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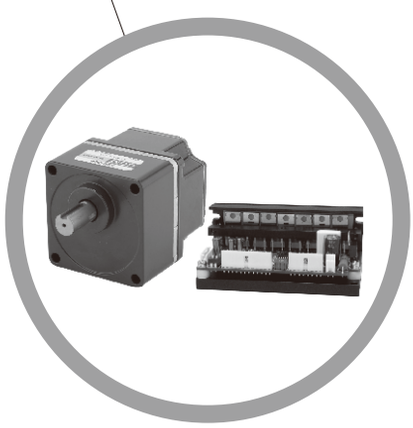
GGM

BRUSHLESS DC MOTOR UNIT



[BLDC MOTOR MODEL CODING SYSTEM]

K	8	B	H	25	N	C

SERIES
K SERIES

FLANGE	
6	□60
8	□80
9	□90
10	□104

BLDC MOTOR	
B	AC Input
L	DC Input

SHAFT	
S	STRAIGHT
G	PINION GENERAL
P	PINION POWERFUL
H	HIGH STRENGTH

OUTPUT	
20	20W
30	30W
40	40W
50	50W
90	90W
100	100W
150	150W
200	200W
400	400W

COOLING	
F	COOLING FAN
N	NON FAN

VOLTAGE	
U	1Ø 100V 50/60Hz
	1Ø 110V 60Hz
	1Ø 115V 60Hz
C	1Ø 200V 50/60Hz
	1Ø 220V 50/60Hz
	1Ø 230V 50/60Hz
2	DC 24V
9	DC 48V

[SPEED CONTROL UNIT MODEL CODING SYSTEM]

G	U	B	–	C	–	90

SERIES
G SERIES

CONTROLLER TYPE	
U	UNIT TYPE

BLDC MOTOR	
B	AC Input
L	DC Input

SHAFT	
U	1Ø 100V 50/60Hz
	1Ø 110V 60Hz
	1Ø 115V 60Hz
C	1Ø 200V 50/60Hz
	1Ø 220V 50/60Hz
	1Ø 230V 50/60Hz
2	DC 24V
9	DC 48V

OUTPUT	
20	20W
30	30W
40	40W
50	50W
90	90W
100	100W
150	150W
200	200W
400	400W

GGM GGM CO., LTD.

[TRANSVERSE AXIS HOLLOW GEARHEAD MODEL CODING SYSTEM]

K	8	H	100	B	TH

SERIES
K SERIES

FLANGE TYPE	
6	60 x 120.5
8	80 x 160.5
9	90 x 180

GEAR TYPE	
G	GENERAL
P	POWERFUL
H	HIGH STRENGTH

RATIO	
5	1/5
:	:
200	1/200

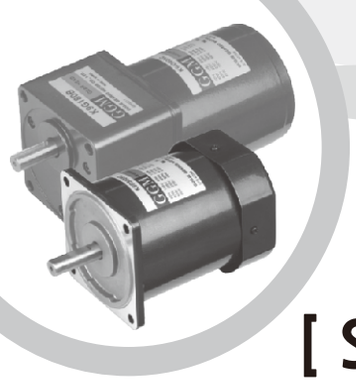
BEARING	
B	BALL BEARING

SHAFT TYPE	
TH	TRANSVERS AXIS HOLLOW

List of functions

Series	Output				Input voltage			
	60mm	80mm	90mm	104mm	single phase AC100~115V	single phase AC200~230V	DC24V	48V
B SERIES (AC Input type)	20W				●	●		
		40W			●	●		
			90W		●	●		
			150W			●		
				200W		●		
				400W		●		
L SERIES (DC Input type)	30W						●	
		50W					●	
			100W				●	
				200W			●	
				400W				●

Series	Speed control range	Speed ratio	Speed change ratio	Funtions		
				Multi-step rotation	Acceleraion/ deceleration rotation	Alarm ouput
B SERIES (AC Input type)	100~2000 r/min	20W, 40W, 90W	Load : less than or equal to ±1% Voltage : less than or equal to ±1% Temperature : less than or equal ±1%		●	●
	100~3000 r/min	150W				
	100~4000 r/min	200W, 400W			●	●
L SERIES (DC Input type)	100~3000 r/min	30W, 50W, 100W	Load : less than or equal to ±1% Voltage : less than or equal to ±1% Temperature : less than equal ±1%	● (2stages)	●	●
	100~4000 r/min	200W, 400W				



[Summary of brushless DC motor]

1. Easy contact, simple manipulation

Motor and wire get easily connected by just connecting speed control unit connector. In case of B Series, the rotation speed can easily be manipulated with the volume on the front.

