class \ P	4
		E	0.4kW	E	0.4kW
		B	0.75 ~ 22kW	B	0.75 ~ 22kW
		F	30 ~ 45kW	F	30kW
	Time Rating	Continuous		Continuous	
	Terminal Box Position	Refer to P.70 for the mounting position.		Refer to P.70 for the mounting position.	
	Wire (Lug Type)	Wire \ P	4	Wire \ P	4
		3 pcs.	0.4 ~ 7.5kW (Direct startup)	5 pcs.	0.4 ~ 7.5kW (Direct startup)
		6 pcs.	*11 ~ 45kW (λ -Δ startup is possible.)	8 pcs.	*11 ~ 30kW (λ -Δ startup is possible.)
	Standard	Complies with JIS.			
Speed Reducer	Reduction Ratio	10, 12, 15, 20, 25, 30, 40, 50, 60, 80, 100, 120, 170, 200, 235, 265, 330, 390, 450, 545			
	Lubrication	Oil bath lubrication (Grease lubrication for the CYCLO speed reducer with reduction ratio 170 or larger)			
	Speed Reduction	Combination of helical gear and bevel gear (When reduction ratio is 170 or more, the CYCLO speed reducer is installed on the input side.)			
	Materials	Casing: Cast iron Gear: Molybdenum chrome steel			
Ambient Environment Conditions	Location of Installation	Indoors (free from dust and water splashes)			
	Ambient Temperature	-10 ~ 40°C			
	Ambient Humidity	85% or less			
	Height	1000m or less above the sea			
Atmosphere		There shall be no corrosive gas, explosive gas or steam. The installation space shall be well ventilated and free from dust.			
Paint		Paint color: Munsell 6.5PB 3.6/8.2 or its equivalent			

Note: 1. Refer to pages 73 ~ 77 for the motor characteristics, the wire connection of brake specification and structure.
2. For the three-phase induction motor, in addition to the above standard specification, the special specifications shown by Table 5 in page 6 can be applied.
3. If you need the λ-Δ startup system for the *section, specify it when ordering.
4. "15kW x 4P" is sometimes CMB depending on the brake specification. Consult our company.

Structure/Motor Production Range

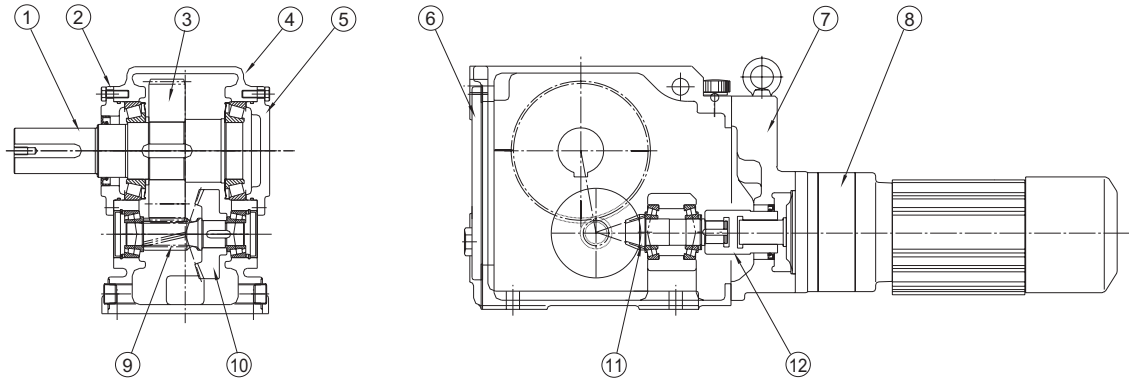
■Structure drawing

Fig. 1 KHHM-72R



Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Output Shaft	5	Cover at Output Side (2)	9	Pinion Shaft
2	Cover at Output Side (1)	6	Case Cover	10	Bevel Gear
3	Gear	7	Pinion	11	Bevel Pinion shaft
4	Casing	8	Connection Plate	12	Gear

Fig. 2 KHHM-72DAR



Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Output Shaft	5	Cover at Output Side (2)	9	Pinion Shaft
2	Cover at Output Side (1)	6	Case Cover	10	Bevel Gear
3	Gear	7	Connecting Cover	11	Bevel Pinion Shaft
4	Casing	8	CYCLO Speed Reducer	12	Connecting Bush

■List of Three-phase Induction Motor Manufacture Range

Refer to page 5 for standard specification.
Consult us for combined specifications indicated in Table 5.

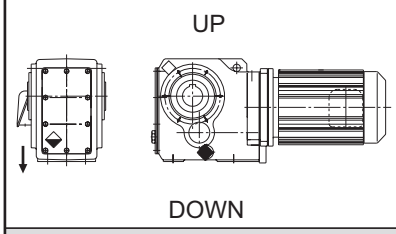
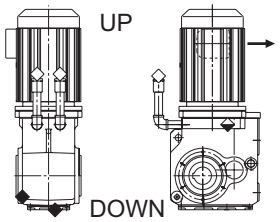
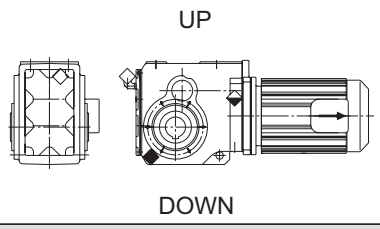
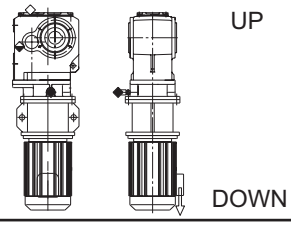
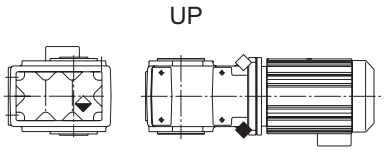
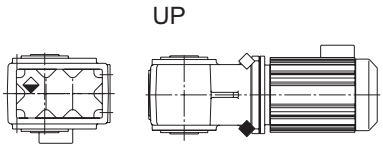
Table 5 Four-Pole Three-Phase Induction Motor which can be Manufactured

Type \ Specification	Indoor Type	Outdoor Type	Heat-resistant Class B	Heat-resistant Class F	Dustproof	Dampproof Treatment	Tropical Treatment	Product Compling with Canada CAS Standard	Complying with U.S.A. NEMA Standard
Explosion-proof Type	●	●	●	●	●	●	●	●	●
Explosion-proof Type with Built-in Brake	●	●	●	●	●	●	●	●	●
Increased Safety Explosion-proof Type (eG3)	●	●	●	●	●	●	●		

Type \ Specification	Power-supply Voltage [V] 200	220	230	350	380	400	415	440	460	200/400 220/440	200/350 220/380
Explosion-proof Type	●	●	●	●	●	●	●	●	●	●	●
Explosion-proof Type with Built-in Brake	●	●	●	●	●	●	●	●	●	●	●
Increased Safety Explosion-proof Type (eG3)	●	●	●	●	●	●	●	●	●	●	●

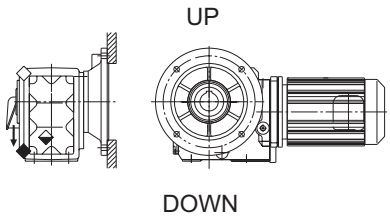
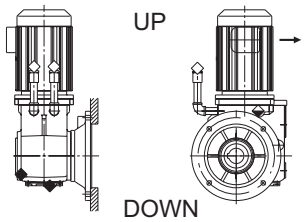
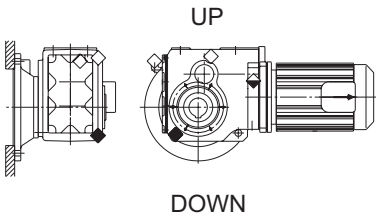
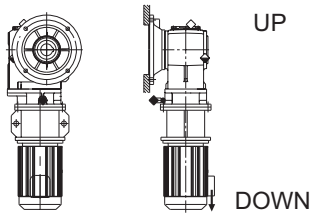
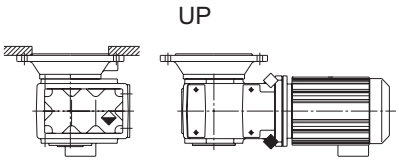
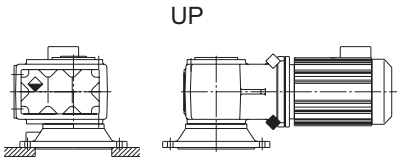
Symbols for Mounting Position (Standard terminal box position/oil filler/drain port position)

Hollow Shaft

KHYM-☐-Y1	KHYM-☐-Y2	KHYM-☐-Y3
		
KHYJM-☐-Y4	**KVYM-☐-Y5**	**KVYM-☐-Y6**
		

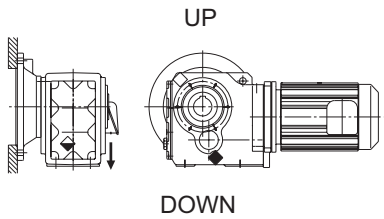
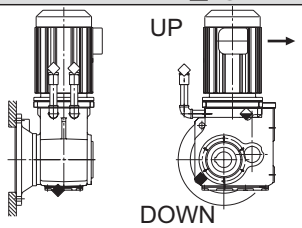
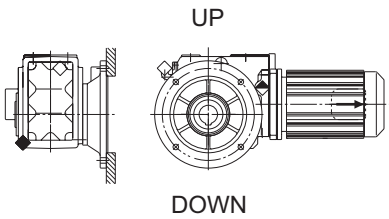
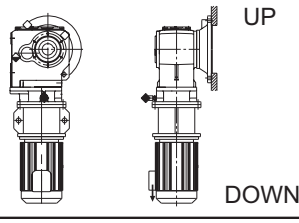
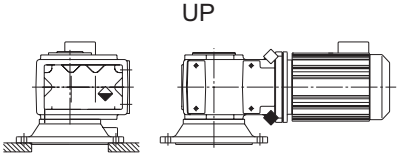
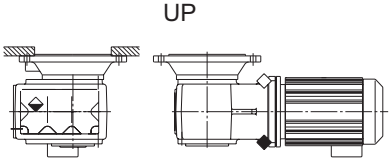
◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Hollow Shaft: Flange L Side

KHYM-☐-F1	KHYM-☐-F2	KHYM-☐-F3
		
KHYJM-☐-F4	**KVYM-☐-F5**	**KVYM-☐-F6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

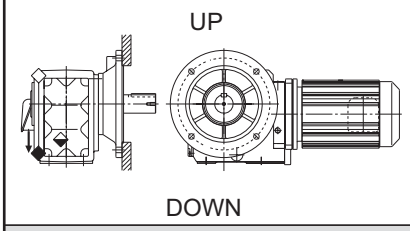
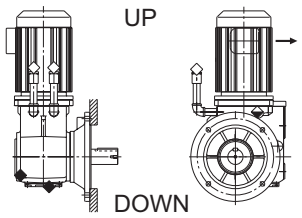
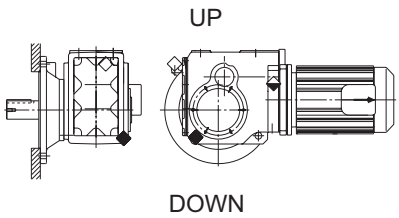
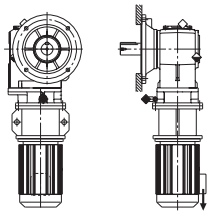
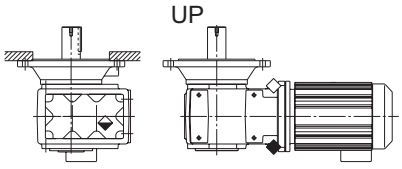
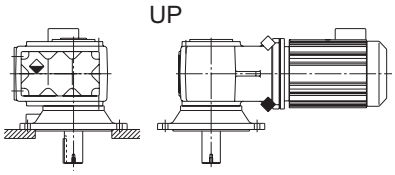
Hollow Shaft: Flange R Side

KHYM-☐-G1	KHYM-☐-G2	KHYM-☐-G3
		
KHYJM-☐-G4	**KVYM-☐-G5**	**KVYM-☐-G6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

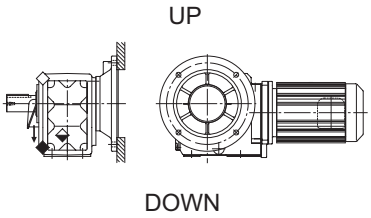
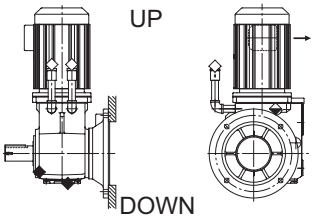
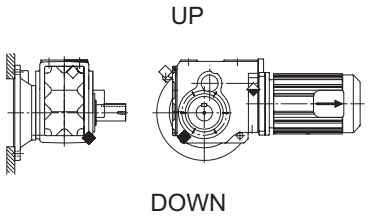
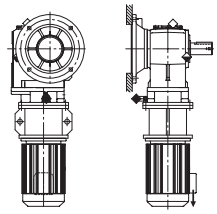
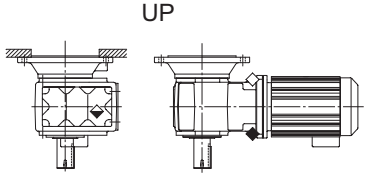
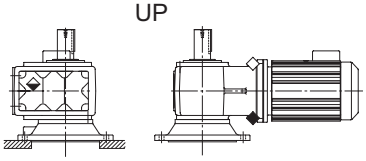
Symbols for Mounting Position (Standard terminal box position/oil filler/drain port position)

Solid Shaft/Flange Mount Type: Shaft Direction L and Flange L Side

KHFM-□L-F1	KHFM-□L-F2	KHYM-□L-F3
		
KHFJM-□L-F4	**KWFM-□L-F5**	**KVFM-□L-F6**
		

◇ Oil filling position ◈ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

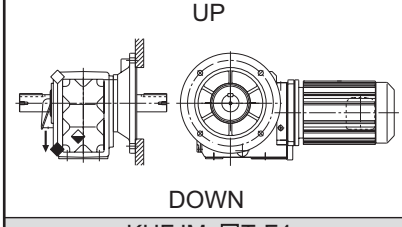
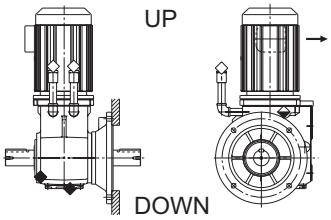
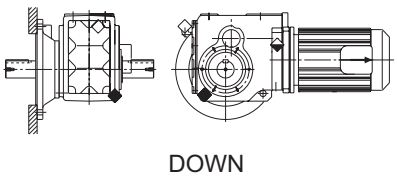
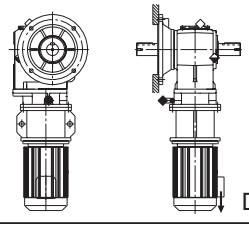
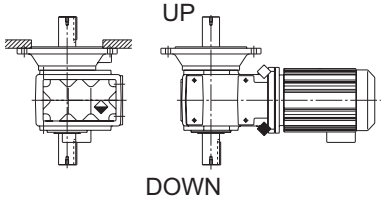
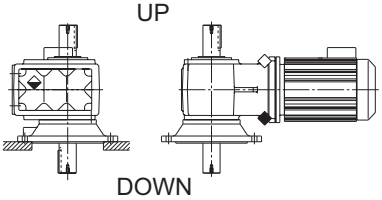
Solid Shaft/Flange Mount Type: Shaft Direction R and Flange L Side

KHFM-□R-F1	KHFM-□R-F2	KHFM-□R-F3
		
KHFJM-□R-F4	**KVFM-□R-F5**	**KWFM-□R-F6**
		

◇ Oil filling position ◈ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Note: Consult us for applications with radial load applied on the output shaft when mounted as in the table above. Actual radial load is different with the value indicated in the selection table.

Solid Shaft/Flange Mount Type: Shaft Direction T and Flange L Side

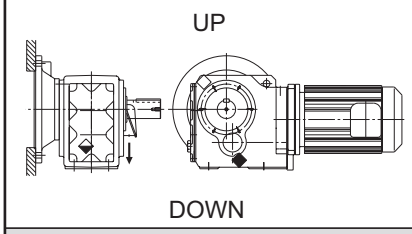
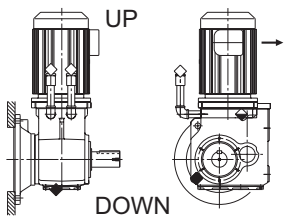
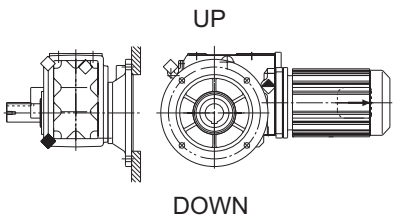
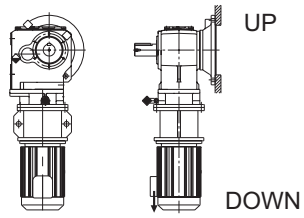
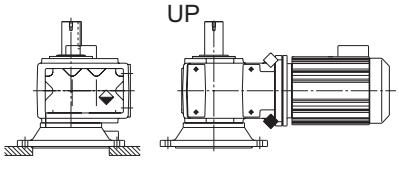
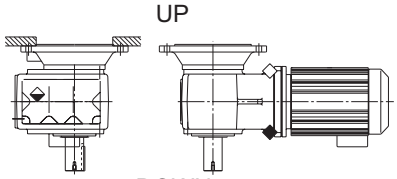
KHFM-□T-F1	KHFM-□T-F2	KHFM-□T-F3
		
KHFJM-□T-F4	**KWFM-□T-F5**	**KVFM-□T-F6**
		

◇ Oil filling position ◈ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Note: Consult us for applications with radial load applied on the output shaft when mounted as in the table above. Actual radial load is different with the value indicated in the selection table.

Symbols for Mounting Position (Standard terminal box position/oil filler/drain port position)

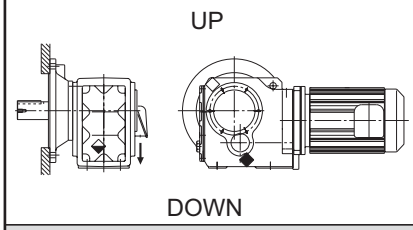
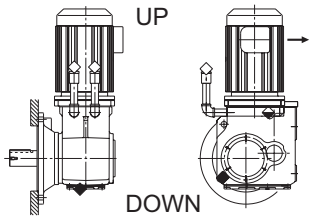
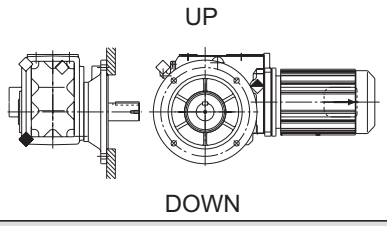
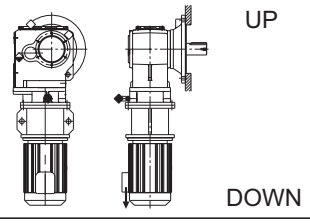
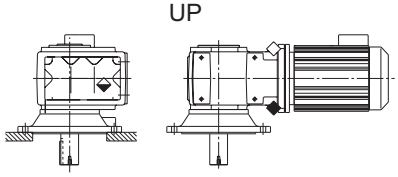
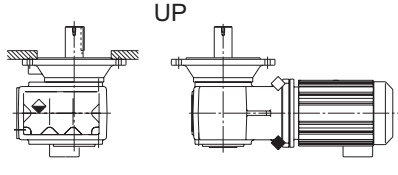
Solid Shaft/Flange Mount Type: Shaft Direction L and Flange R Side

KHFM-□L-G1	KHFM-□L-G2	KHFM-□L-G3
		
KHFJM-□L-G4	**KWFM-□L-G5**	**KVFM-□L-G6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

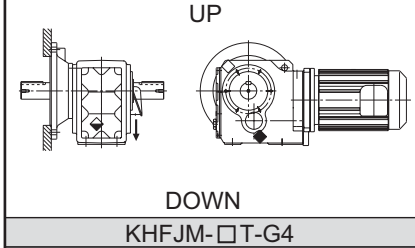
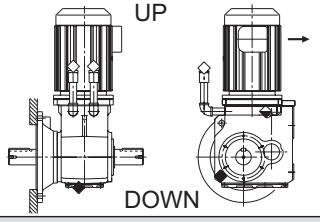
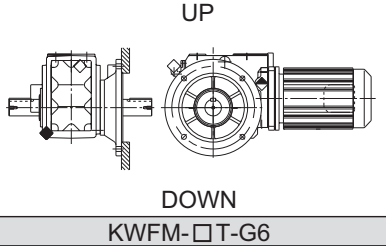
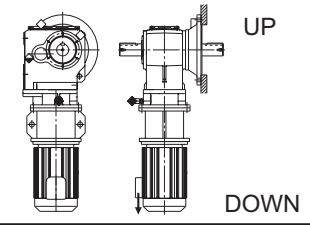
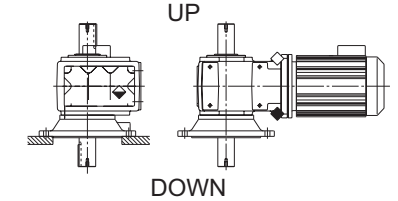
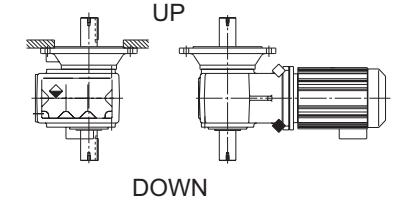
Note: Consult us for applications with radial load applied on the output shaft when mounted as in the table above. Actual radial load is different with the value indicated in the selection table.

Solid Shaft/Flange Mount Type: Shaft Direction R and Flange R Side

KHFM-□R-G1	KHFM-□R-G2	KHFM-□R-G3
		
KHFJM-□R-G4	**KVFM-□R-G5**	**KWFM-□R-G6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Solid Shaft/Flange Mount Type: Shaft Direction T and Flange R Side

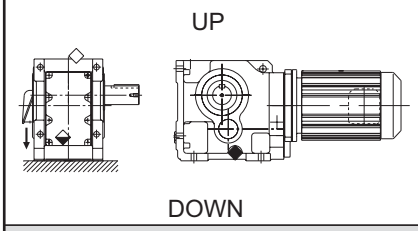
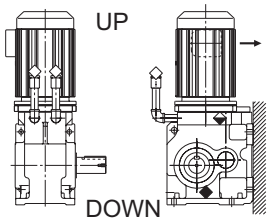
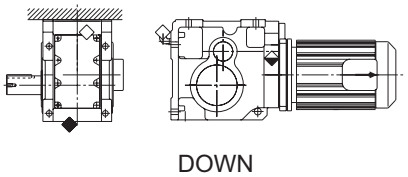
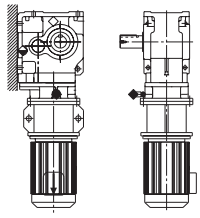
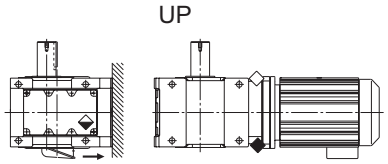
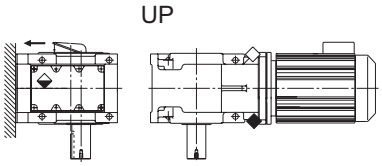
KHFM-□T-G1	KHFM-□T-G2	KHFM-□T-G3
		
KHFJM-□T-G4	**KVFM-□T-G5**	**KWFM-□T-G6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Note: Consult us for applications with radial load applied on the output shaft when mounted as in the table above. Actual radial load is different with the value indicated in the selection table.

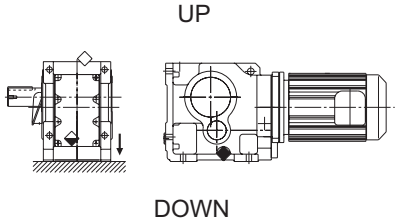
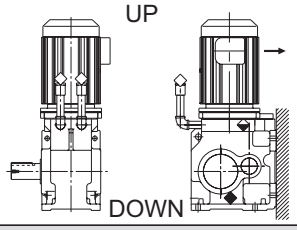
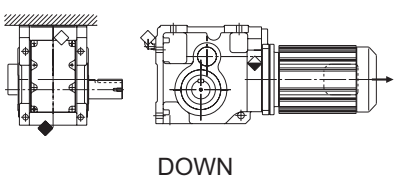
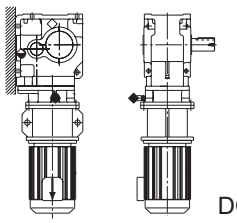
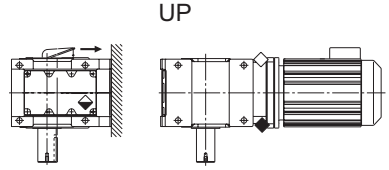
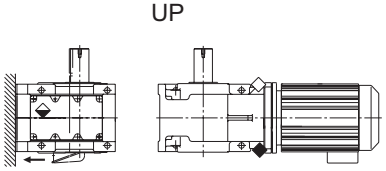
Symbols for Mounting Position (Standard terminal box position/oil filler/drain port position)

Solid Shaft/Foot Mount Type (1): Shaft Direction L

KHHM-□L-K1	KHHM-□L-K2	KHHM-□L-K3
		
KHHJM-□L-K4	**KWHM-□L-K5**	**KVHM-□L-K6**
		

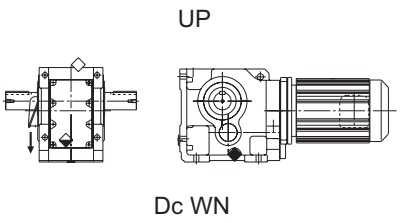
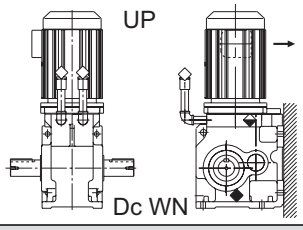
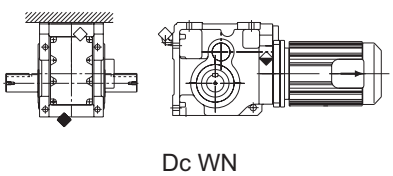
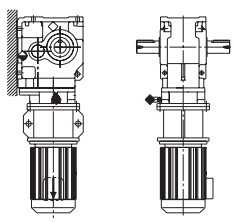
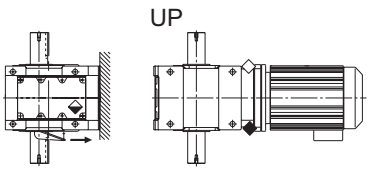
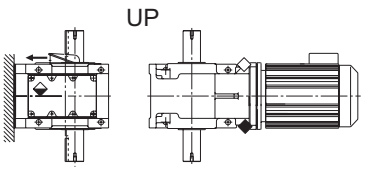
◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Solid Shaft/Foot Mount Type (1): Shaft Direction R

KHHM-□R-K1	KHHM-□R-K2	KHHM-□R-K3
		
KHHJM-□R-K4	**KVHM-□R-K5**	**KVHM-□R-K6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

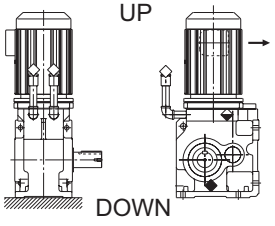
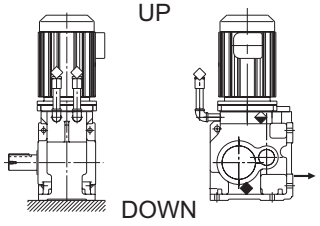
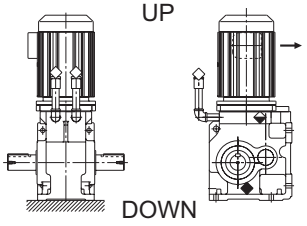
Solid Shaft/Foot Mount Type (1): Shaft Direction T

KHHM-□T-K1	KHHM-□T-K2	KHHM-□T-K3
		
KHHJM-□T-K4	**KVHM-□T-K5**	**KVHM-□T-K6**
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Symbols for Mounting Position (Standard terminal box position/oil filler/drain port position)

Solid Shaft/Foot Mount Type (2): Shaft Direction L, R, T

KHHM-□L-V2	KHHM-□R-V2	KHHM-□T-V2
		

◇ Oil filling position ◆ Oil level ◆ Oil drain position → Pulling direction of terminal box leadwire

Selection Procedure

Flow of model selection | Explanation of symbols

Tℓ: Actual transmission torque at the gearmotor output shaft [N・m]
Tout: Output torque of gearmotor
SF: Output torque of gearmotor
SH_G: Allowance ratio of speed reducer against motor fs rating output

$$\left(SH_G = \frac{\text{Allowable speed reducer transmission capacity}}{\text{Motor rating output}}\right)$$

Pro: Allowable radial load [N]
Lf: Position coefficient
Cf: Connection coefficient
Fs: Impact coefficient
Pr: Actual radial load [N]

Example of selection

Calculation of actual transmission torque Tℓ

Tℓ (1200N・m) ← Actual transmission torque

○ Tℓ = 1200 [N/m]
○ Chain conveyor (Uniform load)
○ 10 hours/day

Decision of service factor (SF)

SF (1.0) ← Table 6, Table 7, Table 8 ← Load conditions, Operation time

Reduction ratio and output revolution

Reduction ratio	Output revolution [r/min] 50Hz	60Hz
10	145.0	175.0
12	121.0	146.0
15	96.7	117.0
20	72.5	87.5
25	58.0	70.0
30	48.3	58.3
40	36.3	43.8
50	29.0	35.0
60	24.2	29.2
80	18.1	21.9
100	14.5	17.5
120	12.1	14.6

Tℓ (1200 [N・m]) SF (1.0)

Output revolution, Power supply frequency

○ 50 [r/min]
○ 50 [Hz]

Reduction ratio (30)

Checking the output torque (Decision of motor capacity)

Tout ≧ Tℓ (1410 > 1200)

Tout ← Selection table page 18 ~ 32

Motor capacity (7.5kW)

Decision of model (Capacity symbol-Frame size-Reduction ratio)

Select the frame size to obtain "$SF_G \geqq SF$". (1.44 ≧ 1.0)

SF_G ← Selection table page 18 ~ 32

○ Sprocket pitch Circle ϕ200 [mm] Radius =0.1 [m]

$$Pr = \frac{T\ell}{R} = \frac{1200}{0.1} = 12000\ [N]$$

Model (10-72□-30)

Checking the radial load

$$Pr \leqq \frac{Pro}{Lf \times Cf \times Fs}$$

$$\left(12000 \leqq \frac{18600}{1.0 \times 1.0 \times 1.0}\right)$$

If you are not satisfied, check again with the model of higher class frame size.