2. Excellent speed stability

Electricity flowing through the motor is controlled by comparing the feedback signal from the motor and the set speed. This stabilizes the speed. Even if the load fluctuates, the speed can be controlled safely from the low to high speeds.
The rate of speed change for B Series is ±1.0%.
The rate of speed change for L Series ±1.0% .

3. Wider range of speed change

Speed can be controlled throughout a wide range by using feedback control.
In case of B Series, the speed is controlled from 100 to 2000r/min(20W, 40W, 90W), from 100 to 3000 r/min(150W, 200W).
In case of L Series, the speed is controlled from 100 to 3000r/min.

4. Slow start · slow stop funtions

Motor starts at the set acceleration time and stops at the set deceleration time. This acceleration and deceleration times can be set within 0.5~10 seconds.

5. Equipped with various control function

Correspond to various operation method and available with slow start/slow stop function effective to delication work transportation.

6. Compact size and high output

It is made more compact and high output by using rotor with permanent magnet.

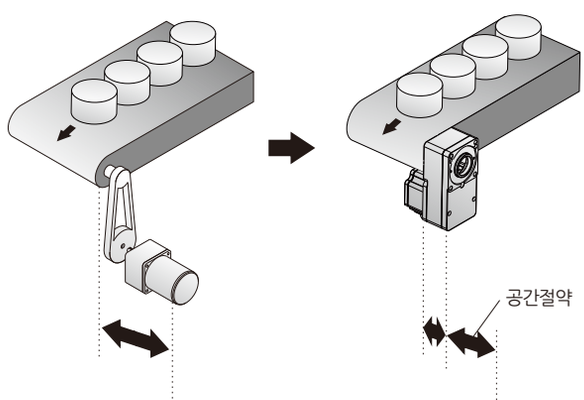
7. Energy saving

Brushless DC motor has almost no second loss by using rotor with permanent magnet. In case of 90W, energy consumption is reduced by 50% by comparing with inverter control AC motor and contributes to FA energy saving.

8. High streghth · gearhead

Applied gear's optimum design, new structure design of case and supplement, bearing structure strength.

◇ TRANSVERSE AXIS HOLLOW GEARHEAD
Execute device's space save because it doesn't use coupling and directly connect to running shaft.



◇ **High stregth · gearhead**(Flat type gearhead)
Accomplished max allowable torque 68N·m to respond to high revolution. In addition, rated lifetime is 5,000 hours.

9. Low noise

We made it quieter by applying new structure and planning skills for motor. Gear head is implemented with active noise control by gear processing techniques, and assembly techniques to reduce noise.

10. Others

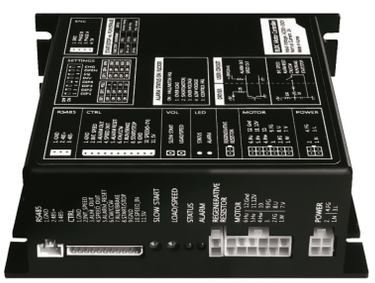
- Motor part was designed with IP65 that it is safe even if it is dropped in the water (in case of malfunction)
  It cannot be used in a place where it is in constant contact with water.
- B series between motor and control unit is extendable max 10.5m and L series is extendable max 2m.(if option cable is applied)

BRUSHLESS DC MOTOR UNIT

B Series

Brushless DC motor is for AC input speed control and unit is for panel installation driver.

- Output : 20~200W
- Speed control range : 100~2000 r/min (20W, 40W, 90W)
  100~3000 r/min (150W)
  100~4000 r/min (200W, 400W)
- Speed change ratio : less than or equal to ±1%(Load)



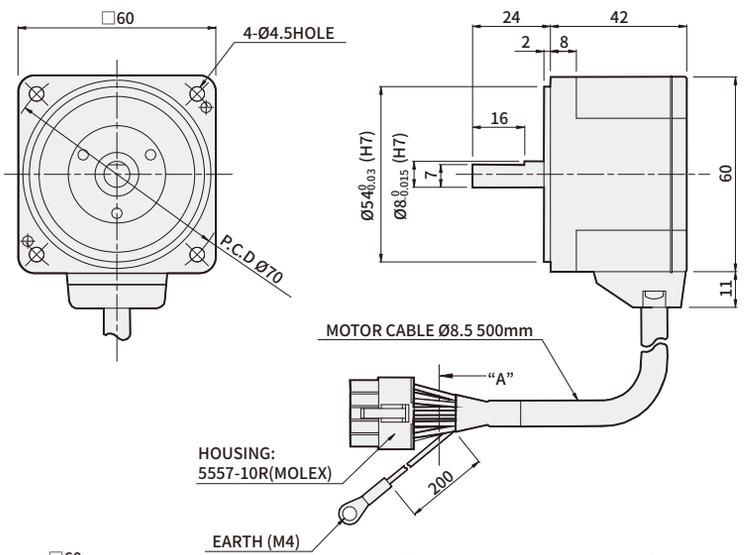
BRUSHLESS DC MOTOR UNIT - B Series

20W □60mm AC voltage input

DIMENSIONS

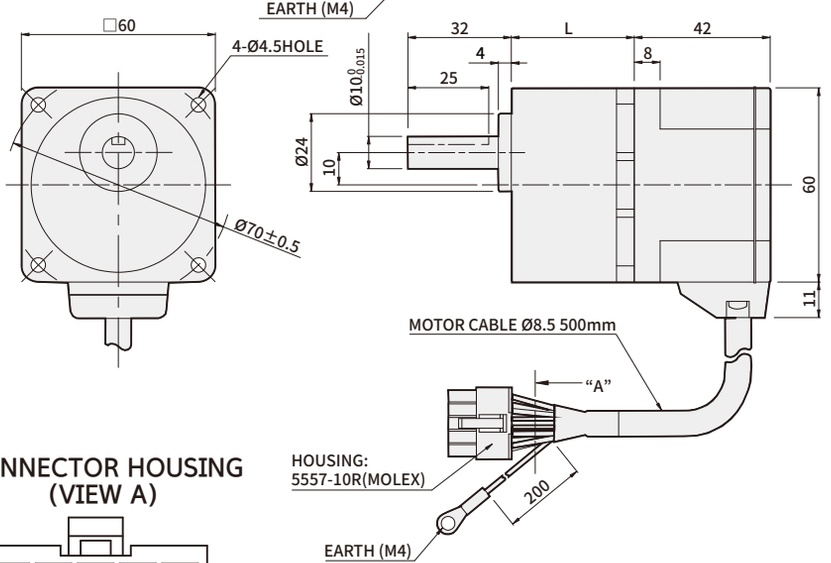
K6BS20N■

(Weight : 0.5Kg)

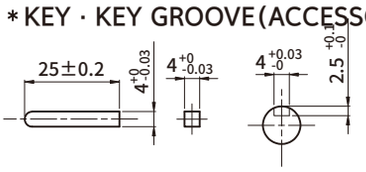


K6BH20N■ + K6H□B

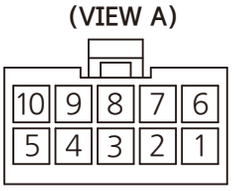
(Weight : 0.9Kg)



*** KEY · KEY GROOVE (ACCESSORY)**



*** CONNECTOR HOUSING (VIEW A)**



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K6BH20N■	K6H□B	5~20	34	M4 P0.7×50
		30~100	38	M4 P0.7×55
		200	43	M4 P0.7×60

* In dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)

* In □ of name, it represents a deceleration ratio.

* Geared motor is included with fixing bolt set (flat washer, spring washer, hexagonal nut 4pcs each)

*** PIN MAP**

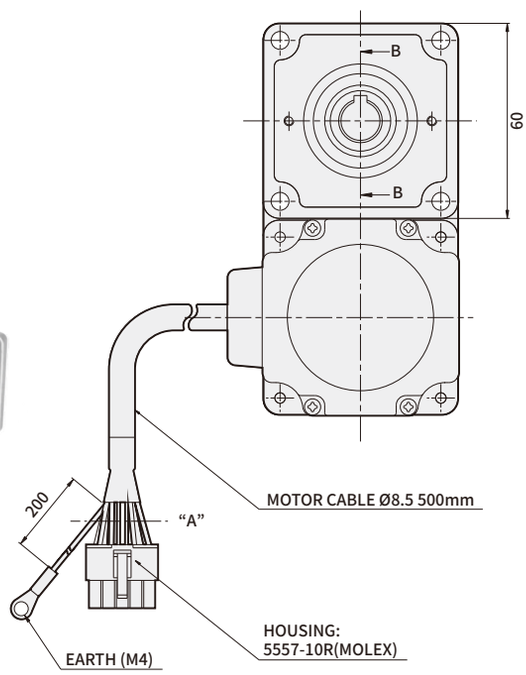
PIN No.	COLOR	SIGNAL
1	BLUE	U
2	-	-
3	GREEN	Ground
4	YELLOW	Vcc
5	ORANGE	Hw
6	PURPLE	V
7	GRAY	W
8		(Drain)
9	BROWN	Hu
10	WHITE	Hv