Pr (12000N) ← Actual radial load
Lf (1.0) ← Table12 ← Radial load position
Cf (1.0) ← Table9 ← Connection method
Fs (1.0) ← Table10 ← Impact coefficient
Pro (18600N) ← Selection table page 18 ~ 32

○ Sh□ft □enter
○ Ch□in □onne□tion
○ □here is sm□ll imp□□t.

Model (10-72□-30)

Decision of type

Refer to the type symbols and the mounting position symbols in pages 5 and 7 ~ 11.

KHHM, L (Left), Mounting position ← Examples of type ymbols page 5, page 7 ~ 11

Mounting method: ○ Foot mounting
Direction of output shaft: ○ Horizontal
Shaft direction: ○ Left (when viewed from motor side)
Motor direction: ○ Horizontal

Checking the specification and dimension

○ Checking specification → "Standard specification" in page 5
*The power supply voltage and the distinction between indoor and outdoor types are not described in type specification. Please specify them when ordering.
○ Checking dimension: Pages 34 ~ 39 (Dimension drawing)

Three-phase ← Motor type
Without brake ← With/without brake

*( ) shows the data for the example of selection.

Type (KHHM10-72L-K1-30)

■Selection of Service Factor

The RHYTAX speed reducer is designed under the condition of "Uniform load and operation of 10 hours/day".
If the operation time of this speed reducer is beyond 10 hours per day or if the load conditions of the machine using the speed reducer are changed, it is necessary to take the following service factor into consideration. The service factor selection is classified into two methods, (1) shown below and (2) shown in page 14, according to the characteristics of load.

(1) Selection according to individual machine's load characteristics

Distinction of load characteristics
U: Uniform load
M: Light impact
H: High impact

Table 6 Service Factor of Speed Reducer

Operation Time	Up ~ 3 Hours/day			Up ~ 10 Hours/day			24 Hours/day		
	U	M	H	U	M	H	U	M	H
Service Factor	0.80	1.00	1.50	1.00	1.25	1.75	1.25	1.50	2.00

Table 7 Load Characteristics of Individual Machine

Compressor/Pump	
Compressor	
Reciprocating type	
Multi-cylinder	M
Single-cylinder	H
Pump	
Centrifugal type	U
Mobile fan type	M
Reciprocating type	
Independent 3-cylinder or higher	M
Combination 2-cylinder or higher	M
Rotary type (gear type or others)	*
Transportation/lifting machine	
Elevator	
Bucket uniform load	U
Heavy load	M
Escalator	U
Flight	M
For passengers/workers	*
Floodgate	*
Car damper	H
Car puller	M
Crane/hoist	
Main hoisting Medium load	M
Heavy load	H
Skip hoist	M
Beam traction/Trolley transverse movement	*
Conveyor (Uniform load)	
Apron/assembly/Belt/bucket/ Chain/flight/Oven/screw/	U
Conveyor (Heavy load/fluctuated transporting)	
Apron/assembly/Belt/bucket/pan/	
Chain/flight/Oven/screw	M
Reciprocator/shaker	H
Stoker	U
Dry dock crane	*
Feeder	
Disk	U
Apron/belt/screw	M
Reciprocator	H
Mixing machine	
Agitator	
Genuine liquid	U
Liquid (Density is changed.)	M
Liquid and solid	M
Mixer	
Density is stable.	U
Density is changed.	M
Concrete mixer	M
Selecting machine	
Classifier	M
Screen	
Rotary type (sand/gravel)	M
Air method	U
Traveling screen	U
Crushing machine	
Crusher	
Ore/stone	H
Mill (rotary type)	
Ball/bevel/rod/hammer	H
Kiln	M
Tumbler	H
Sand muller	M
Printer	*
Washer	M
Machine tool	
Tapping machine	H
Punch press (gear drive)	H
Planer	H
Bending roll	M
General machine tools	*
Rubber/plastic	
Extruder	
Rod/pipe/tube	U
Blow molding machine	M
Pre-plasticizer	M
Others	*
Mixer	H
Rubber calender	M
Rubber mill (2 parallel lines or more)	M
Seater/refiner	M
Tuber/strainer	M
Cracker	H
Dryer	*
Dredging machine	
Cable reel/conveyor	
Cutter head drive	
Jig drive	
Screen drive	
Stacker/winch	
Food	
Rice-cleaning machine	
Beat slicer	
Dough mixer	
Meat grinder	
Dryer	
Brewing /distillation	
Canning machine/bottling machine	
Brew kettle (continuous)	
Mashing tub (continuous)	
Cooker (continuous)	
Scale hopper (frequent startup)	
Paper making	
Aerorator	
Agitator	
For assisting barker (hydraulic type)	
Mechanical barker	
Drum barker	
Beater/pulper	
Bleaching machine	
Conveyor	
Conveyor (for pulpwood)	
Cutter/plater	
Cylinder	
Reel (for pulp)	
Chest	
Washer/thickener	
Paper extracting machine	
Couch	
Suction roll	
Press	
Dryer	
Calender	
Super calender	
Winder	
Iron manufacture	
Bridle roll drive	
Slag pusher	
Draw bench (base machine/main drive)	
Molding machine	
Slitter	
Table conveyor	*
Pinch dryer/scrubber roll	*
Wire extending machine/Rolling mill	M
Wire winder	M
Reel (for stripping)	M
Sugar manufacture	M
Cane knife	M
Crusher	H
Mill	
Oil manufacture	
Chiller	M
Paraffin filter press	M
Rotary kiln	M
Cement	
Dryer/cooler	M
Cement kiln	*
Fiber/spinning and weaving	
Batcher/calender/card	
Drying can/dryer/dyeing machine	
Mangle/napper/pad	M
Slasher/soaper/winder	
Spinning machine/tentering machine/cloth washer	
Cloth finishing machine	M
(Cloth washer, pad, tentering machine, dryer, calender, etc.)	
Ship	
Lighter towing machine	H
Wind rose	*
Steering machine	M
Capstan/cargo winch	*
Mooring winch	*
Turning gear	*
Pottery	
Brick press/briquette pressing machine	H
Pug mill	M
General pottery machines	M
Water treatment	
Clarifier	U
Bar screen	U
Chemical feeder	U
Collector	U
Desiccating screen	M
Scum breaker	M
Mixer	M
Thickener	M
Vacuum filter	M
Aerorator	*
Flocculator	M
Rotary screen	U
Woodcraft	*

Contact our company for the machine with * or the unlisted machines.

Note: Names and mechanical characteristics in this table are not always the same as the actual machine. Refer to the values of the table as reference values for selection.

(2) Selection according to individual machine's load characteristics
Select the service factor of staring/stop frequency and reduction ratio according to Table 8.

Table 8 Service Factor of Startup/stop Frequency and Reduction Ratio

Operation time	Up ~ 3 Hours/day			Up ~ 10 Hours/day			24 Hours/day		
[Times/hour]	I	II	III	I	II	III	I	II	III
~ 10	0.80	1.00	1.30	1.00	1.15	1.50	1.20	1.30	1.65
~ 200	0.85	1.20	1.45	1.10	1.35	1.65	1.30	1.50	1.85
~ 500	0.90	1.30	1.55	1.15	1.50	1.80	1.40	1.65	2.00

$$\text{Ratio of the moment of inertia } (GD^2 \text{ ratio}) = \frac{\text{The moment of inertia of motor shaft conversion load } (GD^2 \text{ of motor shaft conversion load})}{\text{he moment of inertia of motor } (GD^2 \text{ of motor})}$$

Distinction of load coefficient

I: Allowable moment of inertia (GD^2 ratio) $\geqq$ 0.3
II: Allowable moment of inertia (GD^2 ratio) $\geqq$ 3
III: Allowable moment of inertia (GD^2 ratio) $\geqq$ 10

Note: 1. Startup/stop times must include the times of braking caused by brake, clutch, etc.
2. Consult us when starting the machine while torque or radial load is applied. Sometimes examination is necessary.

■Allowable Radial Load

When you install gears or pulleys to the RHYTAX speed reducer, use it not to exceed the allowable radial load.

Radial load of output shaft
Check the radial load of output shaft according to the following formula.

$$\text{Radial load } Pr = \frac{T\ell}{R} \geqq \frac{Pro}{Lf \cdot Cf \cdot Fs} \quad [N]$$

Consult us when starting frequency is especially high.

Pr: Actual radial load [N]
Tℓ: Actual transmission torque at output shaft of speed reducer [N/m]
R: Pitch circle radius of sprocket, gear, pulley, etc. [m]
Pro: Allowable radial load [N] (Table 11)
Lf: Position coefficient (Table 12 and Table 13)
Cf: Connection coefficient (Table 9)
Fs: Impact coefficient (Table 10)

Table 9 Connection Coefficient Cf

Connection Method	Cf
Chain	1
Gear	1.25
V belt	1.5

Table 10 Impact Coefficient Fs

Impact Level	Fs
Little Impact	1
Moderate Impact	1 ~ 1.2
Violent Impact	1.4 ~ 1.6

Note: Impact coefficient should be 1.4 ~ 1.6 for direct startup.

Table 11 Allowable Radial Load of Output Shaft Pro

Frame Size \ Output Revolution [r/min]		5	10	20	30	36	45	50	60	75	90	100	120	150	180
72, 72DA	[N]	21600	21600	21600	20600	19600	19100	18600	17700	16700	16200	15700	15200	14700	14200
	[kgf]	2200	2200	2200	2100	2000	1950	1900	1800	1700	1650	1600	1550	1500	1450
82, 82DA	[N]	26500	26500	26500	26000	25500	24500	23500	21600	20600	19600	18600	17700	16700	15700
	[kgf]	2700	2700	2700	2650	2600	2500	2400	2200	2100	2000	1900	1800	1700	1600
92, 95, 92DA	[N]	29400	29400	29400	29400	29400	28400	27500	25500	24500	23500	22600	20600	19600	18600
	[kgf]	3000	3000	3000	3000	3000	2900	2800	2600	2500	2400	2300	2100	2000	1900
102, 105, 102DA	[N]	36300	36300	36300	36300	36300	35300	34300	32400	31400	30400	29400	28400	27500	26500
	[kgf]	3700	3700	3700	3700	3700	3600	3500	3300	3200	3100	3000	2900	2800	2700
112, 115, 112DA	[N]	45100	45100	45100	45100	45100	44100	43200	41700	40200	39200	38300	37300	36300	35300
	[kgf]	4600	4600	4600	4600	4600	4500	4400	4250	4100	4000	3900	3800	3700	3600

Table 12 Output Shaft Radial Load Position Coefficient Lf (Hollow shaft)

Frame Size \ L [mm]	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160
72, 72DA	1.00	1.05	1.08	1.11	1.15	1.19	1.21	1.34	1.53	1.70	1.89	2.10			
82, 82DA	1.00	1.05	1.05	1.10	1.13	1.16	1.19	1.25	1.41	1.59	1.75	1.91	2.25		
92, 95, 92DA	1.00	1.05	1.05	1.08	1.10	1.14	1.16	1.23	1.33	1.48	1.64	1.79	2.10	2.40	
102,105,102DA	1.00	1.05	1.05	1.05	1.09	1.11	1.14	1.20	1.25	1.39	1.54	1.68	1.95	2.25	
112,115,112DA	1.00	1.05	1.00	1.05	1.05	1.09	1.11	1.16	1.20	1.25	1.38	1.50	1.75	2.00	2.25

Table 13 Output Shaft Radial Load Position Coefficient Lf (Solid Shaft)

Frame Size \ L [mm]	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160
72, 72DA	0.81	0.84	0.86	0.89	0.92	0.95	0.97	1.07	1.22	1.36	1.51	1.65			
82, 82DA	0.80	0.83	085	0.88	0.90	0.93	0.95	1.00	1.13	1.27	1.40	1.53	1.80		
92, 95, 92DA	0.79	0.82	0.84	0.86	0.88	0.91	0.93	0.98	1.06	1.18	1.31	1.43	1.68	1.92	
102,105,102DA	0.79	0.81	0.83	0.85	0.87	0.89	0.91	0.96	1.00	1.11	1.23	1.34	1.57	1.80	
112,115,112DA	0.78	0.79	0.81	0.83	0.85	0.87	0.89	0.93	0.96	1.00	1.10	1.20	1.40	1.60	1.80

MEMO

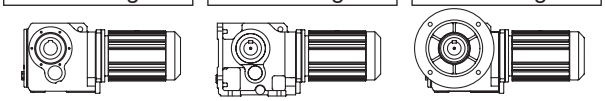
Gearmotor Selection Table

Selection Table 0.4/0.55kW

0.4kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38

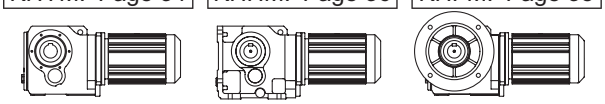


Frequency/Motor Revolution n_1 50Hz·1450 r/min						60Hz·1750 r/min						Type
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
6.17	545	55.5	21600	2200	2.75	7.45	451	46.0	21600	2200	2.75	05 - 72DA - 235
5.47	614	62.6	21600	2200	3.30	6.60	509	51.9	21600	2200	3.75	05 - 72DA - 265
4.39	765	78.0	21600	2200	2.65	5.30	634	64.6	21600	2200	3.20	05 - 72DA - 330
3.75	904	92.2	21600	2200	2.25	4.49	749	76.4	21600	2200	2.71	05 - 72DA - 390
3.22	1040	106	21600	2200	1.95	3.89	864	88.1	21600	2200	2.35	05 - 72DA - 450
2.66	1260	128	21600	2200	1.61	3.21	1050	107	21600	2200	1.94	05 - 72DA - 545
			26500	2700	2.41				26500	2700	2.90	05 - 82DA - 545

0.55kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38



Frequency/Motor Revolution n_1 50Hz·1450 r/min						60Hz·1750 r/min						Type
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
8.53	542	55.2	21600	2200	2.73	10.29	449	45.8	21600	2200	2.73	08 - 72DA - 170
7.25	638	65.0	21600	2200	2.45	8.75	528	53.8	21600	2200	2.45	08 - 72DA - 200
6.17	749	76.4	21600	2200	2.00	7.45	621	63.3	21600	2200	2.73	08 - 72DA - 235
5.47	845	86.1	21600	2200	2.40	6.60	700	71.3	21600	2200	1.42	08 - 72DA - 265
4.39	1050	107	21600	2200	1.93	5.30	872	88.8	21600	2200	2.33	08 - 72DA - 330
3.72	1240	126	21600	2200	1.63	4.49	1060	105	21600	2200	1.97	08 - 72DA - 390
			26500	2700	2.45				26500	2700	2.95	08 - 82DA - 390
3.22	1430	146	21600	2200	1.42	3.89	1190	121	21600	2200	1.71	08 - 72DA - 450
			26500	2700	2.12				26500	2700	2.56	08 - 82DA - 450
2.66	1740	177	21600	2200	1.17	3.21	1440	147	21600	2200	1.41	08 - 72DA - 545
			26500	2700	1.75				26500	2700	2.11	08 - 82DA - 545

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 0.75kW

0.75kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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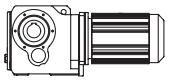
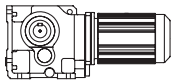


KHHM: Page 36



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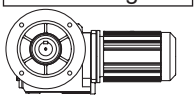

Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
8.53	739	75.3	21600	2200	2.00	10.3	612	62.4	21600	2200	2.00	1 - 72DA - 170
7.25	869	88.6	21600	2200	1.80	8.75	720	73.4	21600	2200	1.80	1 - 72DA - 200
6.17	1020	104	21600	2200	1.47	7.45	850	87	21600	2200	1.47	1 - 72DA - 235
			26500	2700	2.98				26500	2700	3.59	1 - 82DA - 235
5.47	1150	117	21600	2200	1.76	6.60	955	97	21600	2200	2.00	1 - 72DA - 265
			26500	2700	2.64				26500	2700	2.93	1 - 82DA - 265
4.39	1430	146	21600	2200	1.42	5.30	1190	121	21600	2200	1.71	1 - 72DA - 330
			26500	2700	2.12				26500	2700	2.56	1 - 82DA - 330
3.72	1700	173	21600	2200	1.20	4.49	1400	143	21600	2200	1.45	1 - 72DA - 390
			26500	2700	1.79				26500	2700	2.16	1 - 82DA - 390
3.22	1960	200	21600	2200	1.04	3.89	1620	165	21600	2200	1.25	1 - 72DA - 450
			26500	2700	1.55				26500	2700	1.88	1 - 82DA - 450
			29400	3000	2.00				29400	3000	2.00	1 - 92DA - 450
2.66	2370	242	21600	2200	0.86	3.21	1960	200	21600	2200	1.03	1 - 72DA - 545
			26500	2700	1.28				26500	2700	1.55	1 - 82DA - 545
			29400	3000	1.69				26400	3000	2.00	1 - 92DA - 545
			36300	3700	2.38				36300	3700	2.87	1 - 102DA - 545

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 1.1kW

1.1kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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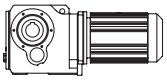
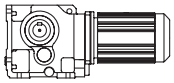
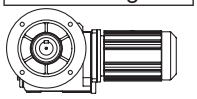




Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
14.5	688	70.2	21600	2200	2.95	17.5	570	58.1	21600	2200	2.95	1H - 72 - 100
12.1	1130	115	21600	2200	2.46	14.6	933	95.1	21600	2200	2.46	1H - 72 - 120
8.53	1080	110	21600	2200	1.36	10.3	898	92	21600	2200	1.36	1H - 72DA - 170
			26500	2700	2.80				26500	2700	3.36	1H - 82DA - 170
7.25	1280	130	21600	2200	1.23	8.75	1060	108	21600	2200	1.23	1H - 72DA - 200
			26500	2700	2.38				26500	2700	2.88	1H - 82DA - 200
6.17	1500	153	21600	2200	1.00	7.45	1240	126	21600	2200	1.00	1H - 72DA - 235
			26500	2700	2.03				26500	2700	2.45	1H - 82DA - 235
5.47	1690	172	21600	2200	1.20	6.60	1400	143	21600	2200	1.36	1H - 72DA - 265
			26500	2700	1.80				26500	2700	2.00	1H - 82DA - 265
4.39	2100	214	21600	2200	0.96	5.30	1740	177	21600	2200	1.16	1H - 72DA - 330
			26500	2700	1.44				26500	2700	1.74	1H - 82DA - 330
			29400	3000	1.91				29400	3000	2.00	1H - 92DA - 330
3.72	2490	254	21600	2200	0.82	4.49	2060	210	21600	2200	0.99	1H - 72DA - 390
			26500	2700	1.22				26500	2700	1.48	1H - 82DA - 390
			29400	3000	1.61				29400	3000	1.95	1H - 92DA - 390
			36300	3700	2.27				36300	3700	2.74	1H - 102DA - 390
3.22	2870	293	26500	2700	1.06	3.89	2380	243	26500	2700	1.28	1H - 82DA - 450
			29400	3000	1.36				29400	3000	1.36	1H - 92DA - 450
			36300	3700	1.97				36300	3700	2.00	1H - 102DA - 450
2.66	3470	354	26500	2700	0.87	3.21	2880	294	26500	2700	1.06	1H - 82DA - 545
			29400	3000	1.15				29400	3000	1.36	1H - 92DA - 545
			36300	3700	1.62				36300	3700	1.96	1H - 102DA - 545
			45100	4600	2.00				45100	4600	2.00	1H - 112DA - 545

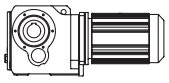
Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 1.5kW

1.5kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34



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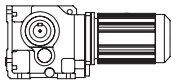

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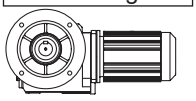


Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
18.1	751	76.5	21600	2200	2.70	21.9	622	63.4	21600	2200	2.70	2 - 72 - 80
14.5	939	95.7	21600	2200	2.16	17.5	778	79.3	21600	2200	2.61	2 - 72 - 100
12.1	1130	115	21600	2200	1.80	14.6	933	95.1	21600	2200	1.80	2 - 72 - 120
8.53	1480	151	21600	2200	1.00	10.3	1220	124	21600	2200	1.00	2 - 72DA - 170
			26500	2700	2.06				26500	2700	2.47	2 - 82DA - 170
7.25	1740	177	26500	2700	1.75	8.75	1440	147	26500	2700	2.11	2 - 82DA - 200
6.17	2040	208	26500	2700	1.49	7.45	1690	172	26500	2700	1.80	2 - 82DA - 235
			39400	3000	1.96				29400	3000	2.00	2 - 92DA - 235
5.47	2300	234	21600	2200	0.88	6.60	1910	195	21600	2200	1.00	2 - 72DA - 265
			26500	2700	1.32				26500	2700	1.47	2 - 82DA - 265
			29400	3000	1.47				29400	3000	1.47	2 - 92DA - 265
			36300	3700	2.45				36300	3700	2.95	2 - 102DA - 265
4.39	2870	293	26500	2700	1.06	5.30	2380	243	26500	2700	1.28	2 - 82DA - 330
			29400	3000	1.40				29400	3000	1.47	2 - 92DA - 330
			36300	3700	1.97				36300	3700	2.37	2 - 102DA - 330
3.72	3390	346	26500	2700	0.90	4.49	2810	286	26500	2700	1.08	2 - 82DA - 390
			29400	3000	1.18				29400	3000	1.43	2 - 92DA - 390
			36300	3700	1.66				36300	3700	2.01	2 - 102DA - 390
			45100	4600	2.24				45100	4600	2.25	2 - 112DA - 390
3.22	3910	399	29400	3000	1.00	3.89	3240	330	29400	3000	1.00	2 - 92DA - 450
			36300	3700	1.44				36300	3700	1.47	2 - 102DA - 450
2.66	4740	483	39400	3000	0.85	3.21	3930	401	39400	3000	1.00	2 - 92DA - 545
			36300	3700	1.19				36300	3700	1.44	2 - 102DA - 545
			45100	4600	1.47				45100	4600	1.47	2 - 112DA - 545

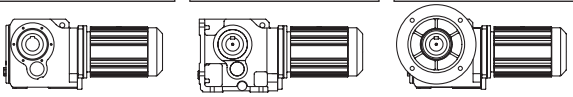
Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 2.2kW

2.2kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38



Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
29.0	688	70.2	20600	2100	2.95	35.0	570	58.1	19600	2000	2.95	3 - 72 - 50
24.2	826	84.2	21600	2200	2.46	29.2	684	69.8	20600	2100	2.46	3 - 72 - 60
18.1	1100	112	21600	2200	1.84	21.9	912	93.0	21600	2200	1.84	3 - 72 - 80
14.5	1380	141	21600	2200	1.47	17.5	1140	116	21600	2200	1.47	3 - 72 - 100
			26500	2700	2.21				26500	2700	2.21	3 - 82 - 100
12.1	1650	168	21600	2200	1.23	14.6	1370	140	21600	2200	1.23	3 - 72 - 120
			26500	2700	1.84				26500	2700	1.84	3 - 82 - 120
8.53	2170	221	26500	2700	1.40	10.3	1800	183	26500	2700	1.68	3 - 82DA - 170
			29400	3000	1.68				29400	3000	1.68	3 - 92DA - 170
7.25	2550	260	26500	2700	1.19	8.75	2110	215	26500	2700	1.44	3 - 82DA - 200
			29400	3000	1.57				29400	3000	1.68	3 - 92DA - 200
			36300	3700	2.21				36300	3700	2.5	3 - 102DA - 200
6.17	3000	306	36500	2700	1.01	7.45	2480	253	26500	2700	1.22	3 - 82DA - 235
			29400	3000	1.34				29400	3000	1.36	3 - 92DA - 235
			36300	3700	1.88				36300	3700	2.27	3 - 102DA - 235
5.47	3380	345	26500	2700	0.90	6.60	2800	285	26500	2700	1.00	3 - 82DA - 265
			29400	3000	1.00				29400	3000	1.00	3 - 92DA - 265
			36300	3700	1.67				36300	3700	2.01	3 - 102DA - 265
			45100	4600	2.25				45100	4600	2.30	3 - 112DA - 265
4.39	4210	429	29400	3000	0.95	5.30	3490	356	29400	3000	1.00	3 - 92DA - 330
			36300	3700	1.34				36300	3700	1.62	3 - 102DA - 330
			45100	4600	1.68				45100	4600	1.68	3 - 112DA - 330
3.72	4970	507	29400	3000	0.81	4.49	4120	420	29400	3000	0.97	3 - 92DA - 390
			36300	3700	1.13				36300	3700	1.37	3 - 102DA - 390
			45100	4600	1.53				45100	4600	1.53	3 - 112DA - 390
3.22	5740	585	29400	3000	0.98	3.89	4750	484	29400	3000	1.00	3 - 102DA - 450
			36300	3700	1.00				36300	3700	1.00	3 - 112DA - 450
2.66	6950	708	36300	3700	0.81	3.21	5760	587	36300	3700	0.98	3 - 102DA - 545
			45100	4600	1.00				45100	4600	1.00	3 - 112DA - 545

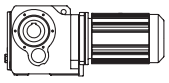
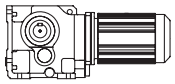
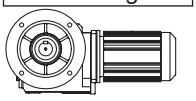
Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 3.0kW