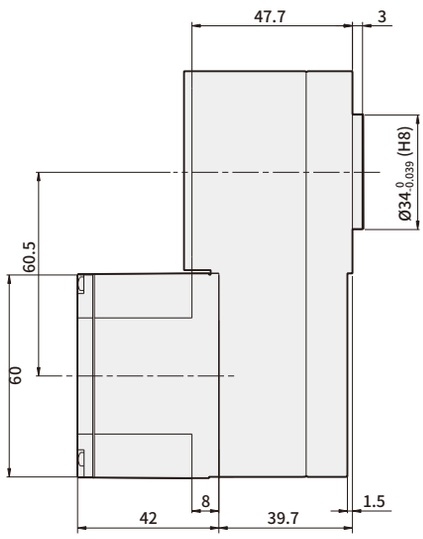
BRUSHLESS DC MOTOR UNIT - B Series

DIMENSIONS

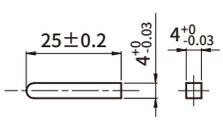
K6BH20N■ + K6H□BTH

(Weight : 1.2Kg)

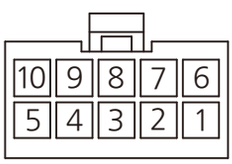


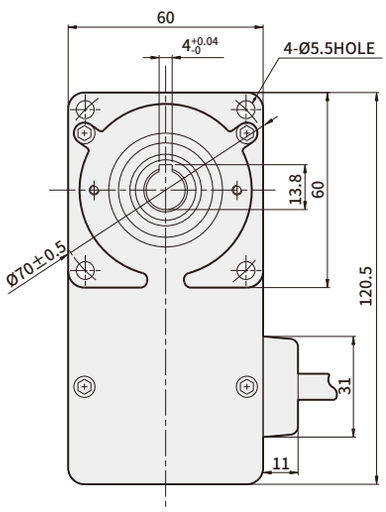


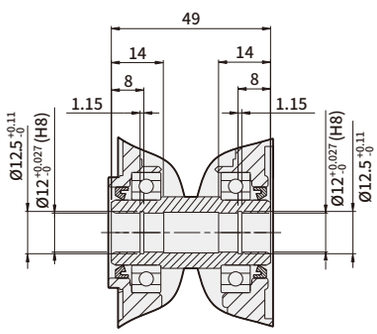
* KEY (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)







SECTION B-B

MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K6BH20N■	K6H□BTH	5~200	M5 P0.8×65

* In Dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)
* In □ of name, it represents a deceleration ratio.
* Mounting bolt sets are included in flat type gearbox.
  M5×65L (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

PIN No.	COLOR	SIGNAL
1	BLUE	U
2	-	-
3	GREEN	Ground
4	YELLOW	Vcc
5	ORANGE	Hw
6	PURPLE	V
7	GRAY	W
8		(Drain)
9	BROWN	Hu
10	WHITE	Hv

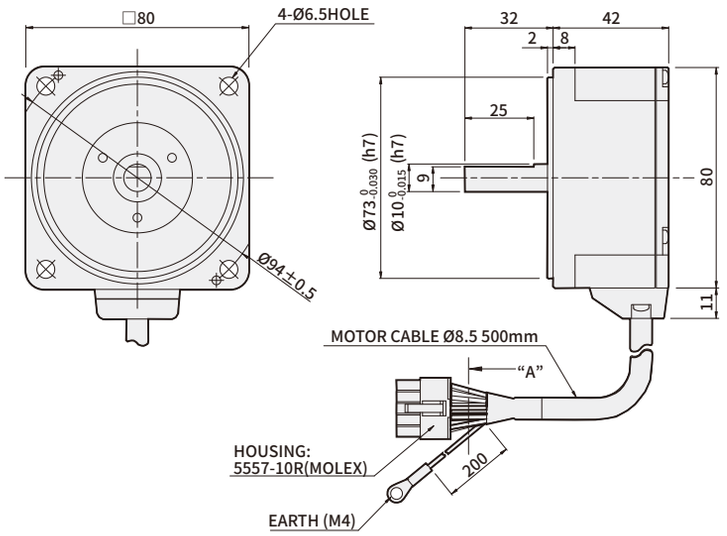
BRUSHLESS DC MOTOR UNIT - B Series

40W □80mm AC voltage input

DIMENSIONS

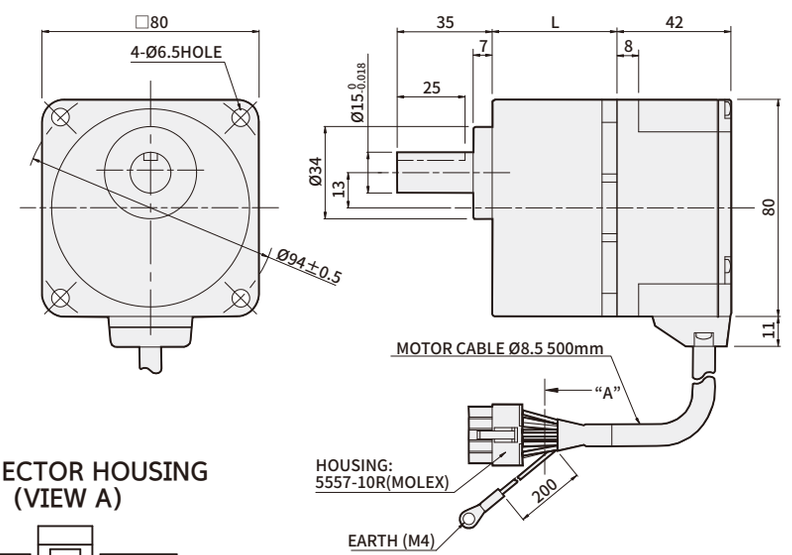
K8BS40N■

(Weight : 0.8Kg)

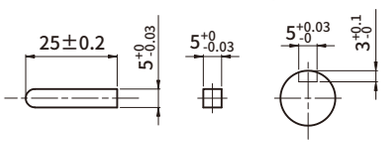


K8BH40N■ + K8H□B

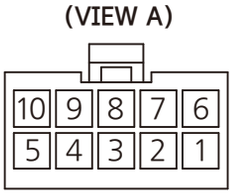
(Weight : 1.7Kg)



＊KEY · KEY GROOVE (ACCESSORY)



＊CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K8BH40N■	K8H□B	5~20	41	M6 P1.0×65
		30~100	46	M6 P1.0×70
		200	51	M6 P1.0×75

＊ In dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)

＊ In □ of name, it represents a deceleration ratio.

＊ Geared motor is included with fixing bolt set. (flat washer, spring washer, hexagonal nut 4pcs each)

＊ PIN MAP

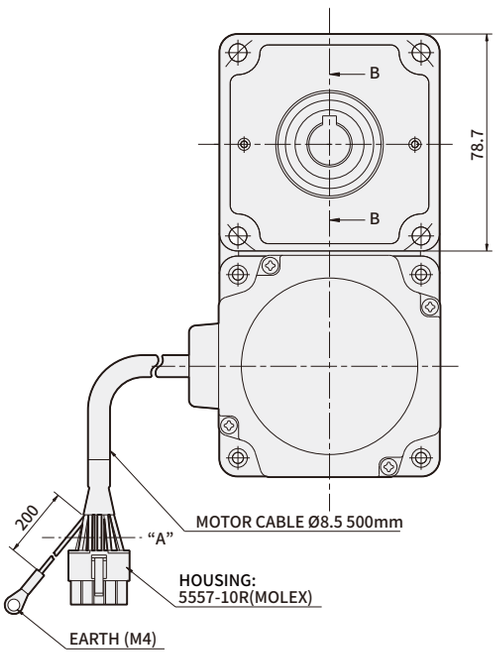
PIN No.	COLOR	SIGNAL
1	BLUE	U
2	-	-
3	GREEN	Ground
4	YELLOW	Vcc
5	ORANGE	Hw
6	PURPLE	V
7	GRAY	W
8		(Drain)
9	BROWN	Hu
10	WHITE	Hv