3.0kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38

Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
36.3	751	76.5	19600	2000	2.70	43.8	622	63.4	18600	1900	2.70	4 - 72 - 40
29.0	939	95.7	20600	2100	2.16	35.0	778	79.3	19600	2000	2.16	4 - 72 - 50
24.2	1130	115	26100	2200	1.80	29.2	933	95.1	20600	2100	1.80	4 - 72 - 60
18.1	1500	153	21600	2200	1.35	21.9	1240	126	21600	2200	1.35	4 - 72 - 80
			26500	2700	2.02				26500	2700	2.02	4 - 82 - 80
14.5	1880	192	21600	2200	1.08	17.5	1560	159	21600	2200	1.08	4 - 72 - 100
			26500	2700	1.62				26500	2700	1.62	4 - 82 - 100
			29400	3000	2.14				29400	3000	2.14	4 - 92 - 100
12.1	2250	229	21600	2200	0.09	14.6	1870	191	21600	2200	0.90	4 - 72 - 120
			26500	2700	1.35				26500	2700	1.35	4 - 82 - 120
			29400	3000	1.78				29400	3000	1.78	4 - 92 - 120
8.53	5960	302	26500	2700	1.03	10.3	2450	250	26500	2700	1.23	4 - 82DA - 170
			29400	3000	1.23				29400	3000	1.23	4 - 92DA - 170
			36300	3700	1.83				36300	3700	1.83	4 - 102DA - 170
7.25	3480	355	26500	2700	0.87	8.75	2880	294	26500	2700	1.06	4 - 82DA - 200
			29400	3000	1.15				29400	3000	1.23	4 - 92DA - 200
			36300	3700	1.62				36300	3700	1.83	4 - 102DA - 200
			45100	4600	1.83				45100	4600	1.83	4 - 112DA - 200
6.17	4090	417	29400	3000	0.98	7.45	3390	346	29400	3000	1.00	4 - 92DA - 235
			36300	3700	1.38				36300	3700	1.67	4 - 102DA - 235
			45100	4600	1.68				45100	4600	1.68	4 - 112DA - 235
5.47	4610	470	36300	3700	1.22	6.60	3820	389	36300	3700	1.48	4 - 102DA - 265
			36300	3700	1.65				36300	3700	1.68	4 - 112DA - 265
4.39	5740	585	36300	3700	0.98	5.30	4750	484	36300	3700	1.19	4 - 102DA - 330
			45100	4600	1.23				45100	4600	1.23	4 - 112DA - 330
3.72	6780	691	36300	3700	0.89	4.49	5620	573	36300	3700	1.00	4 - 102DA - 390
			45100	4600	1.12				45100	4600	1.12	4 - 112DA - 390

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 3.7kW

3.7kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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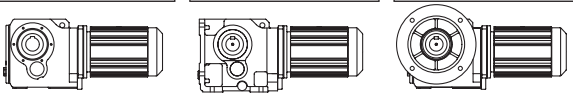

Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
48.3	695	70.8	18600	1900	2.92	58.3	576	58.7	17700	1800	2.92	5 - 72 - 30
36.3	926	94.4	19600	2000	2.19	43.8	767	78.2	18600	1900	2.19	5 - 72 - 40
29.0	1160	118	20600	2100	1.75	35.0	959	97.8	19600	2000	1.75	5 - 72 - 50
24.2	1390	142	21600	2200	1.46	29.2	1150	117	20600	2100	1.46	5 - 72 - 60
			26500	2700	2.19				26000	2650	2.19	5 - 82 - 60
18.1	1850	189	21600	2200	1.10	21.9	1530	156	21600	2200	1.10	5 - 72 - 80
			26500	2700	1.64				26500	2700	1.64	5 - 82 - 80
			29400	3000	2.17				29400	3000	2.17	5 - 92 - 80
14.5	2320	236	21600	2200	0.88	17.5	1920	196	21600	2200	0.88	5 - 72 - 100
			26500	2700	1.31				26500	2700	1.31	5 - 82 - 100
			26400	3000	1.73				29400	3000	1.73	5 - 92 - 100
12.1	2780	283	26500	2700	1.09	14.6	2300	234	26500	2700	1.09	5 - 82 - 120
			29400	3000	1.44				29400	3000	1.44	5 - 92 - 120
			36300	3700	1.97				36300	3700	1.97	5 - 102 - 120
8.53	3650	372	26500	2700	0.83	10.3	3020	308	26500	2700	1.00	5 - 82DA - 170
			29400	3000	1.00				26400	3000	1.00	5 - 92DA - 170
			36300	3700	1.49				36300	3700	1.49	5 - 102DA - 170
7.25	4290	437	29400	3000	0.93	8.75	3550	362	2940	3000	1.00	5 - 92DA - 200
			36300	3700	1.32				36300	3700	1.49	5 - 102DA - 200
6.17	5040	514	36300	3700	1.12	7.45	4180	426	36300	3700	1.35	5 - 102DA - 235
			45100	4600	1.37				45100	4600	1.37	5 - 112DA - 235
5.47	5680	579	36300	3700	0.99	6.60	4710	480	36300	3700	1.20	5 - 102DA - 265
			36300	3700	1.34				36300	3700	1.37	5 - 112DA - 265
4.39	7080	722	36300	3700	0.80	5.30	5860	597	36300	3700	0.96	5 - 102DA - 330
			45100	4600	1.00				45100	4600	1.00	5 - 112DA - 330

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 5.5kW

5.5kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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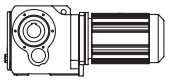
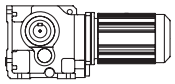
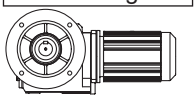

Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
145	344	35.1	14700	1500	2.73	175	285	29.1	14200	1450	2.73	8 - 72 - 10
121	413	42.1	15200	1550	2.73	146	342	34.9	14700	1500	2.73	8 - 72 - 12
96.7	516	52.6	15700	1600	2.73	117	428	43.6	15200	1550	2.73	8 - 72 - 15
72.5	688	70.2	16700	1700	2.73	87.5	570	58.1	16200	1650	2.73	8 - 72 - 20
58.0	860	87.7	17700	1800	2.16	70.0	713	72.7	16700	1700	2.16	8 - 72 - 25
48.3	1030	105	18600	1900	1.97	58.3	855	87.2	1770	1800	1.97	8 - 72 - 30
36.3	1380	141	19600	2000	1.47	43.8	1140	116	18600	1900	1.47	8 - 72 - 40
			25000	2550	2.21				24500	2500	2.21	8 - 82 - 40
29.0	1720	175	20600	2100	1.18	35.0	1430	146	19600	2000	1.18	8 - 72 - 50
			26000	2650	1.77				25500	2600	1.77	8 - 82 - 50
24.2	2060	210	26500	2700	1.47	29.2	1710	174	26500	2700	1.47	8 - 82 - 60
			29400	3000	1.94				26400	3000	1.94	8 - 92 - 60
18.1	2750	280	26500	2700	1.10	21.9	2280	232	26500	2700	1.10	8 - 82 - 80
			29400	3000	1.46				29400	3000	1.46	8 - 92 - 80
			36300	3700	1.99				36300	3700	1.99	8 - 102 - 80
14.5	3440	351	29400	3000	1.17	17.5	2850	291	29400	3000	1.17	8 - 92 - 100
			36300	3700	1.64				36300	3700	1.64	8 - 102 - 100
			45100	4600	2.21				45100	4600	2.21	8 - 112 - 100
12.1	4130	421	36300	3700	1.32	14.6	3420	349	36300	3700	1.32	8 - 102 - 120
			45100	4600	1.84				45100	4600	1.84	8 - 112 - 120
8.53	5420	552	36300	3700	1.00	10.3	4490	458	36300	3700	1.00	8 - 102DA - 170
7.25	6380	650	36300	3700	0.88	8.75	5280	538	36300	3700	1.00	8 - 102DA - 200
			45100	4600	1.00				45100	4600	1.00	8 - 112DA - 200

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 7.5kW

7.5kW	Frequency Hz	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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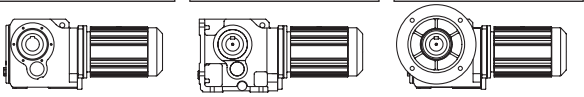

Frequency/Motor Revolution n_1												Type					
50Hz·1450 r/min						60Hz·1750 r/min											
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol	-	Frame Size	-	Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]						
145	469	47.8	14700	1500	2.00	175	389	39.6	14200	1450	2.00	10	-	72	-	10
121	563	57.4	15200	1550	2.00	146	467	47.6	14700	1500	2.00	10	-	72	-	12
96.7	704	71.8	15700	1600	2.00	117	583	59.4	15200	1550	2.00	10	-	72	-	15
72.5	939	95.7	16700	1700	2.00	87.5	778	79.3	16200	16500	2.00	10	-	72	-	20
58.0	1170	119	17700	1800	1.59	70.0	972	99.1	16700	1700	1.59	10	-	72	-	25
			21600	2200	2.43				20600	2100	2.43	10	-	82	-	25
48.3	1410	144	18600	1900	1.44	58.3	1170	119	17700	1800	1.44	10	-	72	-	30
			23500	2400	2.13				21600	2200	2.16	10	-	82	-	30
36.3	1880	192	19600	2000	1.08	43.8	1560	159	18600	1900	1.08	10	-	72	-	40
			25000	2550	1.62				24500	2500	1.62	10	-	82	-	40
			29400	3000	2.14				28400	2900	2.14	10	-	92	-	40
29.0	2350	240	20600	2100	0.87	35.0	1940	198	19600	2000	0.87	10	-	72	-	50
			26000	2650	1.30				25500	2600	1.30	10	-	82	-	50
			29400	3000	1.71				29400	3000	1.71	10	-	92	-	50
			36300	3700	2.40				36300	3700	2.40	10	-	102	-	50
24.2	2820	287	26500	2700	1.08	29.2	2330	238	26500	2700	1.08	10	-	82	-	60
			29400	3000	1.42				29400	3000	1.42	10	-	92	-	60
			36300	3700	1.94				36300	3700	1.94	10	-	102	-	60
18.1	3750	382	26500	2700	0.81	21.9	3110	317	26500	2700	0.81	10	-	82	-	80
			29400	3000	1.07				29400	3000	1.07	10	-	92	-	80
			36300	3700	1.46				36300	3700	1.46	10	-	102	-	80
			45100	4600	2.03				45100	4600	2.03	10	-	112	-	80
14.5	4690	478	29400	3000	0.85	17.5	3890	397	29400	3000	0.85	10	-	92	-	100
			36300	3700	1.20				36300	3700	1.20	10	-	102	-	100
			45100	4600	1.62				45100	4600	1.62	10	-	112	-	100
12.1	5630	574	36300	3700	0.97	14.6	4670	476	36300	3700	0.97	10	-	102	-	120
			45100	4600	1.35				45100	4600	1.35	10	-	112	-	120

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 11kW

11kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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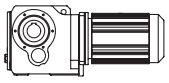
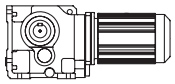
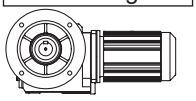

Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
145	688	70.2	14700	1500	1.36	175	570	58.1	14200	1450	1.36	15 - 72 - 10
			16700	1700	2.00				15700	1600	2.00	15 - 82 - 10
121	826	84.2	15200	1550	1.36	146	684	69.8	14700	1500	1.36	15 - 72 - 12
			17700	1800	2.00				16700	1700	2.00	15 - 82 - 12
96.7	1030	105	15700	1600	1.36	117	855	87.2	15200	1550	1.36	15 - 72 - 15
			18600	1900	2.00				17700	1800	2.00	15 - 82 - 15
72.5	1380	141	16700	1700	1.36	87.5	1140	116	16200	1650	1.36	15 - 72 - 20
			20600	2100	2.00				19600	2000	2.00	15 - 82 - 20
58.0	1720	175	17700	1800	1.08	70.0	1430	146	16700	1700	1.08	15 - 72 - 25
			21600	2200	1.65				20600	2100	1.65	15 - 82 - 25
			25500	2600	2.24				24500	2500	2.24	15 - 92 - 25
48.3	2060	210	18600	1900	0.98	58.3	1710	174	17700	1800	0.98	15 - 72 - 30
			23500	2400	1.47				21600	2200	1.47	15 - 82 - 30
			27500	2800	1.94				25500	2600	1.94	15 - 92 - 30
36.3	2750	280	25000	2550	1.10	43.8	2280	232	24500	2500	1.10	15 - 82 - 40
			29400	3000	1.46				28400	2900	1.46	15 - 92 - 40
			36300	3700	2.05				35300	3600	2.05	15 - 102 - 40
29.0	3440	351	26000	2650	0.88	35.0	2850	291	25500	2600	0.88	15 - 82 - 50
			29400	3000	1.17				26400	3000	1.17	15 - 92 - 50
			36300	3700	1.64				36300	3700	1.64	15 - 102 - 50
			45100	4600	2.21				45100	4600	2.21	15 - 112 - 50
24.2	4130	421	29400	3000	0.97	39.2	3420	349	29400	3000	0.97	15 - 92 - 60
			36300	3700	1.32				36300	3700	1.32	15 - 102 - 60
			45100	4600	1.84				45100	4600	1.84	15 - 112 - 60
18.1	5510	562	36300	3700	0.99	21.9	4560	465	36300	3700	0.99	15 - 102 - 80
			45100	4600	1.38				45100	4600	1.38	15 - 112 - 80
14.5	6880	701	45100	4600	1.01	17.5	5700	581	45100	4600	1.01	15 - 112 - 100
12.1	8260	842	45100	4600	0.92	14.6	6840	697	45100	4600	0.92	15 - 112 - 120

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 15kW

15kW	Frequency Hz	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

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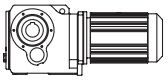
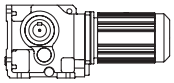
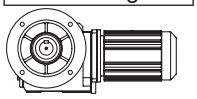




Frequency/Motor Revolution n_1												Type				
50Hz·1450 r/min						60Hz·1750 r/min										
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol	-	Frame Size	-	Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]						
145	939	95.7	14700	1500	1.00	175	778	79.3	14200	1450	1.00	20	-	72	-	10
			16700	1700	1.47				15700	1600	1.47	20	-	72	-	10
			19600	2000	2.00				18600	1900	2.00	20	-	92	-	10
121	1130	115	15200	1550	1.00	146	933	95.1	14700	1500	1.00	20	-	72	-	12
			17700	1800	1.47				16700	1700	1.47	20	-	82	-	12
			20600	2100	2.00				19600	2000	2.00	20	-	92	-	12
96.7	1410	144	15700	1600	1.00	117	1167	119	15200	1550	1.00	20	-	72	-	15
			18600	1900	1.47				17700	1800	1.47	20	-	82	-	15
			22600	2300	2.00				20600	2100	2.00	20	-	92	-	15
72.5	1880	192	16700	1700	1.00	87.5	1555	159	16200	1650	1.00	20	-	72	-	20
			20600	2100	1.47				19600	2000	1.47	20	-	82	-	20
			24500	2500	2.00				23500	2400	2.00	20	-	92	-	20
58.0	2350	240	21600	2200	1.21	70.0	1944	198	20600	2100	1.21	20	-	82	-	25
			25500	2600	1.64				24500	2500	1.64	20	-	92	-	25
			32400	3300	2.39				31400	3200	2.39	20	-	105	-	25
48.3	2820	287	23500	2400	1.08	58.3	2333	238	21600	2200	1.08	20	-	82	-	30
			27500	2800	1.42				25500	2600	1.42	20	-	92	-	30
			34300	3500	2.00				32400	3300	2.00	20	-	105	-	30
36.3	3750	382	25000	2550	0.81	43.8	3111	317	24500	2500	0.81	20	-	82	-	40
			29400	3000	1.07				28400	2900	1.07	20	-	92	-	40
			36300	3700	1.50				35300	3600	1.50	20	-	102	-	40
			45100	4600	2.03				44100	4500	2.03	20	-	115	-	40
29.0	4690	478	29400	3000	0.85	35.0	3888	396	29400	3000	0.85	20	-	92	-	50
			36300	3700	1.20				36300	3700	1.20	20	-	102	-	50
			45100	4600	1.62				45100	4600	1.62	20	-	112	-	50
24.2	5630	574	36300	3700	0.97	29.2	4666	476	36300	3700	0.97	20	-	102	-	60
			45100	4600	1.35				45100	4600	1.35	20	-	112	-	50

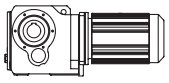
Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 18.5kW

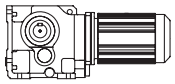
18.5kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

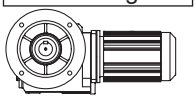
KHYM: Page 34



KHHM: Page 36



KHFM: Page 38



Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
145	1160	118	16700	1700	1.19	175	959	97.8	15700	1600	1.19	25 - 82 - 10
			19600	2000	1.62				18600	1900	1.62	25 - 92 - 10
			27500	2800	2.00				26500	2700	2.00	25 - 105 - 10
121	1390	142	17700	1800	1.19	146	1150	117	16700	1700	1.19	25 - 82 - 12
			20600	2100	1.62				19600	2000	1.62	25 - 92 - 12
			28400	2900	2.00				27500	2800	2.00	25 - 105 - 12
96.7	1740	177	18600	1900	1.19	117	1440	147	17700	1800	1.19	25 - 82 - 15
			22600	2300	1.62				20600	2100	1.62	25 - 92 - 15
			29400	3000	2.00				28400	2900	2.00	25 - 105 - 15
72.5	2320	236	20600	2100	1.19	87.5	1920	196	19600	2000	1.19	25 - 82 - 20
			24500	2500	1.62				23500	2400	1.62	25 - 92 - 20
			31400	3200	2.00				20600	2100	2.00	25 - 105 - 20
58.0	2890	295	21600	2200	0.98	70.0	2400	245	20300	2100	0.98	25 - 82 - 25
			2550	2600	1.33				24500	2500	1.33	25 - 92 - 25
			32400	3300	1.94				31400	3200	1.94	25 - 105 - 25
48.3	3470	354	27500	2800	1.15	58.3	2880	294	25500	2600	1.15	25 - 92 - 30
			34300	3500	1.62				32400	3300	1.62	25 - 105 - 30
			43200	4400	2.19				41700	4250	2.19	25 - 115 - 30
36.3	4630	472	36300	3700	1.22	43.8	3840	391	35300	3600	1.22	25 - 102 - 40
			45100	4600	1.64				44100	4500	1.64	25 - 115 - 40
29.0	5790	590	36300	3700	0.97	35.0	4800	489	36300	3700	0.97	25 - 102 - 50
			45100	4600	1.31				45100	4600	1.31	25 - 112 - 50
24.2	6950	708	45100	4600	1.10	29.2	5750	586	45100	4600	1.10	25 - 112 - 60

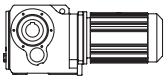
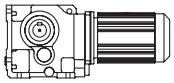
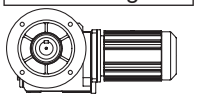
Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 22kW

22kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38

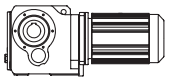
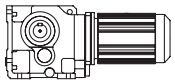
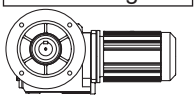
Frequency/Motor Revolution n_1												Type				
50Hz·1450 r/min						60Hz·1750 r/min										
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol	-	Frame Size	-	Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]						
145	1380	141	16700	1700	1.00	175	1140	116	15700	1600	1.00	30	-	82	-	10
			19600	2000	1.36				18600	1900	1.36	30	-	92	-	10
			27500	2800	1.68				26500	2700	1.68	30	-	105	-	10
			36300	3700	2.05				35300	3600	2.05	30	-	115	-	10
121	1650	168	17700	1800	1.00	146	1370	140	16700	1700	1.00	30	-	82	-	12
			20600	2100	1.36				19600	2000	1.36	30	-	92	-	12
			28400	2900	1.68				27500	2800	1.68	30	-	105	-	12
			37300	3800	2.05				36300	3700	2.05	30	-	115	-	12
96.7	2060	210	18600	1900	1.00	117	1710	174	17700	1800	1.00	30	-	82	-	15
			22600	2300	1.36				20600	2100	1.36	30	-	92	-	15
			29400	3000	1.68				28400	2900	1.68	30	-	105	-	15
			38300	3900	2.05				37300	3800	2.05	30	-	115	-	15
72.5	2750	280	20600	2100	1.00	87.5	2280	232	19600	2000	1.00	30	-	82	-	20
			24500	2500	1.36				23500	2400	1.36	30	-	92	-	20
			31400	3200	1.68				30400	3100	1.68	30	-	105	-	20
			40200	4100	2.05				39200	4000	2.05	30	-	115	-	20
58.0	3440	351	25500	2600	1.12	70.0	2850	291	24500	2500	1.12	30	-	92	-	25
			32400	3300	1.63				31400	3200	1.63	30	-	105	-	25
			41700	4250	2.05				40200	4100	2.05	30	-	115	-	25
48.3	4130	421	27500	2800	0.97	58.3	3420	349	25500	2600	0.97	30	-	92	-	30
			34300	3500	1.37				32400	3300	1.37	30	-	105	-	30
			43200	4400	1.84				41700	4250	1.84	30	-	115	-	30
36.3	5510	562	36300	3700	1.02	43.8	4560	465	35300	3600	1.02	30	-	102	-	40
			45100	4600	1.38				44100	4500	1.38	30	-	115	-	40
39.0	6880	701	45100	4600	1.11	35.0	5700	581	45100	4600	1.11	30	-	112	-	50

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

30kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38

Frequency/Motor Revolution n_1												Type
50Hz·1450 r/min						60Hz·1750 r/min						
Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Output Revolution n_2	Output Torque Tout		Allowable Output Shaft Radial Load Pro		SF_G	Capacity Symbol - Frame Size - Reduction Ratio
[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		[r/min]	[Nm]	[kgf·m]	[N]	[kgf]		
145	1880	192	19600	2000	1.00	175	1560	159	18600	1900	1.00	40 - 92 - 10
			27500	2800	1.23				26500	2700	1.23	40 - 105 - 10
			36300	3700	1.50				35300	3600	1.50	40 - 115 - 10
121	2250	229	20600	2100	1.00	146	1870	191	19600	2000	1.00	40 - 92 - 12
			28400	2900	1.23				27500	2800	1.23	40 - 105 - 12
			37300	3800	1.50				36300	3700	1.50	40 - 115 - 12
96.7	2820	287	22600	2300	1.00	117	2330	238	20600	2100	1.00	40 - 92 - 15
			29400	3000	1.23				28400	2900	1.23	40 - 105 - 15
			38300	3900	1.50				37300	3800	1.50	40 - 115 - 15
72.5	3750	382	24500	2500	1.00	87.5	3110	317	23500	2400	1.00	40 - 92 - 20
			31400	3200	1.23				30400	3100	1.23	40 - 105 - 20
			40200	4100	1.50				39200	4000	1.50	40 - 115 - 20
58.0	4690	478	32400	3300	1.19	70.0	3890	397	31400	3200	1.19	40 - 105 - 25
			41700	4250	1.50				40200	4100	1.50	40 - 115 - 25
48.3	5630	574	34300	3500	1.00	58.3	4670	476	32400	3300	1.00	40 - 105 - 30
			43200	4400	1.35				41700	42500	1.35	40 - 115 - 30
36.3	7510	766	45100	4600	1.01	43.8	6220	634	44100	4500	1.22	40 - 115 - 40

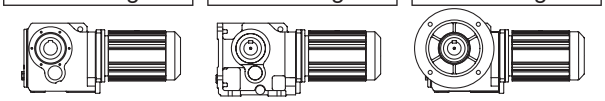
Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Selection Table 37kW · 45kW

37kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38

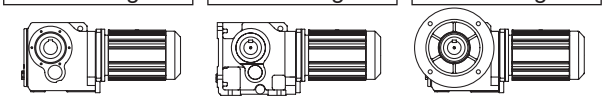


Frequency/Motor Revolution n_1 50Hz·1450 r/min						60Hz·1750 r/min						Type
Output Revolution n_2 [r/min]	Output Torque Tout [Nm]	[kgf·m]	Allowable Output Shaft Radial Load Pro [N]	[kgf]	SF_G	Output Revolution n_2 [r/min]	Output Torque Tout [Nm]	[kgf·m]	Allowable Output Shaft Radial Load Pro [N]	[kgf]	SF_G	Capacity Symbol - Frame Size - Reduction Ratio
145	2320	236	27500	2800	1.00	175	1920	196	26500	2700	1.00	50 - 105 - 10
			36300	3700	1.22				35300	3600	1.22	50 - 115 - 10
121	2780	283	28400	2900	1.00	146	2300	234	27500	2800	1.00	50 - 105 - 12
			37300	3800	1.22				36300	3700	1.22	50 - 115 - 12
96.7	3470	354	29400	3000	1.00	117	2880	294	28400	2900	1.00	50 - 105 - 15
			38300	3900	1.22				37300	3800	1.22	50 - 115 - 15
72.5	4630	472	31400	3200	1.00	87.5	3840	391	30400	3100	1.00	50 - 105 - 20
			40200	4100	1.22				39200	4000	1.22	50 - 115 - 20
58.0	5790	590	32400	3300	0.97	70.0	4800	489	31400	3200	0.97	50 - 105 - 25
			41700	4250	1.22				40200	4100	1.22	50 - 115 - 25
48.3	6950	708	43200	4400	1.10	58.3	5750	586	41700	4250	1.10	50 - 115 - 30

45kW	Frequency [Hz]	50	60
	Poles P	4	4
	Revolution n_1 [r/min]	1450	1750

Dimension drawing

KHYM: Page 34 KHHM: Page 36 KHFM: Page 38



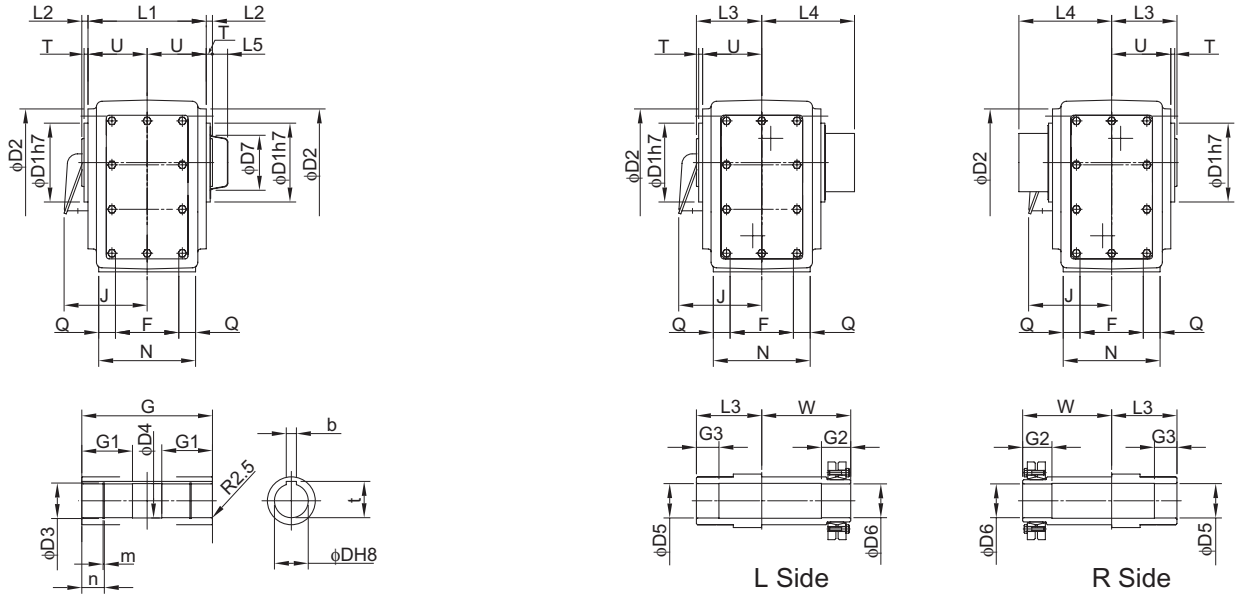
Frequency/Motor Revolution n_1 50Hz·1450 r/min						60Hz·1750 r/min						Type
Output Revolution n_2 [r/min]	Output Torque Tout [Nm]	[kgf·m]	Allowable Output Shaft Radial Load Pro [N]	[kgf]	SF_G	Output Revolution n_2 [r/min]	Output Torque Tout [Nm]	[kgf·m]	Allowable Output Shaft Radial Load Pro [N]	[kgf]	SF_G	Capacity Symbol - Frame Size - Reduction Ratio
145	2820	287	36300	3700	1.00	175	2330	238	35300	3600	1.00	60 - 115 - 10
121	3380	245	37300	3800	1.00	146	2800	285	36300	3700	1.00	60 - 115 - 12
96.7	4220	430	38300	3900	1.00	117	3500	357	37300	3800	1.00	60 - 115 - 15
72.5	5630	574	40200	4100	1.00	87.5	4670	476	39200	4000	1.00	60 - 115 - 20
58.0	7040	718	41700	4250	1.00	70.0	5830	594	40200	4100	1.00	60 - 115 - 25
48.3	8450	861	43200	4400	0.90	58.3	7000	714	41700	4250	0.90	60 - 115 - 30

Note: 1. The motor revolution (n_1) in the above tables is a typical value, and the output revolution (n_2) is the value of [n_1/reduction ratio]. Refer to the "Motor" section of the technical data for the details of motor revolution.
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for actual reduction ratio.
3. The allowable output shaft radial load (Pro) is the center value of the solid shaft/output shaft.
4. Refer to page 52 for the details of lubrication.
5. The values in the above tables are subject to change without notice in advance.