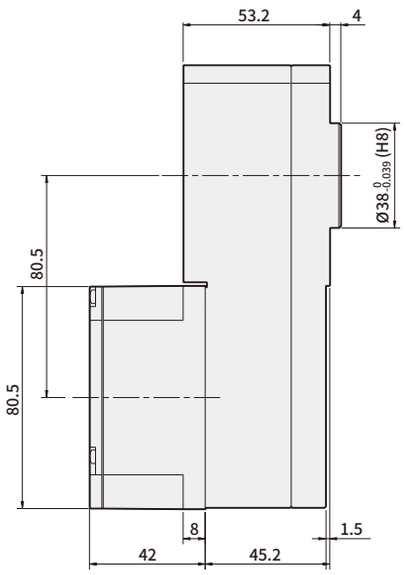
BRUSHLESS DC MOTOR UNIT - B Series

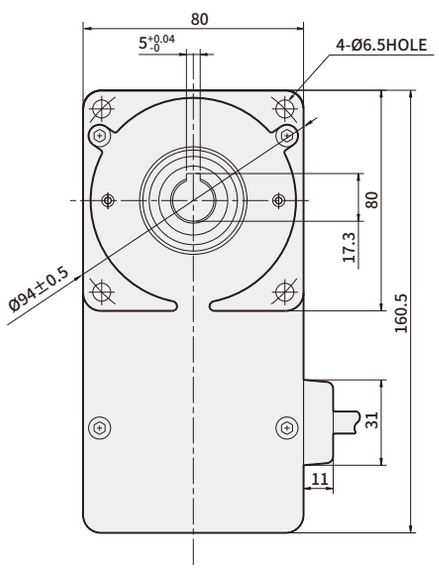
DIMENSIONS

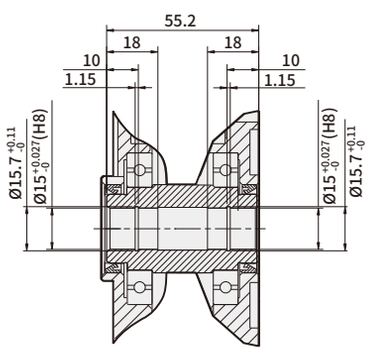
K8BH40N■ + K8H□BTH

(Weight : 2.3Kg)



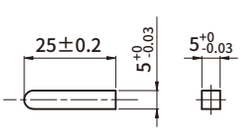




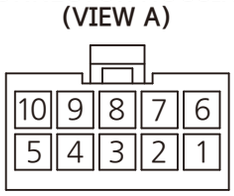


SECTION B-B

* KEY (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)



* PIN MAP

PIN No.	COLOR	SIGNAL
1	BLUE	U
2	-	-
3	GREEN	Ground
4	YELLOW	Vcc
5	ORANGE	Hw
6	PURPLE	V
7	GRAY	W
8		(Drain)
9	BROWN	Hu
10	WHITE	Hv

MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K8BH40N■	K8H□BTH	5~200	M6 P1.0×70

* In Dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)
* In □ of name, it represents a deceleration ratio.
* Mounting bolt sets are included in flat type gearbox.
  M6×70L (flat washer, spring washer, hexagonal nut 4pcs each)

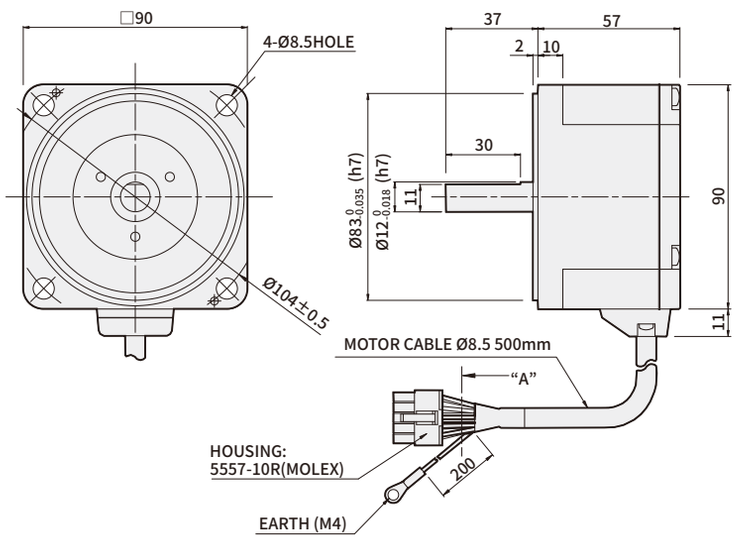
BRUSHLESS DC MOTOR UNIT - B Series

90W □90mm AC voltage input

DIMENSIONS

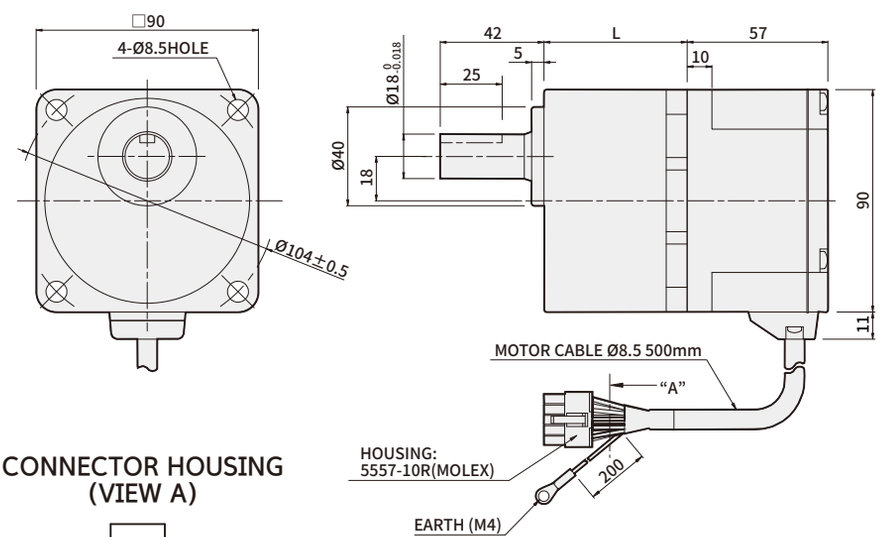
K9BS90N■

(Weight : 1.3Kg)

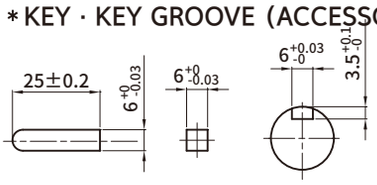


K9BH90N■ + K9H□B

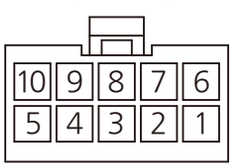
(Weight : 2.6Kg)



* KEY · KEY GROOVE (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K9BH90N■	K9H□B	5~20	45	M8 P1.25×75
		30~100	58	M8 P1.25×90
		200	64	M8 P1.25×95

* PIN MAP

PIN No.	COLOR	SIGNAL
1	BLUE	U
2	-	-
3	GREEN	Ground
4	YELLOW	Vcc
5	ORANGE	Hw
6	PURPLE	V
7	GRAY	W
8		(Drain)
9	BROWN	Hu
10	WHITE	Hv

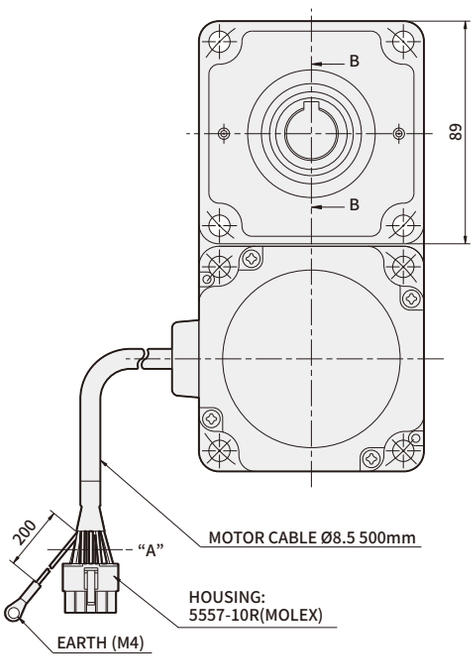
* In dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)
* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing bolt set. (flat washer, spring washer, hexagonal nut 4pcs each)