Gearmotor Dimension Table

Gearmotor Dimension Table: Hollow Shaft Type (KHYM)

KHYM□-72 ~ 112, 115 (Fig. 3a)
KHYM□-72DA ~ 112, 115DA (Fig. 3b)



Standard Shaft

With Clamp Collar (Option)

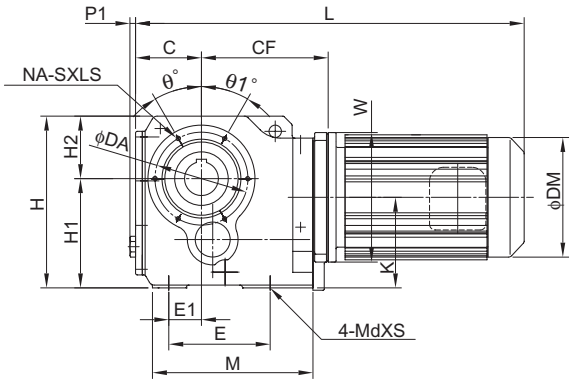


Fig. 3a

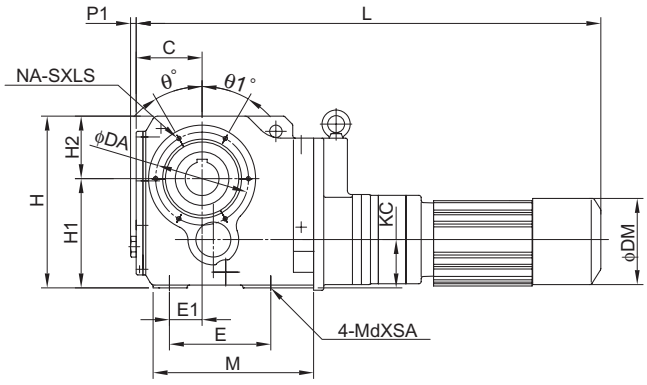


Fig. 3b

Frame Size	CF	C	P1	H	H1	H2	K	KC	M	E	E1	d	SA	N	F	Q	T	U	L1	L2	L3	L4	L5	D1
72	225	136	12	305	194	111	161	86	285	180	58	16	26	172	140	16	7	105	210	11	116	184	47	140
82	241	145	12	343	218	125	186	99	318	208	69	16	32	200	160	20	7	121	242	12	133	201	52	152
92, 95	260	156	12	381	245	136	207	112	348	220	75	20	35	210	170	20	7	128	256	13.5	142	217	57	164
102, 105	312	179	12	430	280	150	245	130	415	255	80	20	35	248	180	34	8	146	292	14	160	261	62	190
112, 115	328	197	12	460	292	168	240	125	446	285	95	20	35	270	190	40	10	164	328	17	181	288	62	210

Frame Size	D2	D3	D4	D5	D6	D7	DA	θ°	θ1°	NA	S	LS	D	b	t	G	G1	G2	G3	W	n	m
72	190	63	61	61 $^{+0.046}_{+0.016}$	60 $^{+0.030}_{+0.005}$	143	165	30	30	6	M12	22	60	18	64.4	232	90	52	40	158	40	2.2
82	218	68	66	66 $^{+0.046}_{+0.016}$	65 $^{+0.030}_{+0.005}$	163	190	34	11	8	M12	22	65	18	69.4	266	96	52	40	175	52	2.7
92, 95	240	73	71	71 $^{+0.046}_{+0.016}$	70 $^{+0.030}_{+0.005}$	183	200	30	30	6	M16	26	70	20	74.9	283	105	59	40	191	52	2.7
102, 105	260	84	81	82 $^{+0.046}_{+0.016}$	80 $^{+0.030}_{+0.005}$	203	220	30	30	6	M16	26	80	22	85.4	320	120	80	55	170	52	2.7
112, 115	290	94	91	92 $^{+0.054}_{+0.019}$	90 $^{+0.030}_{+0.005}$	213	245	45	15	6	M20	33	90	25	95.4	362	135	86	55	257	60	3.2

Note: 1. □ shows motor capacity symbol.
2. Output shaft diameter dimension: The tolerance is JIS B 0401-1976 "H8."
3. End key dimension: Complies with "JIS B 1301-1996 Parallel key (tightening type)."
4. Refer to page 63 for the torque arm dimension.
5. The dimensions and weight in the above drawings are subject to change without notice in advance.

Gearmotor Dimension Table: Hollow Shaft Type (KHYM)

Fig. 3a (Four-Polar Motor)

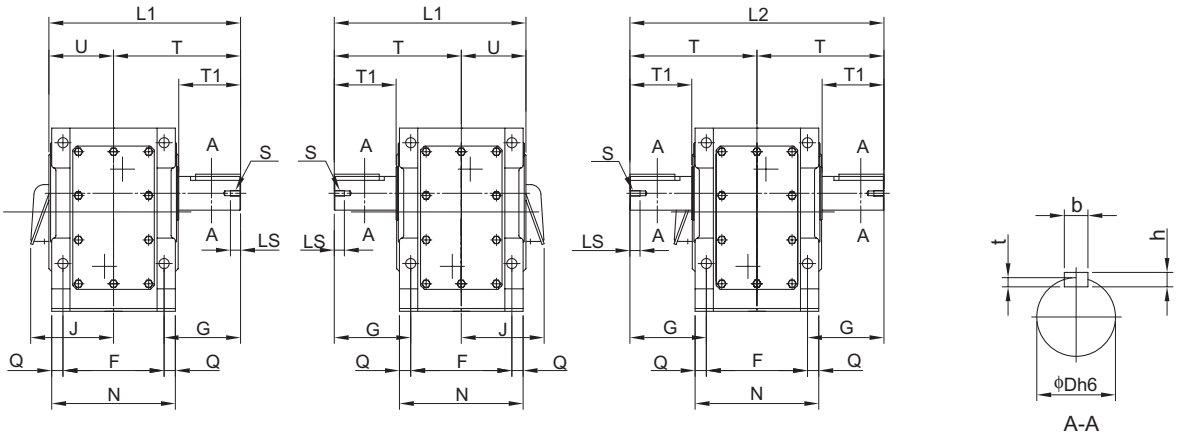
Frame Size	Motor [kW]	Indoor Specification									
		Standard Motor					Motor with Brake				
		L	J	W	DM	Weight [kg]	L	J	W	DM	Weight [kg]
72	1.1	613	119	230	160	82	675	119	230	160	87
	1.5	613	119	230	160	82	675	119	230	160	87
	2.2	648	126	230	173	87	711	126	230	173	93
	3.0	674	147	230	212	95	746	147	230	212	105
	3.7	674	147	230	212	95	746	147	230	212	105
	5.5	718	147	230	212	102	790	147	230	212	112
	7.5	731	188	230	251	116	826	188	230	251	133
	11	790	188	230	251	130	886	188	230	251	147
	15	836	232	300	324	189	941	232	300	324	223
82	1.5	638	119	230	160	120	700	119	230	160	125
	2.2	673	126	230	173	125	736	126	230	173	131
	3.0	699	147	230	212	133	771	147	230	212	173
	3.7	699	147	230	212	133	771	147	230	212	173
	5.5	743	147	230	212	140	815	147	230	212	150
	7.5	756	188	230	251	155	851	188	230	251	172
	11	816	188	230	251	169	911	188	230	251	186
	15	861	232	300	324	228	966	232	300	324	262
	18.5	946	297	300	394	300	1111	297	300	394	345
	22	946	297	300	394	300	1111	297	300	394	345
92,95	2.2	703	126	230	173	159	766	126	230	17	165
	3.0	729	147	230	212	167	801	147	230	212	177
	3.7	729	147	230	212	167	801	147	230	212	177
	5.5	773	147	230	212	174	845	147	230	212	184
	7.5	786	188	230	251	189	881	188	230	251	206
	11	846	188	230	251	203	941	188	230	251	220
	15	891	232	360	324	270	996	232	360	324	304
	18.5	976	297	360	394	343	1141	297	360	394	388
	22	976	297	360	394	343	1141	297	360	394	388
	30	976	297	360	394	356	1141	297	360	394	401
102,105	3.7	804	147	230	212	228	876	147	230	212	238
	5.5	848	147	230	212	235	920	147	230	212	245
	7.5	861	188	230	251	250	957	188	230	251	267
	11	921	188	230	251	264	1016	188	230	251	281
	15	966	232	360	324	327	1071	232	360	324	361
	18.5	1051	297	360	394	399	1216	297	360	394	444
	22	1051	297	360	394	399	1216	297	360	394	444
	30	1051	297	360	394	412	1216	297	360	394	457
	37	1166	297	360	394	449	-	-	-	-	-
112,115	5.5	883	147	230	212	298	955	147	230	212	308
	7.5	896	188	230	251	312	991	188	230	251	329
	11	956	188	230	251	326	1051	188	230	251	343
	15	998	232	360	324	390	1106	232	360	324	424
	18.5	1086	297	360	394	462	1251	297	360	394	507
	22	1086	297	360	394	462	1251	297	360	394	507
	30	1086	297	360	394	475	1251	297	360	394	507
	37	1201	297	360	394	513	-	-	-	-	-
	45	1201	297	360	394	529	-	-	-	-	-

Fig. 3b (Four-Polar Motor)

Frame Size	Motor [kW]	Indoor Specification							
		Standard Motor				Motor with Brake			
		L	J	DM	Weight [kg]	L	J	DM	Weight [kg]
72DA	0.4	715	85	124	80	747	105	124	81
	0.55	751	114	148	83	800	114	148	85
	0.75	751	114	148	83	800	114	148	85
	1.1	782	119	160	87	844	119	160	92
	1.5	782	119	160	87	844	119	160	92
82DA	0.4	794	-	124	133	826	-	124	134
	0.55	823	-	148	136	866	-	148	138
	0.75	823	-	148	136	866	-	148	138
	1.1	851	-	160	140	913	-	160	144
	1.5	851	-	160	140	913	-	160	144
	2.2	868	-	173	143	931	-	173	149
	3.0	894	147	212	152	966	147	212	162
	3.7	894	147	212	152	966	147	212	162
92DA	0.75	848	-	148	167	891	-	148	169
	1.1	876	-	160	171	938	-	160	175
	1.5	876	-	160	171	938	-	160	175
	2.2	893	-	173	174	956	-	173	180
	3.0	919	147	212	183	991	147	212	193
	3.7	919	147	212	183	991	147	212	193
102DA	0.75	938	-	148	237	981	-	148	240
	1.1	966	-	160	241	1028	-	160	246
	1.5	966	-	160	241	1028	-	160	246
	2.2	983	-	173	245	1046	-	173	251
	3.0	1009	-	212	255	1081		212	264
	3.7	1009	-	212	255	1081	-	212	264
	5.5	1053	-	212	262	1125	-	212	272
112DA	1.1	1000	-	160	304	1062	-	160	309
	1.5	1000	-	160	304	1062	-	160	309
	2.2	1017	-	173	308	1080	-	173	314
	3.0	1043	-	212	318	1115	-	212	327
	3.7	1043	-	212	318	1115	-	212	327
	5.5	1087	-	212	325	1159	-	212	335

Gearmotor Dimension Table: Solid Shaft/Foot Mount Type (KHHM)

KHHM □ -72 Δ ~ 112, 115 (Fig. 4a)
KHHM □ -72DA Δ ~ 112, 115DA (Fig. 4b)



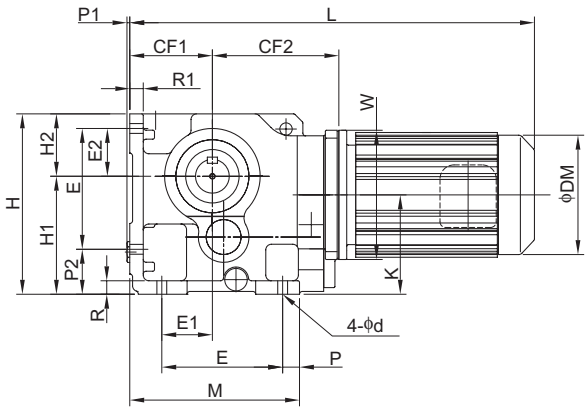


Fig. 4a

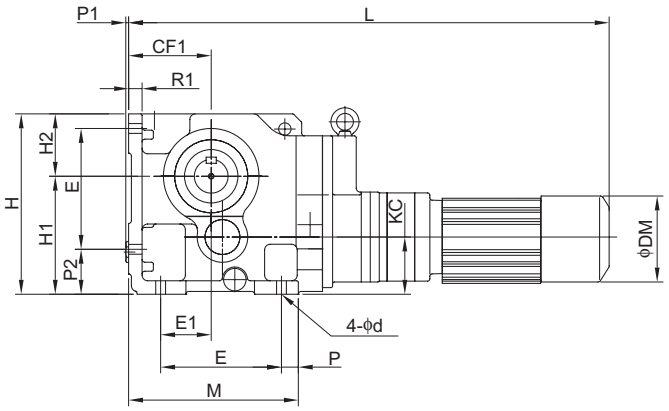


Fig. 4b

Frame Size	CF1	CF2	P	P1	P2	H	H1	H2	K	KC	M	E	E1	E2	d	R	R1	N
72	147	225	30	1	80	321	210	111	177	102	302	215	90	85	18	24	28	220
82	160	241	34	2	85	355	230	125	198	112	334	240	100	95	22	26	28	255
92, 95	180	260	35	1	95	391	255	136	217	122	370	260	105	100	22	29	31	270
102, 105	215	312	42	-	100	440	290	150	255	140	432	300	125	110	26	35	35	310
112, 115	235	328	40	-	110	488	320	168	268	153	470	330	135	120	26	40	40	350

Frame Size	F	Q	G	T	U	L1	L2	T1	S	LS	D	b	h	t
72	180	20	136	226	115	341	452	110	M10	18	60	18	11	7
82	205	25	151	253	130	383	506	120	M12	24	65	18	11	7
92, 95	220	25	160	270	139	409	540	130	M12	24	70	20	12	7.5
102, 105	250	30	175	300	155	455	600	140	M16	32	80	22	14	9
112, 115	290	30	196	341	176	517	682	160	M16	32	90	25	14	9

Note: 1. □ shows motor capacity symboll. Δ shows shaft direction symbol L, R, or T.
2. Output shaft diameter dimension: The tolerance is JIS B 0401-1976 "h6."
3. End key dimension: Complies with "JIS B 1301-1996 Parallel key (tightening type)."
4. The dimensions and weight in the above drawings are subject to change without notice in advance.

Gearmotor Dimension Table: Solid Shaft/Foot Mount Type (KHHM)

Fig. 4a (Four-Polar Motor)

Frame Size	Motor	Indoor Specification											
		Standard Motor						Motor with Brake					
	[kW]	L	J	W	DM	Weight [kg] Shaft Direction Symbol L/R	Weight [kg] Shaft Direction Symbol T	L	J	W	DM	Weight [kg] Shaft Direction Symbol L/R	Weight [kg] Shaft Direction Symbol T
72	1.1	624	119	230	160	103	106	686	119	230	160	108	111
	1.5	624	119	230	160	103	106	686	119	230	160	108	111
	2.2	659	126	230	173	108	111	722	126	230	173	114	117
	3.0	685	147	230	212	116	119	757	147	230	212	126	129
	3.7	685	147	230	212	116	119	757	147	230	212	126	129
	5.5	729	147	230	212	123	126	801	147	230	212	133	136
	7.5	742	188	230	251	137	140	837	188	230	251	154	157
	11	802	188	230	251	151	154	897	230	251	251	168	171
	15	847	232	300	324	210	213	952	232	324	324	244	247
82	1.5	653	119	230	160	139	143	715	119	230	160	144	148
	2.2	688	126	230	173	144	148	751	126	230	173	150	154
	3.0	714	147	230	212	152	156	786	147	230	212	162	166
	3.7	714	147	230	212	152	156	786	147	230	212	162	166
	5.5	758	147	230	212	159	163	830	147	230	212	169	173
	7.5	771	188	230	251	173	177	739	188	230	251	190	194
	11	831	188	230	251	187	191	926	188	230	251	204	208
	15	876	232	300	324	246	250	981	232	300	324	280	284
	18.5	1016	297	300	394	318	322	1181	297	300	394	363	367
	22	1016	297	300	394	318	322	1181	297	300	394	363	367
92,95	2.2	1031	126	230	173	178	183	790	126	230	173	184	189
	3.0	753	147	230	212	187	192	825	147	230	212	197	202
	3.7	753	147	230	212	187	192	825	147	230	212	197	202
	5.5	797	147	230	212	194	199	869	147	230	212	204	209
	7.5	810	188	230	251	208	213	905	188	230	251	225	230
	11	870	188	230	251	222	227	965	188	230	251	239	244
	15	915	232	360	324	290	295	1020	232	360	324	324	329
	18.5	1000	297	360	394	362	367	1165	297	360	394	407	412
	22	1000	297	360	394	362	367	1165	297	360	394	407	412
	30	1000	297	360	394	375	380	1165	297	360	394	420	425
102,105	3.7	840	147	230	212	271	277	912	147	230	212	281	287
	5.5	884	147	230	212	278	284	956	147	230	212	288	294
	7.5	897	188	230	251	292	298	992	188	230	251	309	315
	11	957	188	230	251	306	312	1052	188	230	251	323	329
	15	1002	232	360	324	370	376	1107	232	360	324	404	410
	18.5	1087	297	360	394	442	448	1252	297	360	394	487	493
	22	1087	297	360	394	455	461	1252	297	360	394	500	506
	30	1087	297	360	394	455	461	1252	297	360	394	500	506
	37	1202	297	360	394	492	498	-	-	-	-	-	-
112,115	5.5	921	147	230	212	345	354	993	147	230	212	355	364
	7.5	934	188	230	251	359	368	1029	188	230	251	376	385
	11	994	188	230	251	373	382	1089	188	230	251	390	399
	15	1039	232	360	324	436	445	1144	232	360	324	470	479
	18.5	1124	297	360	394	509	518	1289	297	360	394	554	563
	22	1124	297	360	394	509	518	1289	297	360	394	554	563
	30	1124	297	394	394	509	518	1289	297	360	394	567	576
	37	1239	297	360	394	559	568	-	-	-	-	-	-
	45	1239	297	360	394	576	585	-	-	-	-	-	-

Fig. 4b (Four-Polar Motor)

Frame size	Motor	Indoor Specification										
		Standard Motor					Motor with Brake					
	[kW]	L	J	DM	Weight [kg] Shaft Direction Symbol L/R	Weight [kg] Shaft Direction Symbol T	L	J	DM	Weight [kg] Shaft Direction Symbol L/R	Weight [kg] Shaft Direction Symbol T
72DA	0.4	726	85	124	92	95	758	105	124	93	96
	0.55	762	114	148	95	98	805	114	148	97	100
	0.75	762	114	148	95	98	805	114	148	97	100
	1.1	793	119	160	99	102	855	119	160	104	107
	1.5	793	119	160	99	102	855	119	160	104	107
82DA	0.4	809	-	124	144	148	841	-	124	145	149
	0.55	838	-	148	147	151	881	-	148	149	153
	0.75	838	-	148	147	151	881	-	148	149	153
	1.1	866	-	160	151	155	928	-	160	155	159
	1.5	866	-	160	151	155	928	-	160	155	159
	2.2	883	-	173	154	158	946	-	173	160	164
	3.0	909	147	212	163	167	981	147	212	173	177
	3.7	909	147	212	163	167	981	147	212	173	177
92DA	0.75	872	-	148	177	182	915	-	148	179	184
	1.1	900	-	160	181	186	962	-	160	185	190
	1.5	900	-	160	181	186	962	-	160	185	190
	2.2	917	-	173	184	189	980	-	173	190	195
	3.0	943	147	212	193	198	1015	147	212	203	208
	3.7	943	147	212	193	198	1015	147	212	203	208
102DA	0.75	974	-	148	263	269	1017	-	148	266	272
	1.1	1002	-	160	267	273	1064	-	160	272	278
	1.5	1002	-	160	267	273	1064	-	160	272	278
	2.2	1019	-	173	271	277	1082	-	173	277	283
	3.0	1045	-	212	281	287	1117	-	212	290	296
	3.7	1045	-	212	281	287	1117	-	212	290	296
	5.5	1089	-	212	288	294	1161	-	212	298	304
112DA	1.1	1038	-	160	339	348	1100	-	160	344	353
	1.5	1038	-	160	339	348	1100	-	160	344	353
	2.2	1055	-	173	343	352	1118	-	173	349	358
	3.0	1081	-	212	353	362	1153	-	212	362	371
	3.7	1081	-	212	353	362	1153	-	212	362	371
	5.5	1125	-	212	360	369	1197	-	212	370	379

Gearmotor Dimension Table: Solid Shaft/Foot Mount Type (KHFM)

KHFM □ -72 Δ ~ 112, 115 (Fig. 5a)
KHFM □ -72DA Δ ~ 112, 115DA (Fig. 5b)

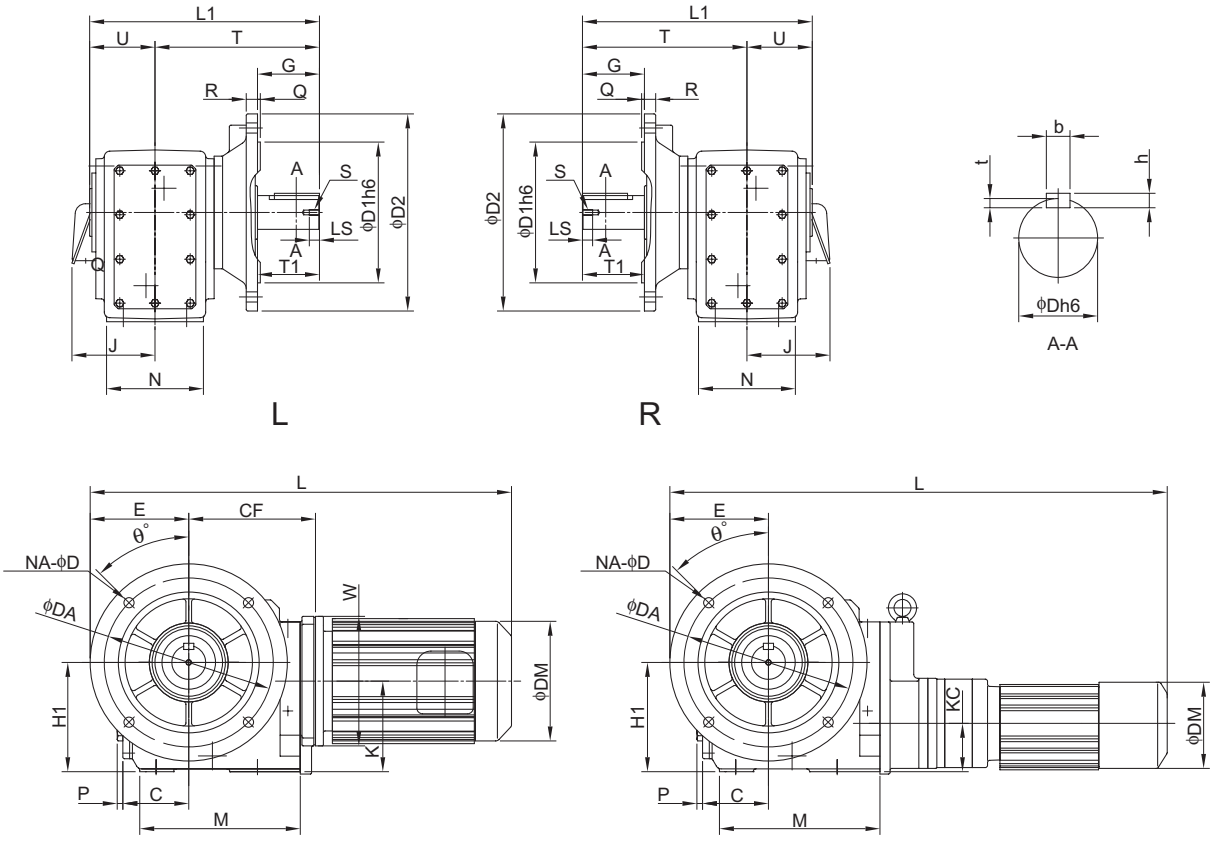


Fig. 5a

Fig. 5b

Frame Size	CF	E	C	P1	M	K	KC	N	T	U	L1	G	D1	D2
72	225	175	136	12	285	161	86	172	292	112	404	110	250	350
82	241	200	145	12	318	186	99	200	318	128	446	120	300	400
92, 95	260	225	156	12	348	207	112	210	342	135	477	130	350	450
102, 105	312	225	176	12	415	245	130	248	370	154	524	140	350	450
112, 115	328	225	197	12	446	240	125	270	416	174	590	160	350	450

Frame Size	Q	R	DA	θ°	NA	d	T1	S	LS	D	b	h	t
72	5	20	300	45	4	18	110	M10	18	60	18	11	7
82	5	20	350	450	4	18	120	M12	24	65	18	11	7
92, 95	5	22	400	23	8	18	130	M16	24	70	20	12	7.5
102, 105	5	22	400	23	8	18	140	M16	32	80	22	14	9
112, 115	5	25	400	23	8	18	160	M20	32	90	25	14	9

Note: 1. □ shows motor capacity symboll. Δ shows shaft direction symbol L, R, or T.
2. Output shaft diameter dimension: The tolerance is JIS B 0401-1976 "h6."
3. End key dimension: Complies with "JIS B 1301-1996 Parallel key (tightening type)."
4. The dimensions and weight in the above drawings are subject to change without notice in advance.

Gearmotor Dimension Table: Solid Shaft/Foot Mount Type (KHFM)

Fig. 5a (Four-Polar Motor)

Frame Size	Motor [kW]	Indoor Specification									
		Standard Motor					Motor with Brake				
		L	J	W	DM	Weight [kg]	L	J	W	DM	Weight [kg]
72	1.1	652	119	230	160	113	714	119	230	160	118
	1.5	652	119	230	160	113	714	119	230	160	118
	2.2	687	126	230	173	117	750	126	230	173	123
	3.0	713	147	230	212	126	785	147	230	212	136
	3.7	713	147	230	212	126	785	147	230	212	136
	5.5	757	147	230	212	133	829	147	230	212	143
	7.5	700	188	230	251	147	865	188	230	251	164
	11	830	188	230	251	161	925	188	230	251	178
	15	875	232	300	324	220	980	232	300	324	254
82	1.5	693	119	230	160	157	755	119	230	160	162
	2.2	728	126	230	173	161	791	126	230	173	167
	3.0	754	147	230	212	170	826	147	230	212	180
	3.7	754	147	230	212	170	826	147	230	212	180
	5.5	798	147	230	212	177	870	147	230	212	187
	7.5	811	188	230	251	191	906	188	230	251	208
	11	871	188	230	251	205	966	188	230	251	222
	15	916	232	300	324	264	1021	232	300	324	298
	18.5	1056	297	300	394	336	1156	297	300	394	382
	22	1056	297	300	394	336	1156	297	300	394	382
92,95	2.2	772	126	230	173	205	835	126	230	173	211
	3.0	798	147	230	212	214	870	147	230	212	224
	3.7	798	147	230	212	214	870	147	230	212	224
	5.5	842	147	230	212	221	914	147	230	212	231
	7.5	855	188	230	251	235	950	188	230	251	252
	11	915	188	230	251	249	1010	188	230	251	266
	15	960	232	360	324	317	1065	232	360	324	351
	18.5	1045	297	360	394	389	1210	297	360	394	434
	22	1045	297	360	394	389	1210	297	360	394	434
	30	1045	297	360	394	402	1210	297	360	394	448
102,105	3.7	850	147	230	212	282	922	147	230	212	292
	5.5	894	147	230	212	289	966	147	230	212	299
	7.5	907	188	230	251	303	1002	188	230	251	320
	11	967	188	230	251	317	1062	188	230	251	334
	15	1012	232	360	324	381	1117	232	360	324	415
	18.5	1097	297	360	394	453	1262	297	360	394	498
	22	1097	297	360	394	453	1262	297	360	394	498
	30	1097	297	360	394	466	1262	297	360	394	511
	37	1212	297	360	394	503	-	-	-	-	-
112,115	5.5	911	147	230	212	357	983	147	230	212	367
	7.5	924	188	230	251	371	1019	188	230	251	388
	11	934	188	230	251	385	1079	188	230	251	402
	15	1029	232	360	324	449	1134	232	360	324	483
	18.5	1114	297	360	394	521	1279	297	360	394	566
	22	1114	297	360	394	521	1279	297	360	394	566
	30	1114	297	360	394	521	1279	297	360	394	579
	37	1229	297	360	394	572	-	-	-	-	-
	45	1229	297	360	394	588	-	-	-	-	-

Fig. 5b (Four-Polar Motor)

Frame Size	Motor [kW]	Indoor Specification							
		Standard Motor				Motor with Brake			
		L	J	DM	Weight [kg]	L	J	DM	Weight [kg]
72DA	0.4	754	85	124	111	786	105	124	112
	0.55	790	114	148	114	833	114	148	116
	0.75	790	114	148	114	833	114	148	116
	1.1	821	119	160	118	833	119	160	123
	1.5	821	119	160	118	833	119	160	123
82DA	0.4	849	-	124	173	881	-	124	171
	0.55	878	-	148	176	921	-	148	175
	0.75	878	-	148	176	921	-	148	175
	1.1	906	-	160	180	968	-	160	181
	1.5	906	-	160	180	968	-	160	181
	2.2	923	-	173	183	968	-	173	186
	3.0	949	147	212	192	1021	147	212	199
	3.7	949	147	212	192	1021	147	212	199
92DA	0.75	917	-	148	214	960	-	148	216
	1.1	945	-	160	218	1007	-	160	222
	1.5	945	-	160	218	1007	-	160	222
	2.2	962	-	173	221	1025	-	173	227
	3.0	988	147	212	230	1060	147	212	240
	3.7	988	147	212	230	1060	147	212	240
102DA	0.75	984	-	148	291	1027	-	148	294
	1.1	1012	-	160	295	1074	-	160	300
	1.5	1012	-	160	295	1074	-	160	300
	2.2	1029	-	173	299	1092	-	173	305
	3.0	1055	-	212	309	1127	-	212	318
	3.7	1055	-	212	309	1127	-	212	318
	5.5	1099	-	212	316	1171	-	212	326
112DA	1.1	1028	-	160	363	1090	-	160	368
	1.5	1028	-	160	363	1090	-	160	368
	2.2	1045	-	173	367	1108	-	173	373
	3.0	1071	-	212	377	1143	-	212	386
	3.7	1071	-	212	377	1143	-	212	386
	5.5	1115	-	212	384	1187	-	212	394

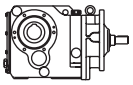
MEMO

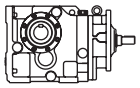
Reducer (Both-Shaft Type) Selection Table

Selection Table: Reducer (Both-Shaft Type)

Input Revolution	n_1= **50** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing — KHY: Page 48 — KHH: Page 49

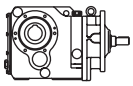


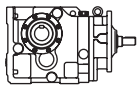


Frame Size	n_2 [r/min]		5.0	4.2	3.3	2.5	2.0	1.7	1.3	1.0	0.83	0.63	0.50	0.42
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	0.52	0.52	0.52	0.52	0.45	0.37	0.28	0.22	0.19	0.14	0.11	0.09
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	0.76	0.8	0.76	0.76	0.67	0.56	0.42	0.34	0.28	0.21	0.17	0.14
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	1.0	1.0	1.0	1.0	0.9	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	0.74	0.55	0.44	0.37	0.28	0.22	0.18
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	1.3	1.3	1.3	1.3	1.2	1.0	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	0.78	0.62	0.50	0.38	0.31	0.25
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	1.6	1.6	1.6	1.6	1.7	1.4	1.0	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	0.84	0.70	0.43	0.42	0.35
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

Input Revolution	n_1= **580** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing — KHY: Page 48 — KHH: Page 49





Frame Size	n_2 [r/min]		58.0	48.3	38.7	29.0	23.2	19.3	14.5	11.6	9.67	7.25	5.80	4.83
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	6.00	6.00	6.00	6.00	5.19	4.33	3.24	2.60	2.16	1.62	1.30	1.08
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	8.80	8.8	8.80	8.80	7.77	6.48	4.86	3.89	3.24	2.43	1.94	1.62
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	12.0	12.0	12.0	12.0	10.3	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	8.55	6.41	5.13	4.27	3.20	2.56	2.14
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	14.8	14.8	14.8	14.8	14.4	12.0	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	9.01	7.21	5.83	4.37	3.61	2.91
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	18.0	18.0	18.0	18.0	19.5	16.2	12.2	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	9.73	8.11	5.03	4.87	4.05
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

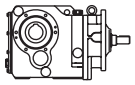
Note: 1. The output revolution (n_2) is the value of [Input revolution (n_1)/Reduction ratio].
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for the real reduction ratio.
3. Refer to page 52 for the details of lubrication.
4. The values in the above tables are subject to change without notice in advance.

Selection Table: Reducer (Both-Shaft Type)

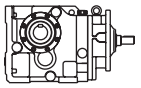
Input revolution	n_1= **720** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing

KHY: Page 48



KHH: Page 49

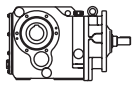


Frame Size	n_2 [r/min]		72.0	60.0	48.0	36.0	28.8	24.0	18.0	14.4	12.00	9.00	7.20	6.00
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	7.45	7.45	7.45	7.45	6.44	5.37	4.03	3.22	2.69	2.01	1.61	1.34
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	10.92	10.9	10.92	10.92	9.65	8.04	6.03	4.83	4.02	3.02	2.41	2.01
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	14.9	14.9	14.9	14.9	12.7	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	10.61	7.96	6.36	5.30	3.98	3.18	2.65
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	18.4	18.4	18.4	18.4	17.9	14.9	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	11.19	8.95	7.24	5.43	4.48	3.62
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	22.3	22.3	22.3	22.3	24.2	20.1	15.1	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	12.08	10.07	6.24	6.04	5.03
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

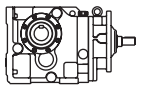
Input revolution	n_1= **870** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing

KHY: Page 48



KHH: Page 49



Frame Size	n_2 [r/min]		87.0	72.5	58.0	43.5	34.8	29.0	21.8	17.4	14.5	10.9	8.70	7.25
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	9.00	9.00	9.00	9.00	7.79	6.49	4.87	3.89	3.24	2.43	1.95	1.62
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	13.20	13.20	13.20	13.20	11.66	9.72	7.29	5.83	4.86	3.64	2.92	2.43
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	18.0	18.0	18.0	18.0	15.4	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	12.82	9.61	7.69	6.41	4.81	3.85	3.20
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	22.2	22.2	22.2	22.2	21.6	18.0	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	13.52	10.82	8.74	6.56	5.41	4.37
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	27.0	27.0	27.0	27.0	29.2	24.3	18.2	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	14.60	12.16	7.54	7.30	6.08
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

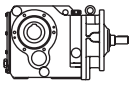
Note: 1. The output revolution (n_2) is the value of [Input revolution (n_1)/Reduction ratio].
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for the real reduction ratio.
3. Refer to page 52 for the details of lubrication.
4. The values in the above tables are subject to change without notice in advance.

Selection Table: Reducer (Both-Shaft Type)

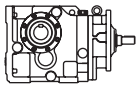
Input revolution	n_1= **980** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing

KHY: Page 48



KHH: Page 49

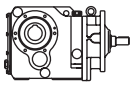


Frame Size	n_2 [r/min]		98.0	81.7	65.3	49.0	39.2	32.7	24.5	19.6	16.33	12.25	9.80	8.17
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	10.14	10.14	10.14	10.14	8.77	7.31	5.48	4.39	3.65	2.74	2.19	1.83
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	14.87	14.9	14.87	14.87	13.14	10.95	8.21	6.57	5.47	4.10	3.28	2.74
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	20.3	20.3	20.3	20.3	17.3	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	14.44	10.83	8.66	7.22	5.41	4.33	3.61
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	25.0	25.0	25.0	25.0	24.4	20.3	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	15.23	12.18	9.85	7.39	6.09	4.92
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	30.4	30.4	30.4	30.4	32.9	27.4	20.6	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	16.44	13.70	8.49	8.22	6.85
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

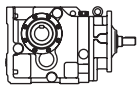
Input revolution	n_1= **1165** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing

KHY: Page 48



KHH: Page 49



Frame Size	n_2 [r/min]		116.5	97.1	77.7	58.3	46.6	38.8	29.1	23.3	19.42	14.56	11.65	9.71
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	12.05	12.05	12.05	12.05	10.43	8.69	6.52	5.21	4.34	3.26	2.61	2.17
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	17.68	17.7	17.68	17.68	15.61	13.01	9.76	7.81	6.51	4.88	3.90	3.25
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	24.1	24.1	24.1	24.1	20.6	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	17.16	12.87	10.30	8.58	6.44	5.15	4.29
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	29.7	29.7	29.7	29.7	29.0	24.1	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	18.11	14.48	11.71	8.78	7.24	5.85
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	36.2	36.2	36.2	36.2	39.1	32.6	24.4	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	19.54	16.29	10.10	9.77	8.14
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

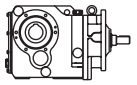
Note: 1. The output revolution (n_2) is the value of [Input revolution (n_1)/Reduction ratio].
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for the real reduction ratio.
3. Refer to page 52 for the details of lubrication.
4. The values in the above tables are subject to change without notice in advance.

Selection Table: Reducer (Both-Shaft Type)

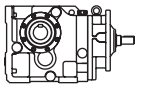
Input Revolution	n_1= **1450** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing

KHY: Page 48



KHH: Page 49



Frame Size	n_2 [r/min]		145	121	96.7	72.5	58.0	48.3	36.3	29.0	24.17	18.13	14.50	12.08
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	15.0	15.0	15.0	15.0	11.9	10.8	8.11	6.49	5.41	4.06	3.24	2.70
	T_{out}	[Nm]	939	1130	1410	1880	2030	2030	2030	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	95.7	115	144	192	207	207	207	207	207	207	207	207
82	P_1	[kW]	22.0	22.0	22.0	22.0	18.2	16.2	12.1	9.72	8.10	6.07	4.86	4.05
	T_{out}	[Nm]	1380	1650	2060	2750	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	141	168	210	280	310	310	310	310	310	310	310	310
95	P_1	[kW]	30.0	30.0	30.0	30.0	24.6	-	-	-	-	-	-	-
	T_{out}	[Nm]	1880	2250	2820	3750	4010	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	192	229	287	382	409	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	21.4	16.0	12.8	10.7	8.01	6.41	5.34
	T_{out}	[Nm]	-	-	-	-	-	4010	4010	4010	4010	4010	4010	4010
	T_{out}	[kgf·m]	-	-	-	-	-	409	409	409	409	409	409	409
105	P_1	[kW]	37.0	37.0	37.0	37.0	35.8	30.0	-	-	-	-	-	-
	T_{out}	[Nm]	2320	2780	3470	4630	5640	5640	-	-	-	-	-	-
	T_{out}	[kgf·m]	236	283	354	472	575	575	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	22.5	18.0	14.6	10.9	9.01	7.29
	T_{out}	[Nm]	-	-	-	-	-	-	5640	5640	5470	5470	5640	5470
	T_{out}	[kgf·m]	-	-	-	-	-	-	575	575	558	558	575	558
115	P_1	[kW]	45.0	45.0	45.0	45.0	45.0	40.5	30.4	-	-	-	-	-
	T_{out}	[Nm]	2820	3380	4220	5630	7610	7610	7610	-	-	-	-	-
	T_{out}	[kgf·m]	287	345	430	574	776	776	776	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	24.3	20.3	12.6	12.2	10.1
	T_{out}	[Nm]	-	-	-	-	-	-	-	7610	7610	6290	7610	7610
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	776	776	641	776	776

Frame Size	n_2 [r/min]		8.53	7.25	6.17	5.47	4.39	3.72	3.22	2.66
	Reduction Ratio [Z]		**170**	**200**	**235**	**265**	**330**	**390**	**450**	**545**
72DA	P_1	[kW]	1.50	1.35	1.10	1.32	1.06	0.90	0.78	0.64
	T_{out}	[Nm]	1480	1570	1500	2030	2030	2030	2030	2030
	T_{out}	[kgf·m]	151	160	153	207	207	207	207	207
82DA	P_1	[kW]	3.09	2.62	2.23	1.98	1.59	1.34	1.17	0.96
	T_{out}	[Nm]	3040	3040	3040	3040	3040	3040	3040	3040
	T_{out}	[kgf·m]	310	310	310	310	310	310	310	310
92DA	P_1	[kW]	3.70	3.46	2.94	2.20	2.10	1.77	1.50	1.27
	T_{out}	[Nm]	3650	4010	4010	3380	4010	4010	3910	4010
	T_{out}	[kgf·m]	372	409	409	345	409	409	399	409
102DA	P_1	[kW]	5.50	4.87	4.14	3.67	2.95	2.50	2.16	1.79
	T_{out}	[Nm]	5420	5640	5640	5640	5640	5640	5640	5640
	T_{out}	[kgf·m]	552	575	575	575	575	575	575	575
112DA	P_1	[kW]	5.50	5.50	5.05	4.95	3.70	3.37	2.20	2.20
	T_{out}	[Nm]	5420	6380	6880	7610	7080	7610	5740	6950
	T_{out}	[kgf·m]	552	650	701	776	722	776	585	708

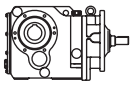
Note: 1. The output revolution (n_2) is the value of [Input revolution (n_1)/Reduction ratio].
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for the real reduction ratio.
3. Refer to page 52 for the details of lubrication.
4. The values in the above tables are subject to change without notice in advance.

Selection Table: Reducer (Both-Shaft Type)

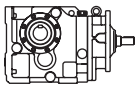
Input Revolution	n_1= **1750** r/min	n_1: Input revolution [r/min] n_2: Output revolution [r/min] P_1: Allowable input capacity [kW] T_{out}: Allowable output torque [Nm, kgf·m]

Dimension drawing

KHY: P. 48



KHH: P. 49



Frame Size	n_2 [r/min]		175	146	117	87.5	70.0	58.3	43.8	35.0	29.17	21.88	17.50	14.58
	Reduction Ratio [Z]		**10**	**12**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**80**	**100**	**120**
72	P_1	[kW]	15.0	15.0	15.0	15.0	11.9	10.8	8.11	6.49	5.41	4.06	3.24	2.70
	T_{out}	[Nm]	778	930	1170	1560	1540	1680	1680	1680	1680	1680	1680	1680
	T_{out}	[kgf·m]	79.3	95	119	159	157	171	171	171	171	171	171	171
82	P_1	[kW]	22.0	22.0	22.0	22.0	18.2	16.2	12.1	9.72	8.10	6.07	4.86	4.05
	T_{out}	[Nm]	1140	1370	1710	2280	2360	2520	2520	2520	2520	2520	2520	2520
	T_{out}	[kgf·m]	116	140	174	232	241	257	257	257	257	257	257	257
95	P_1	[kW]	30.0	30.0	30.0	30.0	24.6	-	-	-	-	-	-	-
	T_{out}	[Nm]	1560	1870	2330	3110	3190	-	-	-	-	-	-	-
	T_{out}	[kgf·m]	159	191	238	317	325	-	-	-	-	-	-	-
92	P_1	[kW]	-	-	-	-	-	21.4	16.0	12.8	10.7	8.01	6.41	5.34
	T_{out}	[Nm]	-	-	-	-	-	3320	3320	3320	3320	3320	3320	3320
	T_{out}	[kgf·m]	-	-	-	-	-	338	338	338	338	338	338	338
105	P_1	[kW]	37.0	37.0	37.0	37.0	35.8	30.0	-	-	-	-	-	-
	T_{out}	[Nm]	1920	2300	2330	3840	4640	4670	-	-	-	-	-	-
	T_{out}	[kgf·m]	196	234	238	391	473	476	-	-	-	-	-	-
102	P_1	[kW]	-	-	-	-	-	-	22.5	18.0	14.6	10.9	9.01	7.29
	T_{out}	[Nm]	-	-	-	-	-	-	4670	4670	4530	4530	4670	4530
	T_{out}	[kgf·m]	-	-	-	-	-	-	476	476	462	462	476	462
115	P_1	[kW]	45.0	45.0	45.0	45.0	45.0	40.5	30.4	-	-	-	-	-
	T_{out}	[Nm]	2330	2800	3500	4670	5830	6310	6310	-	-	-	-	-
	T_{out}	[kgf·m]	238	285	357	476	594	643	643	-	-	-	-	-
112	P_1	[kW]	-	-	-	-	-	-	-	24.3	20.3	12.6	12.2	10.1
	T_{out}	[Nm]	-	-	-	-	-	-	-	6310	6310	6290	6310	6310
	T_{out}	[kgf·m]	-	-	-	-	-	-	-	643	643	641	643	643

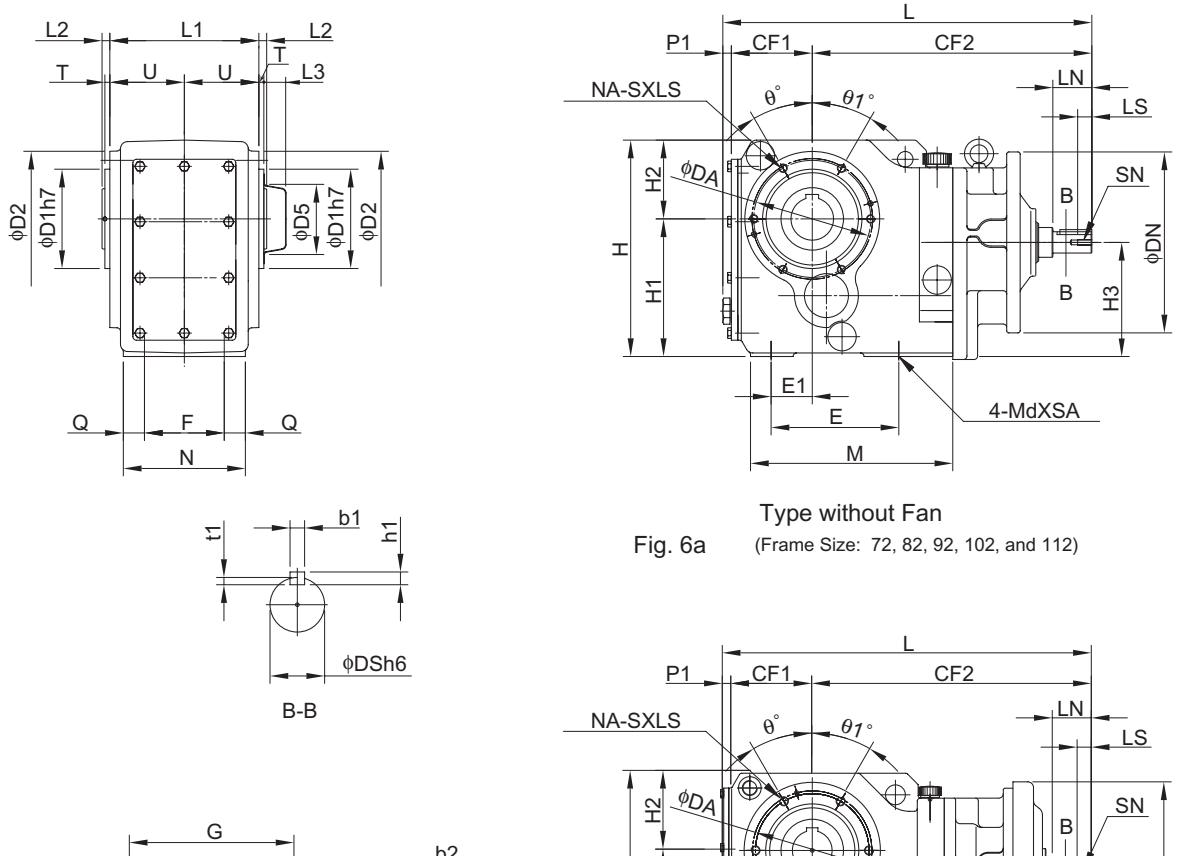
Frame Size	n_2 [r/min]		10.3	8.75	7.45	6.60	5.30	4.49	3.89	3.21
	Reduction Ratio [Z]		**170**	**200**	**235**	**265**	**330**	**390**	**450**	**545**
72DA	P_1	[kW]	1.50	1.35	1.10	1.50	1.28	1.08	0.94	0.78
	T_{out}	[Nm]	1220	1300	1240	1910	2030	2030	2030	2030
	T_{out}	[kgf·m]	124	133	126	195	207	207	207	207
82DA	P_1	[kW]	3.70	3.2	2.69	2.20	1.92	1.62	1.41	1.16
	T_{out}	[Nm]	3020	3040	3040	2800	3040	3040	3040	3040
	T_{out}	[kgf·m]	308	310	310	285	310	310	310	310
92DA	P_1	[kW]	3.70	3.70	3.00	2.20	2.20	2.14	1.50	1.50
	T_{out}	[Nm]	3020	3550	3390	2800	3490	4010	3240	3930
	T_{out}	[kgf·m]	308	362	346	285	356	409	330	401
102DA	P_1	[kW]	5.50	5.50	5.00	4.43	3.56	3.01	2.20	2.15
	T_{out}	[Nm]	4490	5280	5640	5640	5640	5640	4750	5640
	T_{out}	[kgf·m]	458	538	575	575	575	575	484	575
112DA	P_1	[kW]	5.50	5.50	5.05	5.05	3.70	3.37	2.20	2.20
	T_{out}	[Nm]	4490	5280	5700	6430	5860	6300	4750	5760
	T_{out}	[kgf·m]	458	538	581	655	597	642	484	587

Note: 1. The output revolution (n_2) is the value of [Input revolution (n_1)/Reduction ratio].
2. The reduction ratio in the above tables is the nominal value. The reduction ratio is different according to frame size. Refer to page 54 for the real reduction ratio.
3. Refer to page 52 for the details of lubrication.
4. The values in the above tables are subject to change without notice in advance.

Reducer Dimension Table

Reducer Dimension Table: Hollow Shaft Type (KHY)

KHY-72 ~ 112, 115



Type without Fan

Fig. 6a (Frame Size: 72, 82, 92, 102, and 112)

Type with Fan

Fig. 6b (Frame Size: 95, 105, and 115)

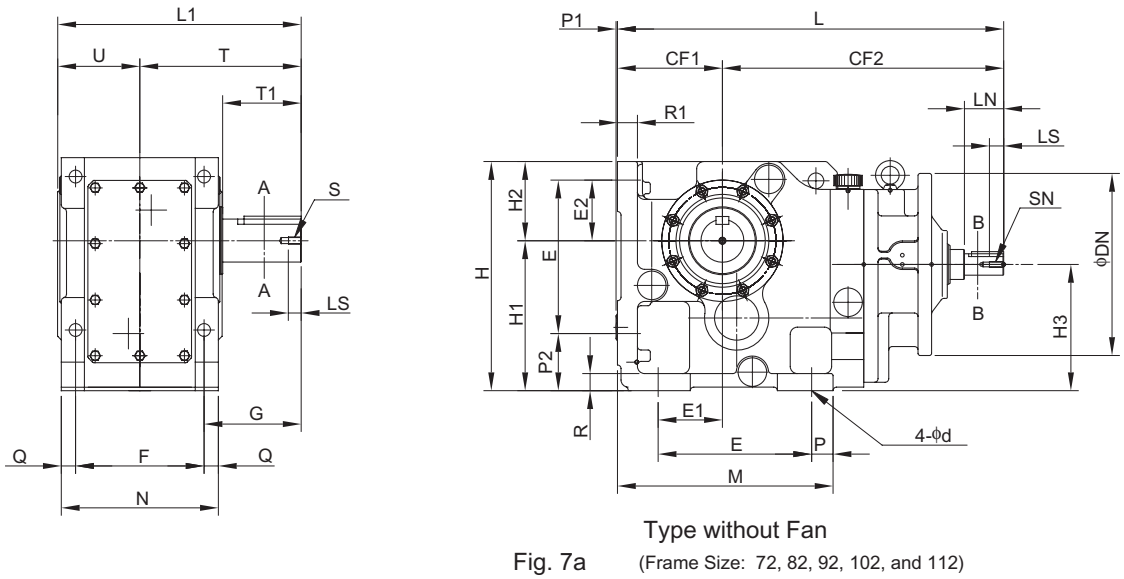
Frame Size	CF1	CF2	P1	H	H1	H2	H3	M	E	E1	d	SA	N	F	Q	T	U	L1	L2	L3	L	LN	LS	SN	Weight [kg]
72	136	394	12	305	194	111	161	285	180	58	16	26	172	140	16	7	105	210	11	47	542	55	20	M8	69
82	145	430	12	343	218	125	186	318	208	69	16	32	200	160	20	7	121	242	12	52	587	65	25	M10	115
92, 95	156	482	12	381	245	136	207	348	220	75	20	35	210	170	20	7	128	256	13.5	57	650	70	25	M12	152
102, 105	179	580	12	430	280	150	245	415	255	80	20	35	248	180	34	8	146	292	14	62	771	90	25	M12	227
112, 115	197	596	12	460	292	168	285	446	285	95	20	35	270	190	40	10	164	328	17	62	805	90	25	M12	291

Frame Size	D1	D2	D3	D4	D5	DA	DN	DF	θ°	θ1°	NA	S	LS	D	b2	t2	G	G1	G2	n	m	DS	b1	t1	h1
72	140	190	63	61	143	165	255	-	30	30	6	M12	22	60	18	64	232	90	52	40	2.2	30	8	4	7
82	152	218	68	66	163	190	255	-	34	11	8	M12	22	65	18	69	266	96	52	52	2.7	35	10	5	8
92, 95	164	240	73	71	183	200	295	317	30	30	6	M16	26	70	20	75	283	105	59	52	2.7	40	12	5	8
102, 105	190	260	84	81	203	220	295	317	30	30	6	M16	26	80	22	85	320	120	80	52	2.7	50	14	5.5	9
112, 115	210	290	94	91	213	245	295	317	45	15	6	M20	33	90	25	95	362	135	86	60	3.2	50	14	5.5	9

Note: 1. Output shaft diameter dimension: The tolerance is JIS B 0401-1976 "H8."
2. End key dimension: Complies with "JIS B 1301-1996 Parallel key (Tightening type)."
3. Refer to page 63 for the torque arm dimension.
4. The dimensions and weight in the above drawings are subject to change without notice in advance.

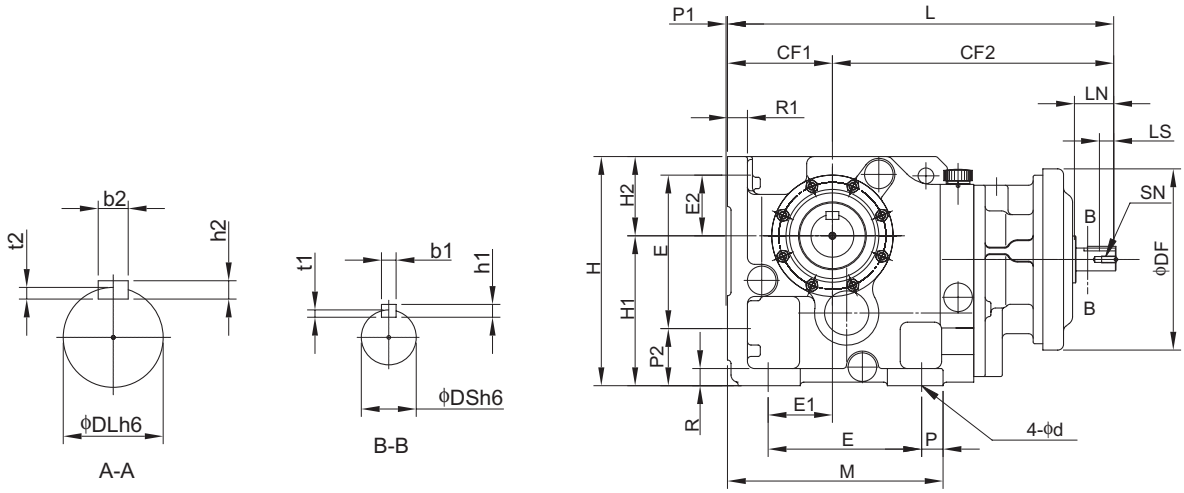
Reducer Dimension Table: Solid Shaft/Foot Mount Type (KHH)

KHH-72 Δ ~ 112, 115



Type without Fan

Fig. 7a (Frame Size: 72, 82, 92, 102, and 112)



Type with Fan

Fig. 7b (Frame Size: 95, 105, and 115)

Frame Size	CF1	CF2	P	P1	P2	H	H1	H2	H3	M	E	E1	E2	d	R	R1	N	Weight [kg]
72	147	394	30	1	80	321	210	111	177	302	215	90	85	18	24	28	220	93
82	160	430	34	2	85	355	230	125	198	334	240	100	95	22	26	28	255	133
92, 95	180	482	35	1	95	391	255	136	217	370	260	105	100	22	29	31	270	171
102, 105	215	580	42	-	100	440	290	150	255	432	300	125	110	26	35	35	310	270
112, 115	235	596	40	-	110	488	320	168	285	470	330	135	120	26	40	40	350	337

Frame Size	F	Q	G	T	U	L1	T1	S	LS	DL	b2	t2	h2	DS	b1	t1	h1	LN	LS	SN
72	180	20	136	226	115	341	110	M10	18	60	18	11	7	30	8	4	7	55	20	M8
82	205	25	151	253	130	383	120	M12	24	65	18	11	7	35	10	5	8	65	25	M10
92, 95	220	25	160	270	139	409	130	M12	24	70	20	12	7.5	40	12	5	8	70	25	M12
102, 105	250	30	175	300	155	455	140	M16	32	80	22	14	9	50	14	5.5	9	90	25	M12
112, 115	290	30	196	341	176	517	160	M16	32	90	25	14	9	50	14	5.5	9	90	25	M12

Note: 1. □ shows shaft direction symbol L, R, or T.
2. Output shaft diameter dimension: The tolerance is JIS B 0401-1976 "h6."
3. End key dimension: Complies with "JIS B 1301-1996 Parallel key (Tightening type)."
4. The dimensions and weight in the above drawings are subject to change without notice in advance.

MEMO

Technical Data/Gear Unit

■Lubrication

1. Standard Lubrication Method

Part \ Reduction Ratio	10	12	15	20	25	30	40	50	60	80	100	120	170	200	235	265	330	390	450	545
Speed Reducer unit at Output Side (RHYTAX)	Oil Bath Lubrication																			
Speed Reducer Unit at Input Side (CYCLO)													(Maintenance-free Type) Grease Lubrication							

• For the bearing of the output shaft, grease lubrication is adopted.

2. Recommended Lubricating Oil

(1) Oil bath Lubrication

Industrial extreme-pressure gear oil (SP system) Class 2 (JIS K2219 gear oil Class 2 or its equivalent) is recommended.

Table 14 Recommended Lubricating Oil

Ambient Ttemperature [°C]	Cosmo Oil	Shell Oil	Exxon Mobil		Gulf Oil	Caltex Oil	BP Oil
-10 ~ +25	Cosmo Gear SE 150	Omala Oil 150	Spartan EP 150	Mobil Gear 629 (ISO VG 150)	EP Lubricant HD 150		Energol GR-XP 150
+10 ~ +40	Cosmo Gear SE 220	Omala Oil 220	Spartan EP 220	Mobil Gear 630 (ISO VG 220)	EP Lubricant HD 220	Meropa 220	Energol GR-XP 220
+30 ~ +50	Cosmo Gear SE 320	Omala Oil 320	Spartan EP 320	Mobil Gear 632 (ISO VG 320)	EP Lubricant HD 320	Meropa 320	Energol GR-XP 320

(2) Grease lubrication

Grease is applied to the units concerned at shipment. You can use the units as soon as you receive them.

3. Oil Quantity (Approximate Value)

When the machine is shipped, oil is removed from it. Before operating the machine, supply oil to the middle of the oil gauge.

Table 15-1 Oil Supply Quantity for Hollow Shaft Type Unit: ℓ

Frame Size \ Mounting Position Symbol	Y1 F1 G1	Y2 F2 G2	Y3 F3 G3	Y4 F4 G4	Y5 F5 G5	Y6 F6 G6
72, 72DA	2.2	8.8	5.7	8.8	3.2	5.7
82, 82DA	3.3	12.8	8.5	12.8	5.0	8.5
92, 95, 92DA	4.4	16.5	11.1	16.5	6.7	11.1
102, 105, 102DA	6.6	24.2	16.4	24.2	10.1	16.4
112, 115, 112DA	8.7	31.6	21.5	31.6	13.3	21.5

Table 15-2 Oil Supply Quantity (1) for Solid Shaft Type Unit: ℓ

Frame Size \ Mounting Position Symbol	F 1 G1	F 2 G2	F 3 G3	F 4 G4	F 5 G5	F 6 G6
72, 72DA	2.2	8.8	5.7	8.8	3.2	5.7
82, 82DA	3.3	12.8	8.5	12.8	5	8.5
92, 95, 92DA	4.4	16.5	11.1	16.5	6.7	11.1
102, 105, 102DA	6.6	24.2	16.4	24.2	10.1	16.4
112, 115, 112DA	8.7	31.6	21.5	31.6	13.3	21.5

Table 15-3 Oil Supply Quantity (2) for Solid Shaft Type Unit: ℓ

Mounting Position Symbol / Frame Size	K1	K2 V2	K3	K4	K5	K6
72, 72DA	2.1	8.5	5.5	8.5	3.1	5.5
82, 82DA	2.9	11.3	7.5	11.3	4.4	7.5
92, 95, 92DA	3.8	14.5	9.7	14.5	5.8	9.7
102, 105, 102DA	6.3	23.4	15.8	23.4	9.7	15.8
112, 115, 112DA	7.7	28.0	19.0	28.0	11.8	19.0

4. Replacement Interval of Lubricating Oil

Replace the lubricating oil after 500 hours operation first and thereafter 2500 hours operation or 6 months. Regard the shorter interval as standard.

5. Cautions for Oil Seal

Oil seal has limited lifetime. When you use the oil seal for a long time, its effect lowers due to natural deterioration and wear. Lifetime of oil seal varies depending on the operation conditions or ambient environment of the speed reducer unit. When the speed reducer is operated normally (operation for 10 hours per day with uniform load and normal temperature), we recommend replacement of the oil seal every 1 to 3 years.

6. In Special Environment

Consult us if you must use the machine for a long time in other ambient temperature other than 0 ~ 40°C, at the input revolution exceeding the standard value (1800r/min), or in other special environments.

■Mounting

- Use the bolt of JIS strength 8.8 or higher for mounting the speed reducer.
- Refer to the cautions on pages 57 ~ 64 for mounting the hollow shaft.
- Refer to the instruction manual for the details of mounting and maintenance.

■Actual Reduction Ratio

Table 16 List of Actual Reduction Ratio

Frame Size	Reduction Ratio											
	10	12	15	20	25	30	40	50	60	80	100	120
72	9.588	12.01	15.41	20.65	24.60	30.83	39.54	48.56	58.23	78.83	97.79	115.3
82	10.19	11.90	15.14	20.15	25.97	30.32	38.58	48.87	57.73	81.19	99.30	115.8
92, 95	10.04	12.06	15.57	20.69	24.58	29.82	39.62	49.88	61.00	81.41	100.8	119.9
102, 105	9.857	12.32	15.21	20.23	24.85	29.13	38.74	49.08	61.16	80.23	99.01	121.8
112, 115	9.857	12.32	15.21	20.23	24.85	29.13	38.74	49.08	61.16	80.23	99.01	121.8

Frame Size	Reduction ratio							
	170	200	235	265	330	390	450	545
72DA	174.8	208.1	241.4	271.0	334.8	398.6	462.4	558.0
82DA	176.8	209.0	241.2	273.3	337.6	401.9	466.2	562.7
92DA	171.5	202.7	233.9	265.0	327.4	389.8	452.1	545.7
102DA	166.1	196.3	226.5	256.8	317.2	377.6	438.0	528.6
112DA	166.1	196.3	226.5	256.8	317.2	377.6	438.0	528.6

■Moment of Inertia J・GD^2

Table 17 Moment of Inertia J · GD^2 at Motor Shaft of Speed Reducer Unit

Reduction Ratio / Frame Size	10		12		15		20	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
72	0.00176	0.00703	0.00121	0.00483	0.000805	0.00322	0.000740	0.00296
82	0.00308	0.0123	0.00235	0.00938	0.00164	0.00657	0.00154	0.00616
92, 95	0.00755	0.0302	0.00565	0.0226	0.00380	0.0152	0.00258	0.0103
102, 105	0.0168	0.0372	0.0123	0.0490	0.00890	0.0356	0.00585	0.0234
112, 115	0.0224	0.0894	0.0158	0.0631	0.0112	0.0449	0.00718	0.0287

Reduction Ratio / Frame Size	25		30		40	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
72	0.00112	0.00447	0.000800	0.00320	0.000558	0.00223
82	0.00199	0.00794	0.00156	0.00622	0.00115	0.00461
92, 95	0.00368	0.0147	0.00283	0.0113	0.00201	0.00804
102, 105	0.00838	0.0335	0.00680	0.0272	0.00468	0.0187
112, 115	0.0100	0.0401	0.00798	0.0319	0.00533	0.0213

Reduction Ratio / Frame Size	50		60		80	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
72	0.000158	0.00183	0.000358	0.00143	0.000231	0.000923
82	0.00081	0.00324	0.000640	0.00256	0.000385	0.00154
92, 95	0.00141	0.00564	0.00109	0.00437	0.000690	0.00276
102, 105	0.00333	0.0133	0.00236	0.00944	0.00158	0.00633
112, 115	0.00375	0.0150	0.00263	0.0105	0.00174	0.00695

Reduction Ratio / Frame Size	100		120	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
72	0.000158	0.000633	0.000128	0.000510
82	0.000290	0.00116	0.000233	0.000930
92, 95	0.000495	0.00198	0.000388	0.00155
102, 105	0.00118	0.00471	0.000845	0.00338
112, 115	0.00128	0.00512	0.000913	0.00365

Note: 1. The tables do not include the moment of inertia GD^2 of motor.
2. The values in these tables are subject to change without notice in advance.

Reduction Ratio / Frame Size	170		200		235		265	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
72	0.0000773	0.000309	0.0000755	0.000302	0.0000745	0.000298	0.0000778	0.000311
82	0.000205	0.000820	0.000151	0.000604	0.000145	0.000580	0.000127	0.000509
92, 95	0.000213	0.000852	0.000201	0.000805	0.000194	0.000775	0.000144	0.000577
102, 105	0.000375	0.00150	0.000350	0.00140	0.000335	0.00134	0.000325	0.00130
112, 115	0.000738	0.00295	0.000705	0.00282	0.000355	0.00142	0.000340	0.00136

Reduction Ratio / Frame Size	330		390		450		545	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
72	0.0000755	0.000302	0.0000495	0.000198	0.0000488	0.000195	0.0000480	0.000192
82	0.000123	0.000790	0.000120	0.000479	0.000118	0.000472	0.000111	0.000442
92, 95	0.000138	0.000553	0.000121	0.000485	0.000119	0.000477	0.000118	0.000470
102, 105	0.000313	0.00125	0.000211	0.000844	0.000207	0.000828	0.000188	0.000751
112, 115	0.000323	0.00129	0.000313	0.00125	0.000308	0.00123	0.000207	0.000826

Table 18 Moment of Inertia J · GD^2 of Three-Phase (Four-Polar) Motor

kW x P	0.4kW x 4P		0.5kW x 4P		0.75kW x 4P		1.1kW x 4P	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
Standard	0.000650	0.00260	0.00101	0.00405	0.00120	0.00480	0.00185	0.00740
With Brake	0.000675	0.00270	0.00111	0.00130	0.00520	0.00520	0.002075	0.00830

kW x P	1.5kW x 4P		2.2kW x 4P		3.0kW x 4P		3.7kW x 4P	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
Standard	0.00213	0.00850	0.00333	0.0133	0.00703	0.0281	0.00848	0.0339
With Brake	0.00235	0.00940	0.00373	0.0149	0.00813	0.0325	0.00958	0.0383

kW x P	5.5kW x 4P		7.5kW x 4P		11kW x 4P		15kW x 4P	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
Standard	0.0114	0.0457	0.0268	0.107	0.0375	0.150	0.0898	0.359
With Brake	0.0125	0.0501	0.0303	0.121	0.0410	0.164	0.108	0.431

kW x P	18.5, 22kW x 4P		30kW x 4P		37kW x 4P		45kW x 4P	
	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]	J [kg·m^2]	GD^2 [kg·m^2]
Standard	0.225	0.900	0.250	1.00	0.308	1.23	0.343	1.37
With Brake	0.243	0.972	0.268	1.07	0.320	1.28	-	-

Note: 1. The values in the above table are subject to change without notice in advance.

■Output Shaft Revolution Direction

・Gear Motor (Unit Coupled Directly with Motor)

When you carry out connecting according to the connection diagram on page 71, the motor shaft turns rightward as viewed from the fan cover side.
The output shaft turns at this time in the arrow directions as shown in the figures below.

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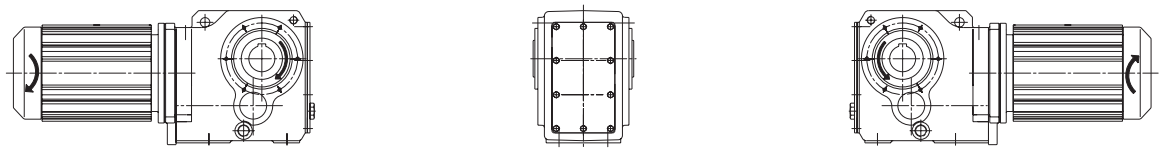
Series</td><td colspan="2"> 
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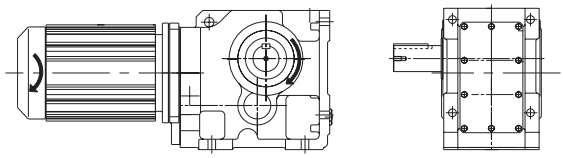
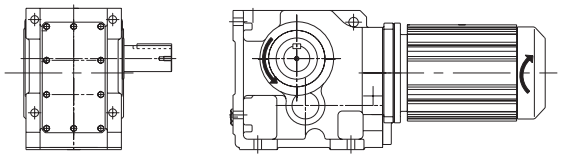
Series</td><td>Shaft Direction R
 
KHHM</td><td>Shaft Direction L
 
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 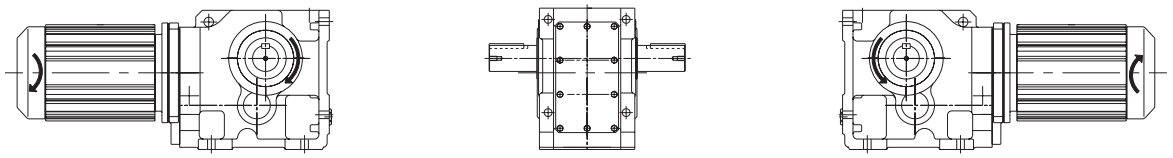
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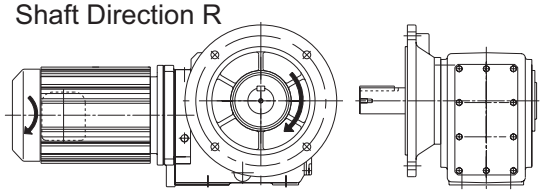
<tr><td>KHFM
Series</td><td>Shaft Direction R
 
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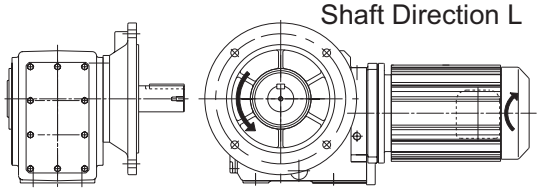
 
KHFM</td></tr>
</table>

Recommended example for mounting and designing the hollow shaft type (key method)

1. Design of The Driven Shaft

Design the driven shaft as referring to the following dimension table.
The hollow shaft is manufactured with the JIS H8 tolerance. The recommended dimension tolerance of the driven shaft is shown below.

Impact does not act with uniform load.	JIS h6 or js6
Impact load occurs or radial load is large.	JIS js6 or k6

2. Mounting to The Driven Shaft

Apply molybdenum disulfide grease to the surface of the driven shaft and to the inner diameter of the hollow shaft. Then, insert the speed reducer into the driven shaft.
When the engagement is tight, lightly hammer the edge of the hollow shaft with a mallet. If you make the jig shown in Fig. 10 and use it as referring to Table 19, you can insert the speed reducer smoothly.

3. Removal from The Driven Shaft

Take care that an excessive force will not be applied to the section between the casing and hollow shaft.
If you make the jig shown in Fig. 10 and use it as referring to Table 19, you can remove the speed reducer smoothly.
Users must prepare the jigs for mounting, fixing and removing.

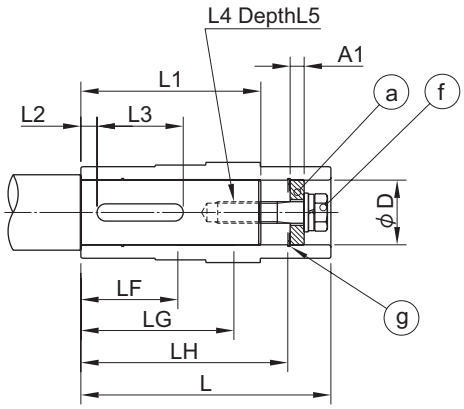


Fig. 8 How to Fix

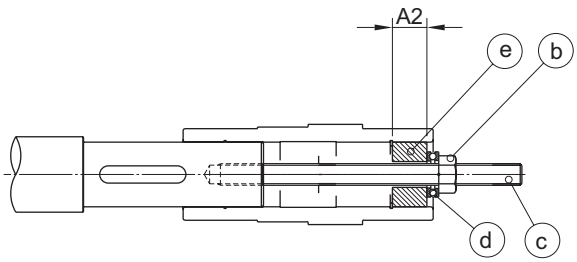


Fig. 10 How to Mount

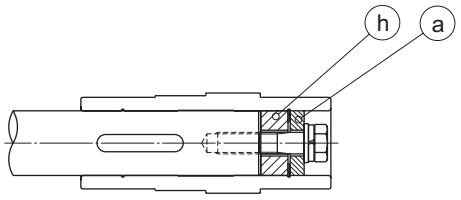


Fig. 9 How to Fix

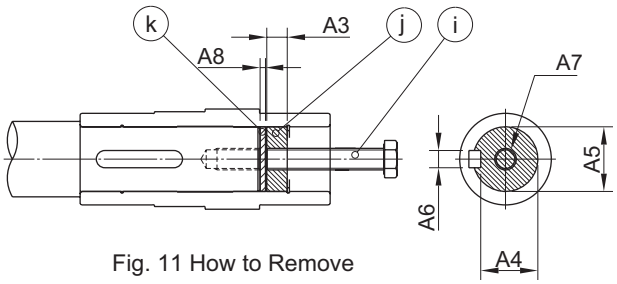


Fig. 11 How to Remove

Table 19

Frame Size	Hollow Shaft					Driven Shaft					Jig													
											a	b	c	d	e	f	g	h	I	j				k
	ϕD	L	LH	LG	LF	L1	L2	L3	L4	L5	A1	Nut	Full Threaded Stud Bolt	Thrust Bearing	A2	Hexagonal Bolt	C snap Ring for Hole	Outer Diameter x Width	Hexagonal Bolt (Full Threaded)	A3	A4	A5	A6	A7	A8
72	60H8	232	192	142	90	167	15	130	M20	40	13	M20	M20 x 350	51105	32	M20 x 80	ϕ60	ϕ60 x 25	M24 x 350	19	53	60 -0.1 -0.3	18	M24	5
82	65H8	266	266	168	98	189	15	140	M20	40	13	M20	M20 x 350	51105	43.5	M20 x 80	ϕ65	ϕ65 x 25	M24 x 350	19	58	60 -0.1 -0.3	18	M24	5
92 95	70H8	283	283	178	105	206	15	150	M20	40	13	M20	M20 x 350	51105	43.5	M20 x 80	ϕ70	ϕ70 x 25	M24 x 350	19	62.5	60 -0.1 -0.3	20	M24	5
102 105	80H8	320	320	200	120	237	20	170	M24	50	15	M24	M24 x 450	51107	42.5	M24 x 85	ϕ80	ϕ80 x 31	M30 x 400	24	71	60 -0.1 -0.3	22	M30	6
112 115	90H8	362	362	227	135	271	20	190	M24	50	15	M24	M24 x 450	51107	50	M24 x 85	ϕ90	ϕ90 x 31	M30 x 400	24	72	60 -0.1 -0.3	25	M30	6

4. Fixing to The Driven Shaft

Make sure to fix the speed reducer to the driven shaft when rotation is prevented by attachment plate method.

a. Example: How to fix the speed reducer to prevent moving toward the machine side

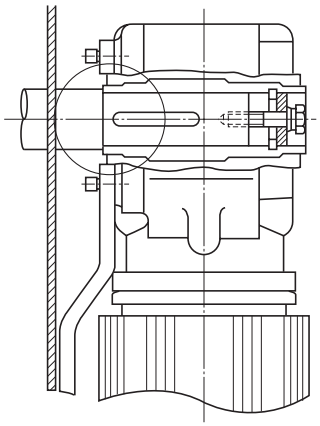


Fig. 12 Fixing with Stepped Shaft

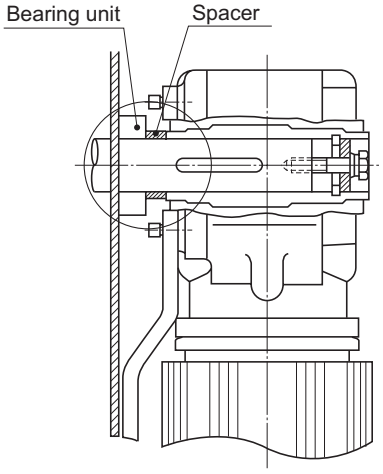


Fig. 13 Fixing with Spacer (Non-Stepped Driven Shaft)

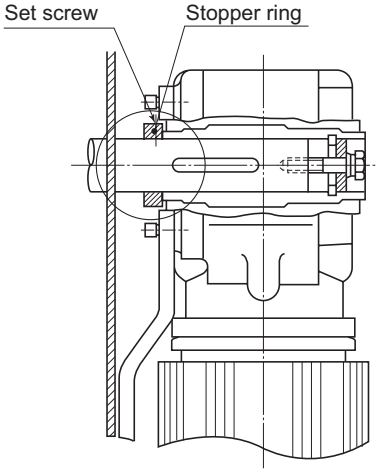


Fig. 14 Fixing with Set Screw and Stopper Ring (Non-Stepped Driven Shaft)

b. Example: How to fix the speed reducer to prevent moving toward the opposite side of machine

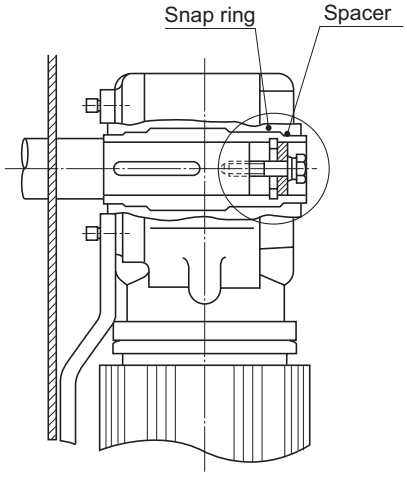


Fig. 15 Fixing with Spacer and Snap Ring

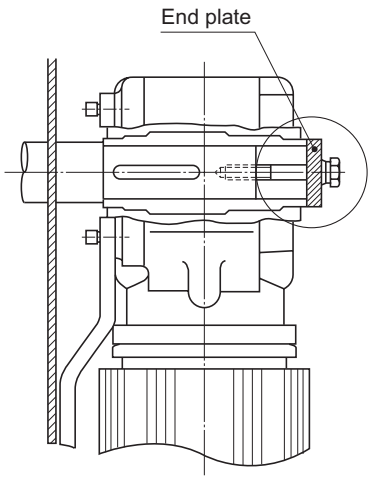


Fig. 16 Fixing with Endplate

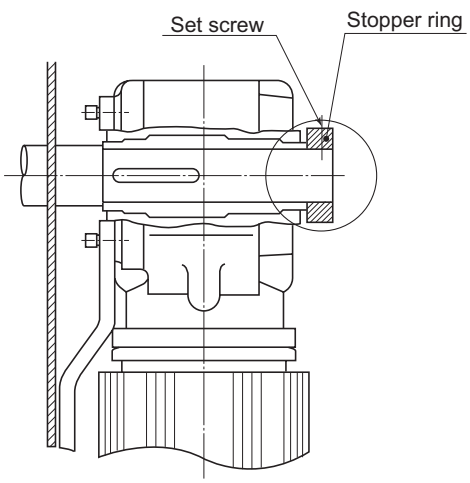


Fig. 17 Fixing with Set Screw and Stopper Ring

Example of Attachment and Recommended Design for Clamp Collar Method (Optional)

1. Design of Driven Shaft

Design the driven shaft following the dimensions in Table 2.

2. Attachment of Clamp Collar

- Clamp collar attached on the reducer unit is shipped with grease applied on the surface to tighten boss. It can be assembled right away.
- Shock absorber placed between the both plates during shipment can be removed by loosening all bolts.
- When reusing clamp collar after removing disassemble and cleanse the parts.
- Then apply molybdenum disulfide on sliding cone, tightening bolt, and the surface, which comes in contact with the bolt head.

(i) Degrease all of the boss hole and the shaft which comes in contact.
(ii) Slide the clamp collar on the hollow shaft. Do not tighten the mounting bolt at this point.
(iii) Slide the driven shaft or reducer to place the driven shaft in the hollow shaft.
(iv) Tighten mounting bolt to some extent. Make sure to place the surface of both plates in parallel when tightening bolts. A wrench with short handle is suitable for this purpose.
(v) Make sure that the clamp collar is set correctly. Tighten bolts gradually using a wrench with suitable length (to apply necessary torque).
Tighten each bolt evenly while maintaining both plates parallel. Tighten bolts little-by-little in the clockwise order, not diametrically opposite to each other. We recommend turning each bolt 30° each time.
(vi) Make sure to check the clamp collar with a torque wrench after tightening torque collar. Specified torque is shown on the nameplate of the clamp collar.
(vi) Make sure that both plates are parallel.

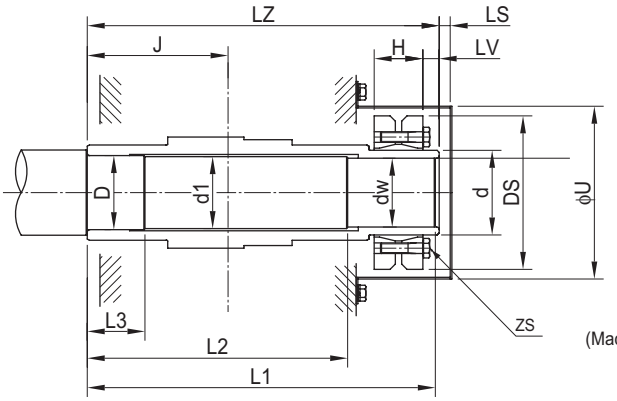


Fig. 18 Clamp Collar Method: Hollow Shaft Dimension

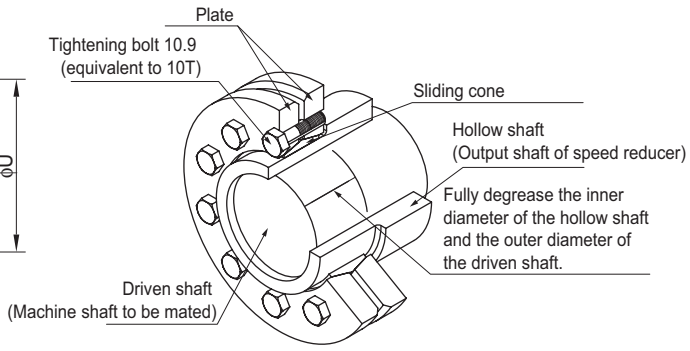


Fig. 19 Structure of Clamp Collar

Table 20 Reference Dimension for Designing The Clamp Collar

Frame Size	Clamp Collar						Hollow Shaft					Driven Shaft (Recommended Design Dimension)					
					Mounting Bolt					Safety Cover							
	Type	d	DS	H	ZS	TA [Nm]	J	LZ	LV	LS	U	dw	d1	D	L1	L2	L3
72	S-60 x 75	75	138	32	M8	30	116	274	5	26	155	60h6	60.5	61h7	271	217	47
82	H-65 x 80	80	145	46	M10	59	133	322	5	12	163	65h6	65.5	66h7	319	251	47
92	H-70 x 90	90	155	50	M10	59	141.5	343	5	16	183	70h6	70.5	71h7	340	268	54
102	H-80 x 110	110	185	60	M10	59	160	400	15	21	203	80h6	81	82h7	397	305	75
112	S-90 x 125	125	215	54	M10	59	181	438	17	31	233	90h6	81	92h7	435	347	81

Table 21 Specified Tightening Torque of Tightening Bolt

Bolt (ISO 10.9, JIS 10T)	M5	M6	M8	M10	M12	M16	M20	M24	M27
Tightening Torque [Nm]	6.9	11.8	29.4	57.8	98	245	480	823	1225

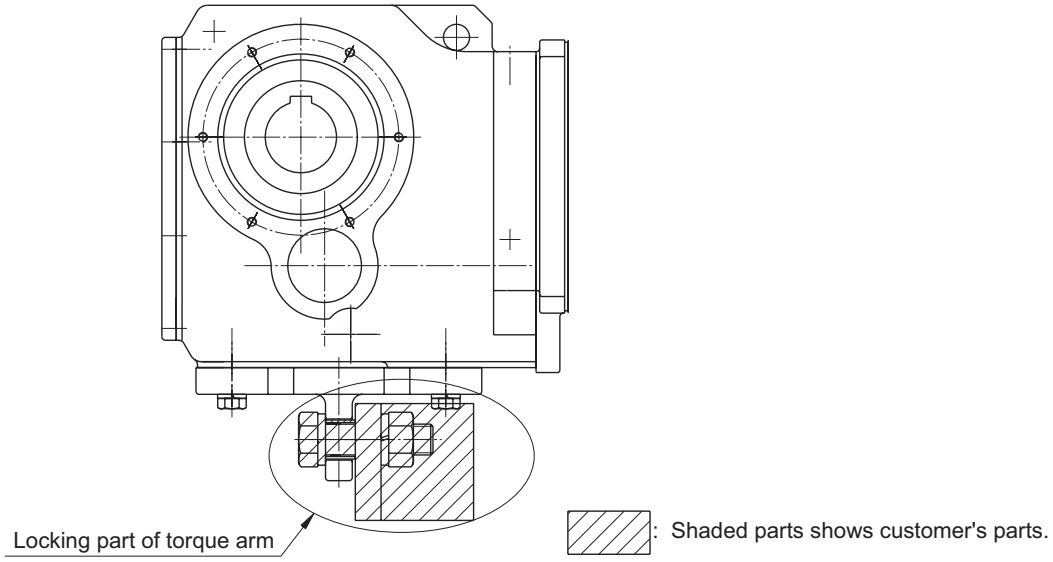
3. Removal of Clamp Collar

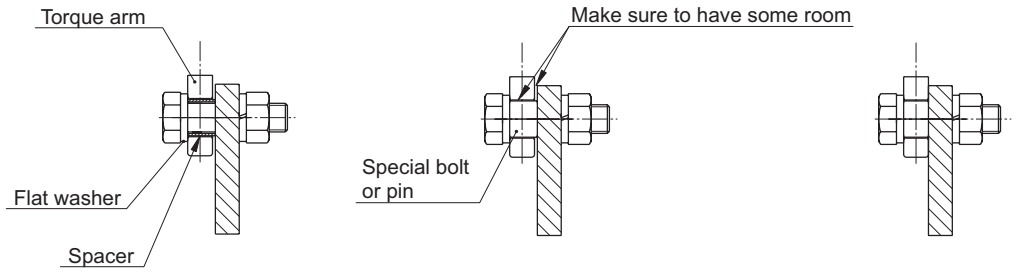
- Conduct removal of clamp collar in the reversed steps of attachment steps.
- Tighten bolts little by little in order. Do not let either plate tilt on the sliding cone.
- Never remove bolt when both plates are not parallel to each other. Both plates may pop out from the sliding cone suddenly, causing injury.
  Instead, first tighten all bolts lightly, and insert a wedge between two plates to make them parallel.

4. Locking by Torque Arm

Mount the torque arm on the driven machine side of the speed reducer case. Use the hexagon socket head bolts for mounting. (Refer to Table 22 for size.)
Allow some degree of freedom when attaching locking part. No excess force should be exerted between gearmotor and driven shaft.
Never secure the torque arm with locking bolts.
Torque arm may be used only when the drive is operated in one direction, continuously or when starting frequency is low.
Use rubber bush to reduce shock between torque arm and mounting bolt (or spacer), when startup frequency and when starting-stop frequency is frequent.

Attachment of "Attachment-Type Torque Arm"





Good example
Space is adjusted so that no excess force is exerted and no contact when the machine operates.

Bad example
There is no degree of freedom because torque arm and machine base is attached.
This exerts excess force on the locking bolt, machine, and reducers, causing damage.

Fig. 20 Attachment Example of Torque Arm Locking

Attachment of "Plate-Type Torque Arm"

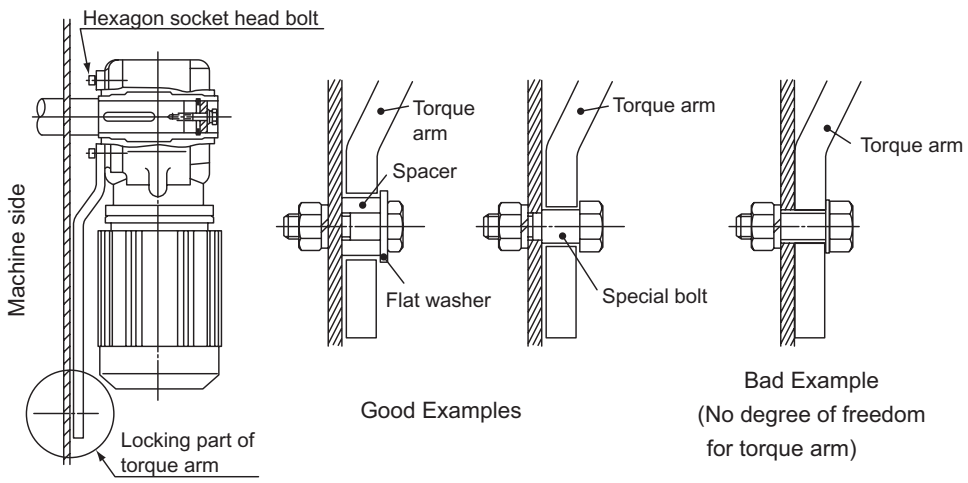


Table 22 Size of Hexagon Socket Head Bolt

Frame Size	Bolt
72, 72DA	M12
82, 82DA	M12
92, 95, 92DA	M16
102, 105, 102DA	M16
112, 115, 112DA	M20

Fig. 21 Attachment Example of Plate Type Torque Arm

Torque Arm Dimension of Attachment Type (Optional)

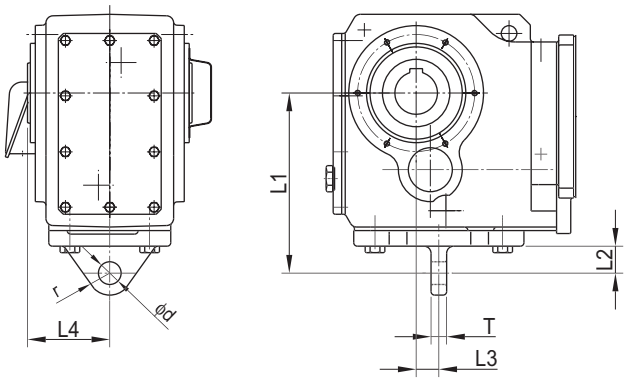


Table 23

Frame Size	L1	L2	L3	L4	T	r	ϕd
72	254	38	32	116	22	31	32
82	288	44	35	133	26	40	40
92, 95	320	47	35	142	28	40	40
102, 105	370	58	47.5	160	32	45	50
112, 115	387	59	47.5	181	36	50	50

Torque Arm Dimension of Plate Type (Optional)

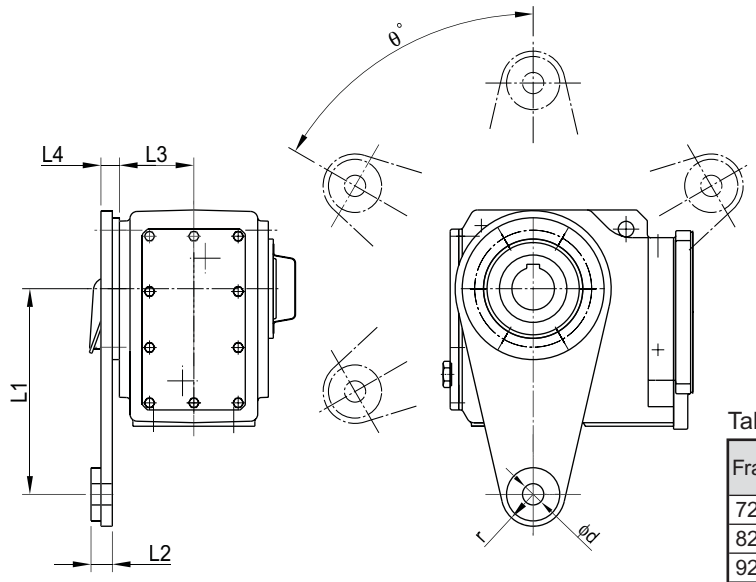


Table 24

Frame Size	L1	L2	L3	L4	θ	r	ϕd H9
72	290	26	105	30	60	45	30
82	310	28	121	30	45	45	30
92, 95	360	31	128	35	60	55	35
102, 105	400	35	146	35	60	55	35
112, 115	460	38	164	40	60	60	42

5. Attachment of Hollow Shaft Type Flange (Optional)

Mount the flange carefully. Do not to twist the reducer case against the driven shaft or the hollow shaft of reducer.
Do not generate excess force.

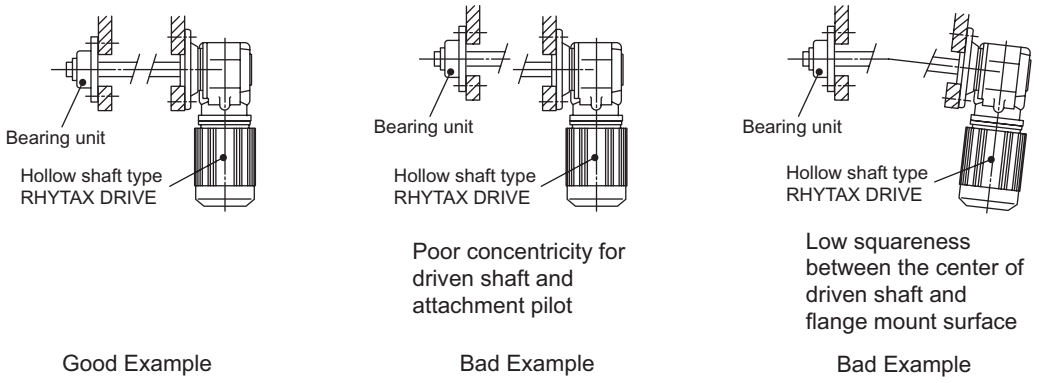


Fig. 22 Attachment Example of Flange Mount (Optional)

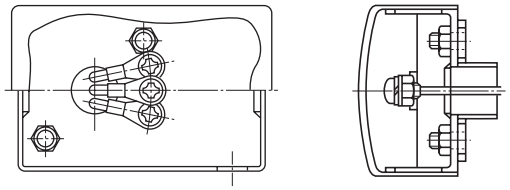
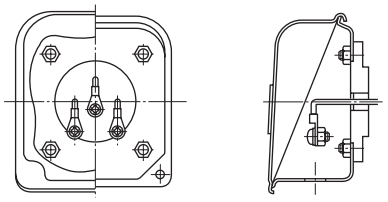
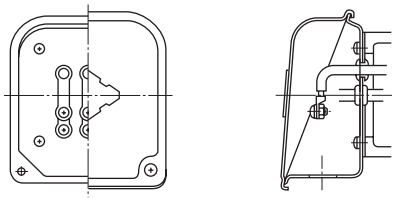
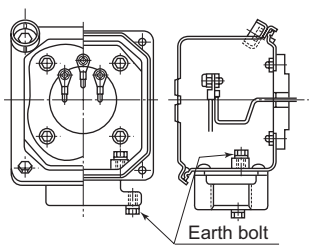
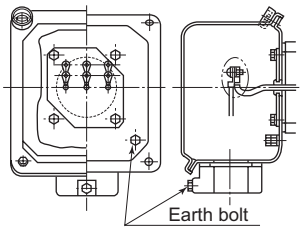
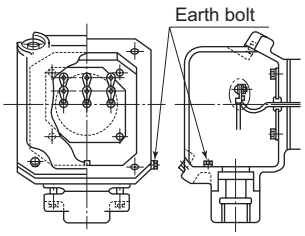
MEMO

MEMO

Technical Data/Motor Unit

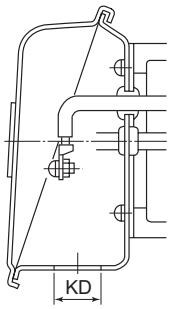
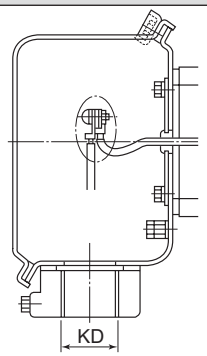
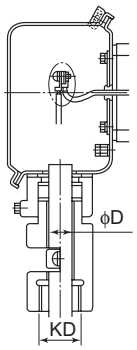
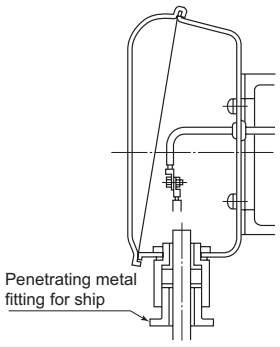
■Specifications of Terminal Box

1. Structure of Terminal Box

<table>
<tr><td rowspan="3">Indoor Type</td><td colspan="2">0.4kW x 4P</td><td colspan="2">0.55kW x 4P ~ 7.5kW x 4P</td></tr>
<tr><td colspan="2"> 
Note: A terminal box of steel plate can also be manufactured.</td><td colspan="2">  </td></tr>
<tr><td colspan="2">11kW x 4P ~ 45kW x 4P</td><td colspan="2"></td></tr>
<tr><td colspan="2">  </td><td colspan="2"></td></tr>
<tr><td rowspan="4">Outdoor Type/Increased Safety Explosion-proof Type</td><td>Outdoor Type</td><td>7.5kW x 4P or less</td><td>11kW x 4P ~ 15kW x 4P</td><td>18.5kW x 4P ~ 45kW x 4P</td></tr>
<tr><td>Increased Safety Explosion-Proof Type</td><td>7.5kW x 4P or less</td><td>11kW x 4P ~ 15kW x 4P</td><td>18.5kW x 4P ~ 37kW x 4P</td></tr>
<tr><td colspan="2"> 
Earth bolt</td><td> 
Earth bolt</td><td> 
Earth bolt</td></tr>
</table>

Technical Data/Motor Unit: Specifications of Terminal Box

2. Table of Terminal Box Cable Port for External Leadwire

Standard Type (Round Hole Type)	Electrical Wire Tube Type	Electrical Wire Tube Female Thread Packing Type (Option)	Penetrating Metal Fitting for Ship (Option)
			

Application		Indoor type	Outdoor Type/Dustproof Type/Anticorrosive Type/Increased Safety Explosion-Proof Type						For Ship	
Motor		Round Hole Type	Electrical Wire Tube Type		Electrical Wire Tube Female Thread Packing Type (Option)				Penetrating Metal Fitting for Ship (Option)	
		Standard Dimension of Pulling-Out Port KD	Electrical Wire Tube Standard dimension KD	Electrical Wire Tube Available Range KD	Standard dimension		Available Range		Standard Dimension	Available Range
Capacity [kW]	Poles				Electrical Wire Tube KD	Cable Diameter ϕD	Electrical Wire Tube KD	Cable Diameter ϕD		
0.4	4	Standard ϕ12.5	16 (PF1/2)							
		FB ϕ23								
0.55	4	ϕ23	22 (PF3/4)	16 (PF1/2) 22 (PF3/4) 28 (PF1) 36 (PF1 1/4)	22 (PF3/4)	12.5	22 (PF3/4)	10.0 ~ 16.5	20c	15a ~ c
1.1	4						28 (PF1)	12.0 ~ 19.5		20a ~ c
2.2	4						36 (PF1 1/2)	15.5 ~ 23.5		25a ~ c
3.0	4				28 (PF1)	14.5				
5.5	4		28 (PF3/4)						25c	
7.5	4	ϕ43		22 (PF3/4)		17.5	22 (PF3/4)	12.0 ~ 16.5		20a ~ c
11	4		36 (PF1 1/4)	28 (PF1) 36 (PF1 1/4)	36 (PF1 1/2)	19.5	28 (PF1) 36 (PF1 1/2)	12.0 ~ 18.7 15.5 ~ 22.7	30a	25a ~ c
15	4			42 (PF1 1/2)	42 (PF1 1/2)	24	42 (PF1 1/2)	17.5 ~ 27.0		30a ~ c
18.5	4	ϕ49		28 (PF1) 36 (PF1 1/4)			28 (PF1) 36 (PF1/4)	13.5 ~ 19.0 16.0 ~ 23.0	35a	25a ~ c
22	4									
30	4		54 (PF2)	42 (PF1 1/2) 54 (PF2)	54 (PF2)	29	42 (PF1 1/2) 54 (PF2)	19.5 ~ 28.0 23.0 ~ 35.7		30a ~ c
37	4			70 (PF2 1/2)		34	70 (PF2 1/2)	29.0 ~ 45.0		35a ~ c
45	4		70 (PF2 1/2)		70 (PF2 1/2)	44				

Table above shows the size of terminal box cable port for external leadwire for standard Sumitomo motors.

Note: 1. We will prepare with the dimensions shown above for outdoor type, increased safety explosion-proof type, and types for ships unless otherwise specified by the customer.

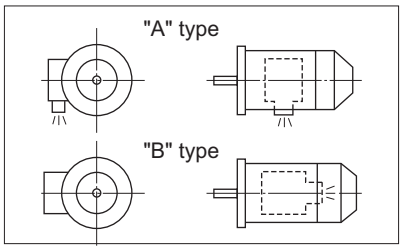
2. Steel terminal box is also available for 0.4kW x 4P instead of standard plastic material. Consult us for special materials.

3. Direction of Terminal Box Cable Port for External Leadwire

Motor	Symbol for Mounting Position	Indoor (Standard)	Outdoor (Increased Safety Explosion-Proof Type)	Penetrating Metal Fitting for Ship
Horizontal	Y1, K1, F1, G1, K5, F5, G5	A	B	B
Vertical	G2, V2, F2, Y2	A	A	A

*Direction would be as shown in the table above unless otherwise specified by the customer.

Refer to pages 7~11 for symbols showing mounting position.



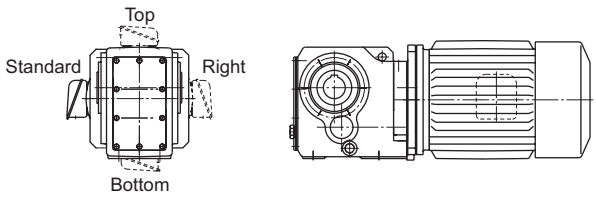
■Position of Motor Terminal Box

Direction for Mounting Terminal Box

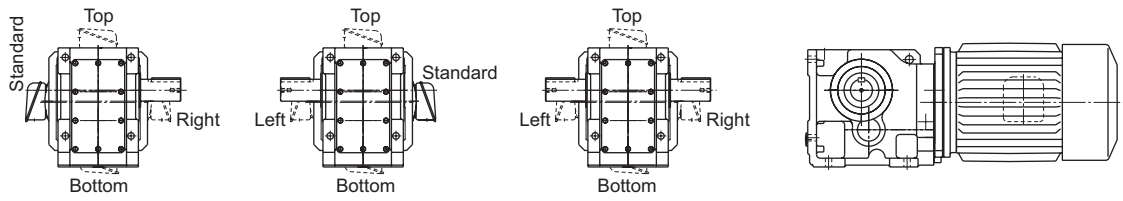
The direction for mounting the motor terminal box can be changed by 90° pitch from the standard direction. Note to specify the terminal box mounting direction referring to Fig. 23 at the time of order. Customers should not change the mounting direction by themselves. The following figure shows the terminal box position viewed from the reducer side.

Fig. 23 Direction for Mounting The Motor Terminal Box

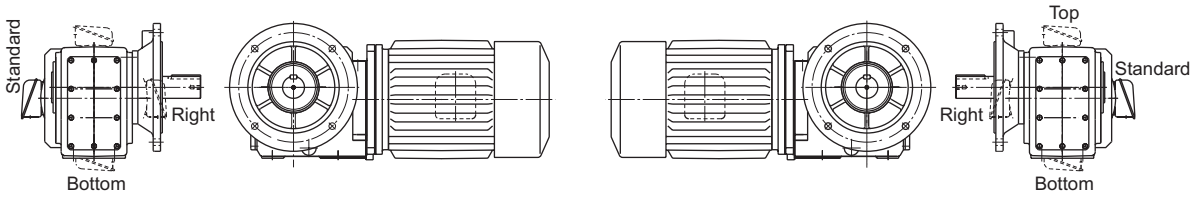
Hollow shaft type KHYM Series



Foot mount type KHHM Series

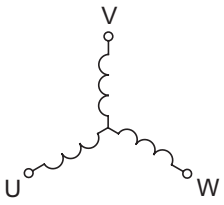
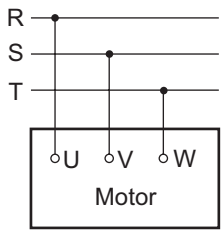
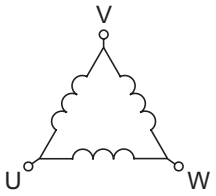
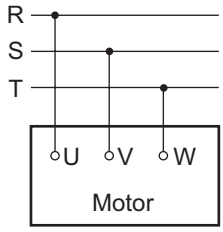
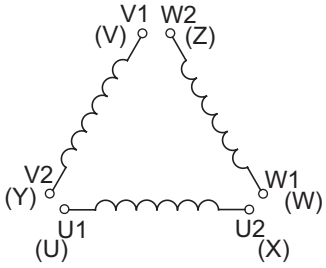
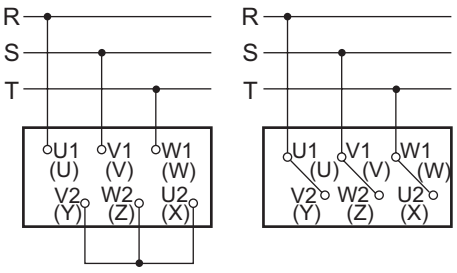


Flange mount type KHFM Series



■Connection

1. Three-Phase Induction Motor

<table>
<tr><th>Application</th><th>Winding</th><th>Connection and terminal Symbol</th><th>Remarks</th></tr>
<tr><td rowspan="2">Direct Startup</td><td> 
</td><td> 
</td><td>Standard product: 3.7kW and smaller</td></tr>
<tr><td> 
</td><td> 
</td><td>Standard product: 5.5kW ~ 7.5kW</td></tr>
<tr><td>λ-Δ Startup</td><td> 
</td><td>Startup: λ connection Startup: Δ connection
 
</td><td>Standard product
(1) Capacity: 11kW or more
(2) Power supply
200V class: 200V, 50/60Hz
220V, 60Hz
400V class: 400V, 50/60Hz
440V, 60Hz
Note: Consult us when you need λ-Δ startup for power supply other than the ones indicated above.</td></tr>
</table>

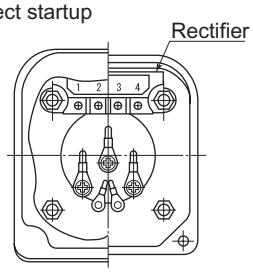
Note: ( ) shows the terminal symbol of previous motor.

2. Three-Phase Induction Motor with Built-in Brake

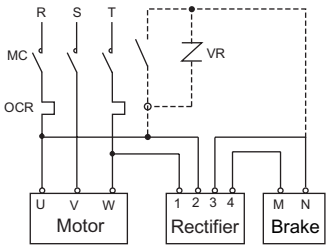
Brake Type	Connection and Terminal Symbol

(1) FB-05A ~ 15B

Direct startup



Example: Figure of terminal box for FB-2B ~ 15B

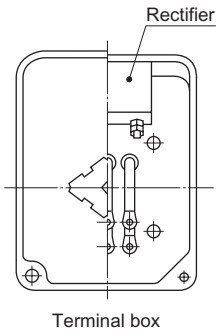


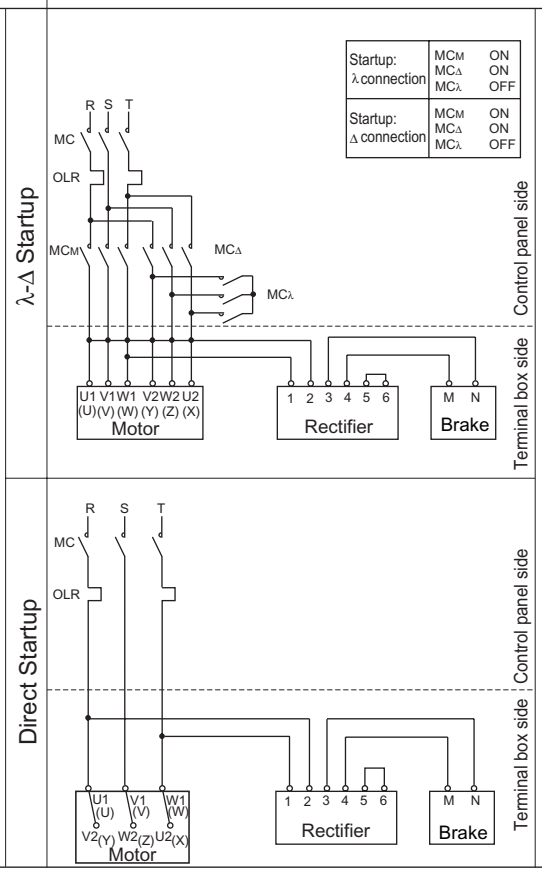
MC: Electromagnetic contactor
VR: Varistor (protective element)
Note: FB-05A1 does not have terminal number "3, for rectifier connection". Connect "N" of brake to "2" of rectifier.

For quick braking circuit, release between "3" and "N" and connect as shown with the dotted line.
We recommend customer to use the contact equipped with DC breaking capacity (for the DC coil load) which is five times or more as much as the brake electric current for the quick braking circuit.

Brake Power Supply		200V~230V	380V~460V
Rating Voltage of Varistor		AC260V~AC300V	AC510V
Voltage of Varistor		430V~470V	820V
Rating current of varistor	FB-05A	0.2 W or more	0.4 W or more
	FB-1B	0.4 W or more	0.6 W or more
	FB-2B, 3B, 5B, 8B	0.6 W or more	1.5 W or more
	FB-10B, 15B	1 W or more	1.5 W or more

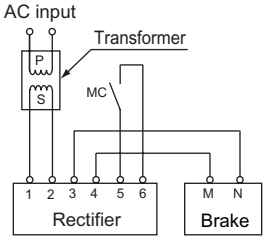
(2) FB-20, 30





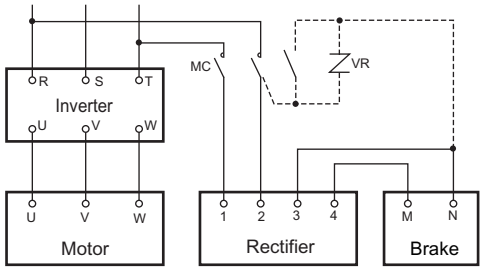
- FB-20 and FB-30 are made only for 200V class. Install the transformer (capacity: 250 ~ 300VA and secondary power supply: 200 ~ 220V) for 400V class power supply.

Example for installing the transformer



P: AC input voltage
S: 200V ~ 220V

(3) Inverter operation (Example: FB-05A ~ 15B)



- When you operate the motor with brake by using the inverter, use the brake power supply from the primary side of the inverter unit and synchronize the brake operation with ON/OFF of the inverter unit.
- Release between "3" and "N" and perform connection as shown with the dotted line. Rapid braking circuit will be made.

Note: ( ) shows the terminal symbol of previous motor.

■Tables of Properties

Table 25 Table of Properties for Explosion-Proof Type Three-Phase Motor

(1) 200V Class

Motor Frame Size	P	4P														
	Power Supply	200V-50Hz					200V-60Hz					220V-60Hz				
	Output [kW]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]
F-71M	0.4	2.4	237	237	9.1	1410	2.1	210	210	8.3	1700	2.0	257	257	9.4	1730
F-80S	0.55	2.8	219	227	11.2	1410	2.6	190	189	10.5	1680	2.5	237	240	11.7	1710
F-80M	0.75	3.9	234	215	16.0	1420	3.4	211	190	15.1	1720	3.4	253	242	16.8	1740
F-90S	1.1	5.3	246	226	26.5	1420	4.9	210	206	24.4	1690	4.6	263	260	27.2	1720
F-90L	1.5	7.0	233	224	34.1	1420	6.3	205	192	31.2	1710	6.0	250	243	34.9	1730
F-100L	2.2	9.7	268	255	52	1430	8.9	229	204	46.9	1700	8.4	282	260	52	1720
F-112S	3.0	12.9	242	237	74	1420	11.9	193	177	66.0	1700	11.1	244	225	74	1720
F-112M	3.7	15.3	262	236	94	1420	14.3	216	188	83	1710	13.3	264	238	93	1730
F-132S	5.5	22.3	285	256	147	1420	20.9	241	208	129	1700	19.4	295	263	145	1720
F-132M	7.5	29.3	274	261	198	1460	27.4	233	224	175	1750	25.5	292	271	195	1760
F-160M	11	41.7	294	282	294	1460	39.4	255	236	260	1750	36.5	311	296	289	1760
G-160L	15	53.7	271	265	360	1460	52.6	220	222	313	1750	48.0	275	280	349	1760
F-180MG	18.5	66.8	294	312	521	1470	65.3	237	258	450	1760	59.9	296	325	504	1770
F-180MG	22	78.9	246	262	522	1470	77.7	199	216	450	1750	70.5	248	272	504	1760
F180L	30	109	244	265	690	1460	106	200	223	599	1740	96.4	249	280	668	1750
F-200L	37	132	256	287	892	1460	129	208	244	768	1740	117	259	306	858	1750
F-200L	45	161	252	288	1076	1450	158	205	248	922	1730	142	255	311	1032	1740

(2) 400V Class

Motor Frame Size	P	4P														
	Power Supply	200V-50Hz					200V-60Hz					220V-60Hz				
	Output [kW]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]
F-71M	0.4	1.2	229	229	4.5	1420	1.0	197	201	4.1	1700	1.0	243	262	4.6	1740
F-80S	0.55	1.4	219	225	5.5	1410	1.3	190	189	5.3	1680	1.2	237	240	5.9	1710
F-80M	0.75	1.9	234	215	8.0	1420	1.7	211	190	7.6	1720	1.7	253	242	8.4	1740
F-90S	1.1	2.7	246	226	13.3	1420	2.4	210	206	12.2	1690	2.3	263	260	13.6	1720
F-90L	1.5	3.5	233	224	17.1	1420	3.1	205	192	15.6	1710	3.0	250	243	17.5	1730
F-100L	2.2	4.9	268	255	26.0	1430	4.5	229	204	23.5	1700	4.2	282	260	26.2	1720
F-112S	3.0	6.5	242	237	37.2	1420	5.9	193	177	33.1	1700	5.5	244	225	37.0	1720
F-112M	3.7	7.6	262	236	46.9	1420	7.2	216	188	41.4	1710	6.7	264	238	46.4	1730
F-132S	5.5	11.2	285	256	73	1420	10.5	241	208	65	1700	9.7	295	263	73	1720
F-132M	7.5	14.6	274	261	99	1460	13.7	233	224	88	1750	12.8	292	271	98	1760
F-160M	11	20.9	294	282	147	1460	19.7	255	236	130	1750	18.3	311	296	145	1760
G-160L	15	26.9	271	265	180	1460	26.3	220	222	157	1750	24.0	275	280	175	1760
F-180MG	18.5	33.4	294	312	261	1470	32.7	237	258	225	1760	30.0	296	325	334	1770
F-180MG	22	39.5	246	262	261	1470	38.9	199	216	225	1750	35.3	248	272	252	1760
F-180L	30	55	244	265	345	1460	53	200	223	299	1740	48.2	249	280	334	1750
F-200L	37	66	256	287	446	1460	65	208	244	384	1740	58.7	259	306	429	1750
F-200L	45	81	252	288	538	1450	79	205	248	461	1730	71.2	255	311	516	1740

Note: The properties of the 4P motor with the built-in brake are the same as (1) and (2) of Table 25. Refer to Table 27 on page 75 for the brake current value.

*The values in the above tables are subject to change without notice in advance. Consult us when you need the actual values.

Table 26 Table of Properties for Increased Safety Explosion-Proof Type Three-Phase Motor

(1) 200V Class

Motor Frame Size	P	4P														
	Power Supply	200V-50Hz					200V-60Hz					220V-60Hz				
	Output [kW]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]
F-71M	0.4	2.3	237	237	9.1	1380	2.0	210	210	8.3	1650	2.0	257	257	9.4	1680
F-80M	0.75	3.9	234	215	16.0	1420	3.4	211	190	15.1	1720	3.3	253	242	16.8	1740
F-90L	1.5	7.0	242	224	34.1	1430	6.3	205	192	31.2	1710	6.0	250	243	34.9	1730
F-100L	2.2	9.6	268	255	52	1430	8.8	229	204	46.9	1700	8.3	282	260	52	1720
F-112M	3.7	15.1	262	236	94	1430	14.2	216	188	83	1710	13.1	264	238	93	1730
F-132S	5.5	22.9	313	286	158	1420	21.1	264	229	139	1700	19.7	325	291	156	1720
F-132M	7.5	29.5	274	261	198	1450	27.4	240	224	175	1750	25.6	292	271	195	1760
F-160M	11	41.9	305	297	302	1450	39.5	263	247	265	1740	36.7	322	309	296	1750
G-160L	15	53	271	265	360	1460	52	220	222	313	1750	48	275	280	349	1760
F-180LG	18.5	66	293	312	522	1480	65	236	257	450	1780	59	295	324	504	1780
F-180LG	22	79	246	262	522	1480	78	199	216	450	1770	70	248	272	504	1780
F-200LG	30	105	245	281	706	1470	105	195	231	610	1760	94	245	292	684	1770
F-200L	37	128	245	289	857	1470	128	195	241	742	1750	115	245	305	832	1760
F-225S	45	154	243	228	985	1470	154	198	193	844	1770	136	246	241	943	1770

(2) 400V Class

Motor Frame Size	P	4P														
	Power Supply	200V-50Hz					200V-60Hz					220V-60Hz				
	Output [kW]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]	Rating Current	Max. Torque [%]	Start Torque [%]	Start Current [A]	Revolution [r/min]
F-71M	0.4	1.2	229	229	4.5	1390	1.0	205	201	4.1	1650	1.0	249	262	4.6	1680
F-80M	0.75	1.9	234	215	8.0	1420	1.7	211	190	7.6	1720	1.7	253	242	8.4	1740
F-90L	1.5	3.5	242	224	17.1	1430	3.1	205	192	15.6	1710	3.0	250	243	17.5	1730
F-100L	2.2	4.8	268	255	26.0	1430	4.4	229	204	23.5	1700	4.2	282	260	26.2	1720
F-112M	3.7	7.5	262	236	46.9	1430	7.1	216	188	41.4	1710	6.6	264	238	46.4	1730
F-132S	5.5	11.4	313	286	79	1420	10.5	264	229	70	1700	9.9	325	291	78	1720
F-132M	7.5	14.8	274	261	99	1450	13.7	240	224	88	1750	12.8	292	271	98	1760
F-160M	11	21.0	305	297	151	1450	19.7	263	247	133	1740	18.3	322	309	148	1750
G-160L	15	26.8	271	265	180	1460	26.1	220	222	157	1750	23.8	275	280	175	1760
F-180LG	18.5	33.1	293	312	261	1480	32.3	236	257	225	1780	29.6	295	324	252	1780
F-180LG	22	39.3	246	262	261	1480	38.8	199	216	225	1770	35.1	248	272	252	1780
F-200LG	30	52	245	281	353	1470	53	195	231	305	1760	47.2	245	292	342	1770
F-200L	37	64	245	289	429	1470	64	195	241	371	1750	58	245	305	416	1760
F-225S	45	77	243	222	492	1470	77	198	193	422	1770	70	246	241	471	1770

*The values in the above tables are subject to change without notice in advance. Consult us when you need the actual values.

■Technical Data/Motor Unit: Built-in Brake

Table 27 Electromagnetic Brake Specifications and Applicable Motor Output

Brake Type	Standard Torque [Nm]	Motor Output [kW x 4]		Moment of Inertia [x 10^{-4}kg•m^2]	Total of Brake Work [x 10^7J]	Operation Delay Time when Braking [s]		Brake Current [A]				Construction Drawing
		General Purpose Motor	AF Motor for Inverter			Normal Braking Circuit	Quick Braking Circuit	200V 50/60Hz	200V 60Hz	400V 50/60Hz	400V 60Hz	
FB-05A1	4.0	0.4	0.2	6.9	12	0.1 ~ 0.15	0.01 ~ 0.015	0.1	0.1	0.05	0.06	Fig. 28
FB-1B	7.5	0.55/0.75	0.4	11/13	33	0.2 ~ 0.3	0.01 ~ 0.02	0.1	0.1	0.1	0.1	Fig. 29
FB-2B	15	1.1/1.5	0.75	21/24	38			0.3	0.3	0.1	0.2	
FB-3B	22	2.2	1.5	38	45	0.3 ~ 0.4		0.3	0.3	0.1	0.2	
FB-5B	37	3.0/3.7	2.2	81/98	235	0.4 ~ 0.5	0.01 ~ 0.02	0.5	0.6	0.3	0.3	Fig. 30
FB-8B	55	5.5	3.7	128	235	0.3 ~ 0.4		0.5	0.6	0.3	0.3	
FB-10B	75	7.5	5.5	309	343	0.7 ~ 0.8	0.03 ~ 0.04	0.8	0.9	0.4	0.4	Fig. 31
FB-15B	110	11	7.5	418	343	0.5 ~ 0.6		0.8	0.9	0.4	0.4	
FB-20	150	15	11	1070	1010	1.7 ~ 1.8*1	0.03 ~ 0.06	0.44	0.49	-*1	-*1	Fig. 32
FB-30	190	18.5	15	2430	1010	1.4 ~ 1.5*1	0.03 ~ 0.06	0.44	0.49	-*1	-*1	Fig. 33
	220	22										
		30	22	2620								

*1. FB-20 and FB-30 brakes are available for 200V class only. Use a transformer for 400V class power supply. Capacity of the transformer should be 250VA ~ 300VA. Secondary voltage should be 200 ~ 220V.

- Lining for FB Brake is asbestos-free.
- Use quick braking circuit for hoisting device or when stopping accuracy is necessary.
- Optional low-noise brake is available, with lower braking noise.
- DC power supply and spring braking method (non-electromagnetic braking method) is used for FB Brake.

Rectifier Output Voltage (FB Brake)

Input voltage	Output voltage
AC200V	DC90V
AC220V	DC99V
AC400V	DC180V
AC440V	DC198V

• Reason Why Quick Braking Circuit Shortens Braking Time

Fig. 24 and Fig. 25 show the difference between the normal braking circuit (standard circuit) and quick braking circuit.
Fig. 26 and Fig. 27 show the current reduction in the normal braking circuit (standard equipment) and quick braking circuit.

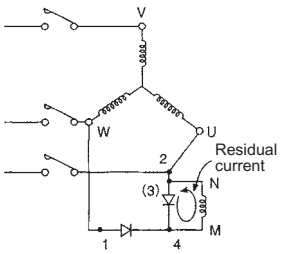


Fig. 24 Standard Circuit

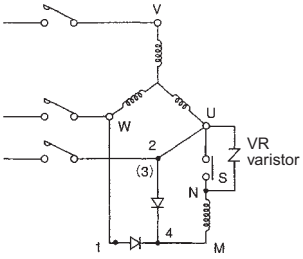


Fig. 25 Quick Braking Circuit

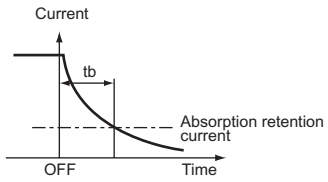


Fig. 26 Current Reduction Curve in Standard Circuit

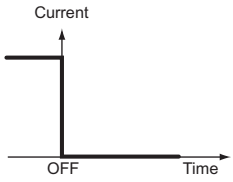


Fig. 27 Current Reduction Curve in Quick Braking Circuit

Residual current flows even after the power source is turned off for standard circuit (Fig. 24). This is because of the energy accumulated in inductance (L) of the brake coil. Fig. 26 shows the reduction curve of the residual current.
When the brake is connected to quick brake circuit (Fig. 25) and S is released as the power source is turned off, residual current will not flow (Fig. 27). This is because closed circuit does not form with braking coil.
Therefore, time (tb) is reduced, making the braking quick.
In another words, quick braking circuit is a circuit to eliminate residual current by turning the braking coil on and off simultaneously with the power source.
(Always use the quick braking circuit for VR varistor to protect rectifier and contact (S).)

Reference
Circuit Inside the Rectifier

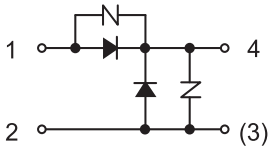
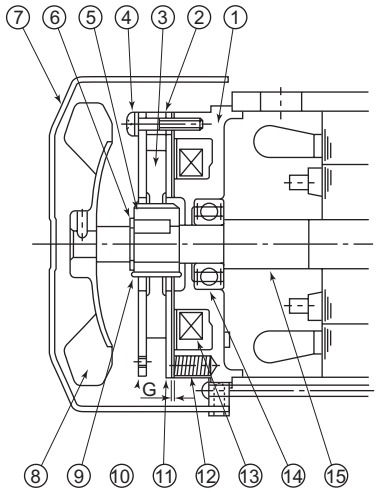


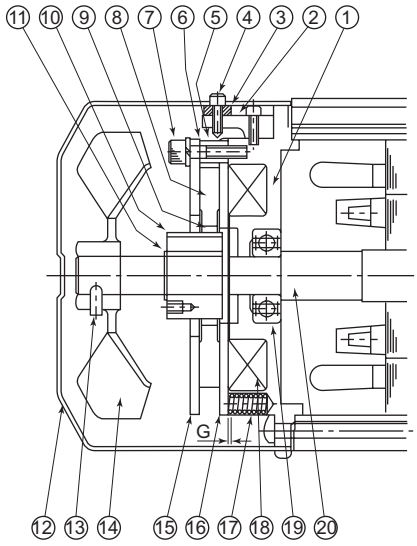
Fig. 28 FB-05A1



Part No.	Part name
1	Fixed iron core
2	Spacer
3	Brake lining
4	Mounting bolt
5	Boss
6	C Snap ring for shaft
7	Fan cover
8	Fan (Not used for 0.1kW x 4P)
9	Plate spring
10	Fixed plate
11	Movable iron core
12	Spring
13	Electromagnet coil
14	Ball bearing
15	Motor shaft

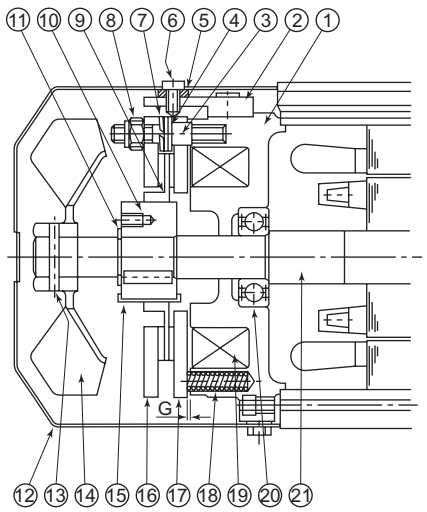
*The model with the brake release is available as an optional unit.

Fig. 30 FB-5B/8B



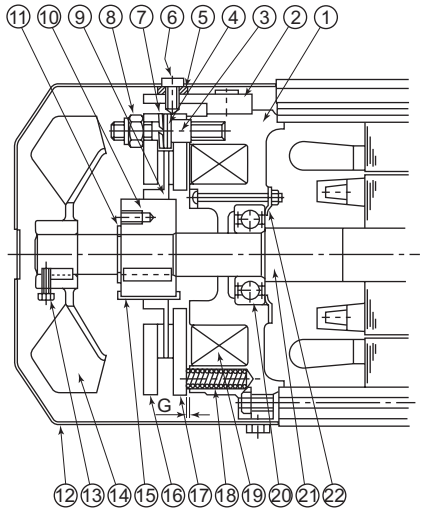
Part No.	Part name
1	Fixed iron core
2	Loosening metal fixture
3	Spacer to prevent manual releasing
4	Brake loosening bolt
5	Spacer
6	Gap adjustment system
7	Mounting bolt
8	Brake lining
9	Plate spring
10	Boss
11	C Snap ring for shaft
12	Cover
13	Fan set bolt
14	Fan
15	Fixed plate
16	Movable iron core
17	Spring
18	Electromagnet coil
19	Ball bearing
20	Motor shaft

Fig. 30 FB-5B/8B



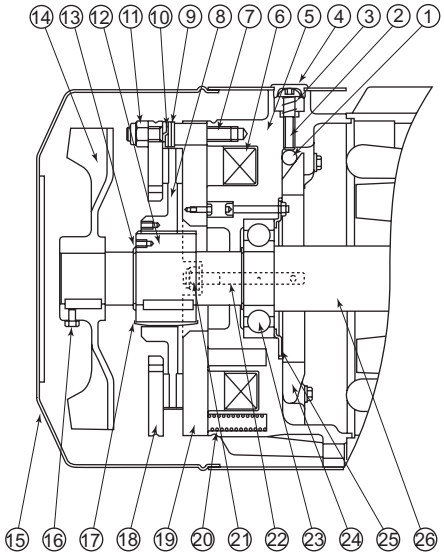
Part No.	Part name
1	Fixed Iron core
2	Loosening metal fixture
3	Stud bolt
4	Adjustment washer
5	Spacer to prevent manual releasing
6	Brake loosening bolt
7	Spring washer
8	Gap adjustment nut
9	Brake lining
10	Boss
11	C Snap ring for shaft
12	Cover
13	Spring pin
14	Fan
15	Plate spring
16	Fixed plate
17	Movable iron core
18	Spring
19	Electromagnet coil
20	Ball bearing
21	Motor shaft

Fig. 31 FB-10B/15B



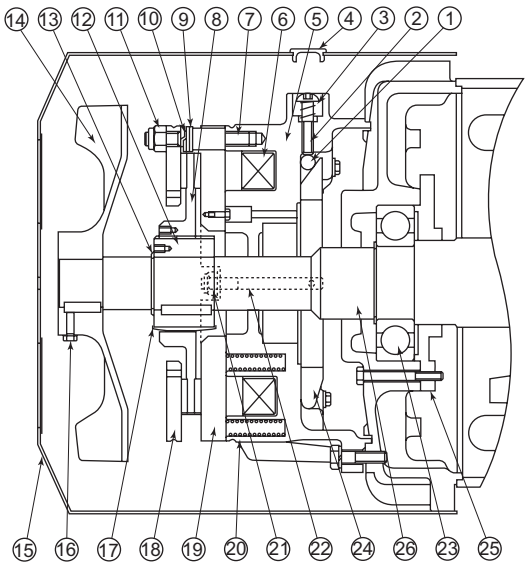
Part No.	Part name	Part No.	Part name
1	Fixed iron core	12	Cover
2	Loosening metal fixture	13	Fan set bolt
3	Stud bolt	14	Fan
4	Adjustment washer	15	Plate spring
5	Spacer to prevent manual releasing	16	Fixed plate
6	Brake loosening bolt	17	Movable iron core
7	Spring washer	18	Spring
8	Gap adjustment nut	19	Electromagnet coil
9	Brake lining	20	Bearing
10	Boss	21	Motor shaft
11	C Snap ring for shaft	22	Bearing cover

Fig. 32 FB-20



Part No.	Part name	Part No.	Part name
1	Roller	14	Fan
2	Brake loosening bolt	15	Cover
3	Auxiliary spring	16	Fan set bolt
4	Blind plug	17	Plate spring
5	Fixed iron core	18	Fixed plate
6	Electromagnet coil	19	Movable iron core
7	Stud bolt	20	Spring
8	Brake lining	21	Nut
9	Adjustment washer	22	Stud bolt
10	Spring washer	23	Bearing
11	Gap adjustment nut	24	Loosening lever
12	Boss	25	Bearing cover
13	C Snap ring for shaft	26	Motor shaft

Fig. 33 FB-30



Part No.	Part name	Part No.	Part name
1	Roller	14	Fan
2	Brake loosening bolt	15	Cover
3	Auxiliary bpring	16	Fan set bolt
4	Blind plug	17	Plate spring
5	Fixed iron core	18	Fixed plate
6	Electromagnet coil	19	Movable iron core
7	Stud bolt	20	Spring
8	Brake lining	21	Nut
9	Adjustment washer	22	Stud bolt
10	Spring washer	23	Bearing
11	Gap adjustment nut	24	Loosening lever
12	Boss	25	Bearing cover
13	C Snap ring for shaft	26	Motor shaft

Technical Data/Motor Unit: With Inverter Motor

Table 27 List of RHYTAX Speed Reducer with Inverter Motor

Motor Capacity [kW x P]	Nominal Reduction Ratio 10	12	15	20	25	30	40	50	60	80	100	120	Capacity Symbol	Frame Size	Auxiliary Symbol
1.5 x 4										●	●	●	2	72	AV
2.2 x 4								●	●	●	●	●	3	72	AV
										●	●	●	3	82	AV
3.7 x 4					●	●	●	●	●	●			5	72	AV
							●	●	●	●			5	82	AV
										●	●		5	92	AV
											●	●	5	102	AV
5.5 x 4	●	●	●	●	●	●	●	●					8	72	AV
					●	●	●	●	●	●			8	82	AV
									●	●	●		8	92	AV
										●	●	●	8	102	AV
											●	●	8	112	AV
7.5 x 4	●	●	●	●	●	●	●						10	72	AV
	●	●	●	●	●	●	●	●	●				10	82	AV
								●	●	●			10	92	AV
								●	●	●	●		10	102	AV
										●	●	●	10	112	AV
11 x 4	●	●	●	●	●								15	72	AV
	●	●	●	●	●	●	●						15	82	AV
						●	●	●					15	92	AV
					●								15	95	AV
							●	●	●				15	102	AV
								●	●				15	112	AV
15 x 4	●	●	●	●									20	71	AV
	●	●	●	●	●	●							20	81	AV
						●	●						20	92	AV
	●	●	●	●	●								20	95	AV
							●	●					20	102	AV
					●	●							20	105	AV
								●	●				20	112	AV
							●						20	115	AV
18.5 x 4	●	●	●	●									25	82	AV
						●							25	92	AV
	●	●	●	●	●								25	95	AV
							●						25	102	AV
	●	●	●	●	●	●							25	105	AV
								●	●				25	112	AV
						●	●						25	115	AV
22 x 4	●	●	●	●									30	82	AV
	●	●	●	●	●								30	95	AV
							●						30	102	AV
	●	●	●	●	●	●							30	105	AV
								●					30	112	AV
	●	●	●	●	●	●	●						30	115	AV
30 x 4	●	●	●	●	●	●	●						40	115	AV
37 x 4	●	●	●	●	●	●							50	115	AV

Table 28 List of RHYTAX Speed Reducer with Inverter Motor

Motor Capacity [kW x P]	Nominal Reduction Ratio 170	235	200	265	330	390	450	545	Capacity Symbol - Frame Size - Auxiliary Symbol
0.4 x 4			●	●	●	●	●	●	05 - 72DA - AV
					●	●	●	●	05 - 82DA - AV
0.75 x 4	●	●	●	●	●	●	●		1 - 72DA - AV
		●	●	●	●	●	●	●	1 - 82DA - AV
							●	●	1 - 92DA - AV
1.5 x 4	●								2 - 72DA - AV
	●	●	●	●	●				2 - 82DA - AV
		●	●	●	●	●	●		2 - 92DA - AV
				●	●	●	●	●	2 - 102DA - AV
						●	●	●	2 - 112DA - AV
2.2 x 4	●	●	●						3 - 82DA - AV
	●	●	●	●					3 - 92DA - AV
		●	●	●	●	●	●		3 - 102DA - AV
				●	●	●	●	●	3 - 112DA - AV
3.7 x 4	●								5 - 82DA - AV
	●	●							5 - 82DA - AV
	●	●	●						5 - 102DA - AV
			●	●	●				5 - 112DA - AV

Note: Contact us for the high speed input (when the motor revolution exceeds 1750 r/min).

Cautions for Driving with Inverter

(1) Set the upper limit of the inverter to 60Hz or smaller for 4P motor.
(2) Take sufficient care for operation with standard motor. Output torque for inverter operation will be as shown in Fig. 34. This is mainly because of the thermal rating of the motor.
(3) Special consideration may be necessary for insulation and voltage-proofing of the motor when driving standard motor with inverter. Consult us when using inverters with high-carrier frequency, with input voltage is higher than 400V, or when the wiring distance is long.

With Standard Motor

When RHYTAX DRIVE with standard motor is driven with inverter: Take sufficient care on output torque. The output torque will be as shown in Fig. 34 mainly due to motor's thermal rating.

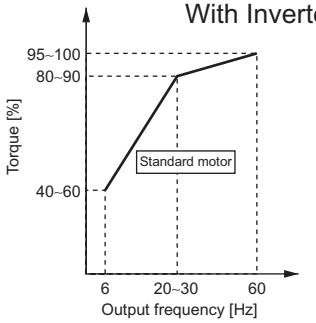


Fig. 34 Continuous Operation Characteristics When Standard Motor is Driven by Inverter

With Inverter Motor (AF Motor)

Use RHYTAX DRIVE with motor for inverter when high output torque is necessary at low frequency. Output torque characteristics is shown in Fig. 35 and available models are shown in Table 27 and 28 for such requirements.

Note: For constant torque operation in 6 ~ 60Hz range: Implement voltage boost function to compensate with voltage drop at low-frequency range of primary resistance of small-capacity motor or long wiring distance.

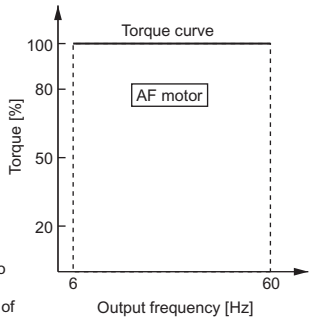


Fig. 35 AF Motor Output Torque Characteristics

Warranty

Warranty Period	The warranty period for the Products shall be 18 months after the commencement of delivery or 18 months after the shipment of the Products from the seller's works or 12 months from the Products coming into operation, whichever comes first.
Warranty Condition	In the event that any problem or damage to the Product arises during the "Warranty Period" from defects in the Product whenever the Product is properly installed and combined with the Buyer's equipment or machines, maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agree upon in writing between the Seller and the Buyer or its customers; the Seller will provide, at its sole discretion, appropriate repair or replacement of the Product without charge at a designted facility, except as stipulated in the "Warranty Exclusions" as described below. However, if the Product is installed or integrated into the Buyer's equipment or machines, the Seller shall not reimburse the cost of: removal or re-installation of the Product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the Buyer or its customers.
Warranty Exclusions	Notwithstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the Product that is caused by: 1. installation, connection, combination or integration of the Product in or to the other equipment or machine that is rendered by any person or entity other than the Seller; 2. insufficient maintenance or improper operation by the Buyer or its customers, such that the Product is not maintained in accordance with the maintenance manual provided or designated by the Seller; 3. improper use or operation of the Product by the Buyer or its customers that is not informed to the Seller, including, without limitation, the Buyer' s or its customers, operation of the Product not in conformity with the specifications, or use of lubricating oil in the Product that is not recommended by the Seller; 4. any problem or damage on any equipment or machine to which the Product is installed, connected or combined or on any specifications particular to the Buyer or its customers; 5. any changes, modifications, improvements or alterations to the Product or those functions that are rendered on the Product by any person or entity other than the Seller; 6. any parts in the Product that are supplied or designated by the Buyer or its customers; 7. earthquake, fire, flood, sea-breeze, gas, thunder, acts of God or any other reasons beyond the control of the Seller; 8. normal wear and tear, or deterioration of the Products, parts, such as bearings, oil-seals; 9. any other troubles, problems or damage to the Product that are not attributable to the Seller.

⚠ SAFETY PRECAUTIONS

- Observe the safety rules for the installation site and equipment strictly (Industrial safety and health law, technical standard for electric facilities, extension rules, plant explosion guidelines, building standards law, etc).
- Read the maintenance manual carefully before use. Request a copy from the distributor of the Product or our Sales Department if the maintenance manual is not handy. A copy of maintenance manual should always reach the actual user of the Product.
- Select a sufficient product for the usage condition and application.
- Install protective equipment on the machine side when the machine is used for applications which may cause loss of human life or significant loss in facility, such as use for human transportation or elevators.
- Use the explosion-proof motor in the explosive environment. Use the explosion-proof motor equipped with the specifications applicable to a dangerous place.
- When driving the motor by the inverter of 400V class, improve the insulation of the motor if a control filter or a reactor is installed to the inverter side.
- Install an oil pan or other preventive devices in case of oil leakage due to failure or termination of service life when the machine is used for food processing equipment, clean room, or other applications that are sensitive to oil.