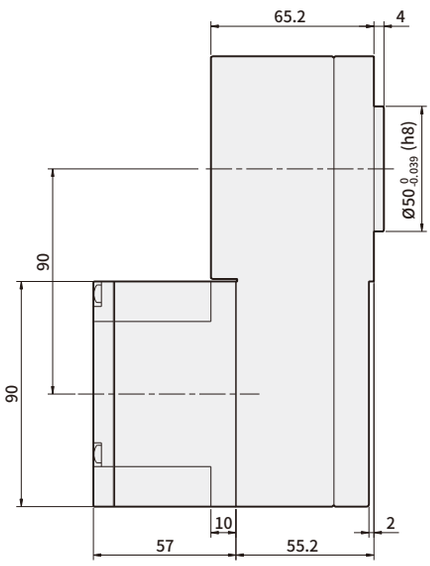
BRUSHLESS DC MOTOR UNIT - B Series

DIMENSIONS

K9BH90N■ + K9H□BTH

(Weight : 3.4Kg)





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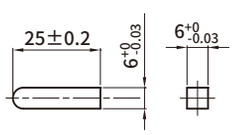
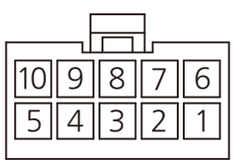
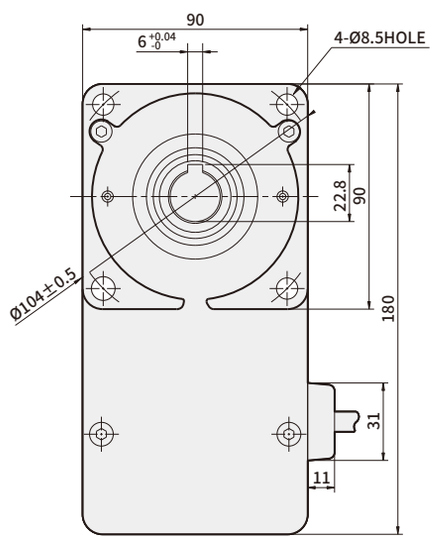
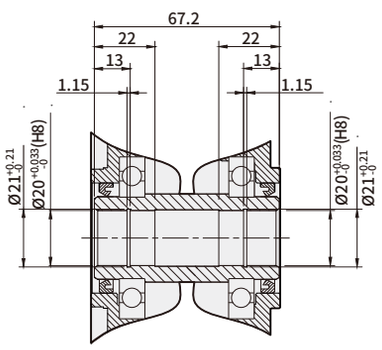


* CONNECTOR HOUSING (VIEW A)







SECTION B-B

MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K9BH90N■	K9H□BTH	5~200	M8 P1.25×90

* In Dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)
* In □ of name, it represents a deceleration ratio.
* Mounting bolt sets are included in flat type gearbox.
  M8×90L (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

PIN No.	COLOR	SIGNAL
1	BLUE	U
2	-	-
3	GREEN	Ground
4	YELLOW	Vcc
5	ORANGE	Hw
6	PURPLE	V
7	GRAY	W
8		(Drain)
9	BROWN	Hu
10	WHITE	Hv

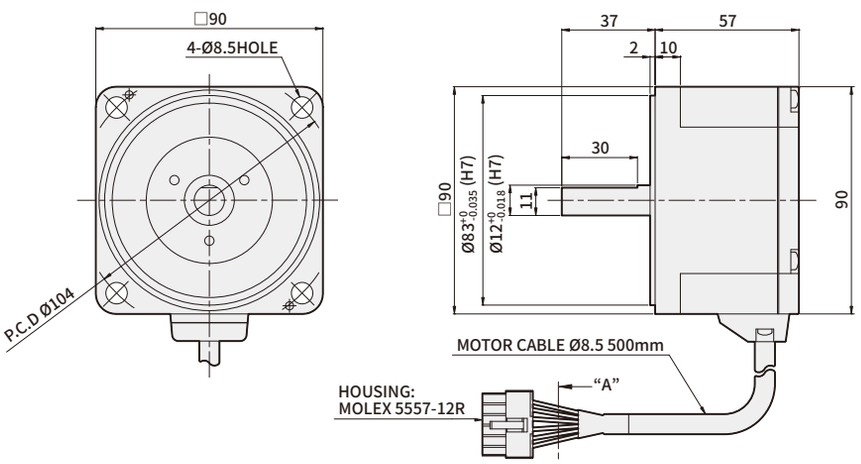
BRUSHLESS DC MOTOR UNIT - B Series

150W □90mm AC voltage input

DIMENSIONS

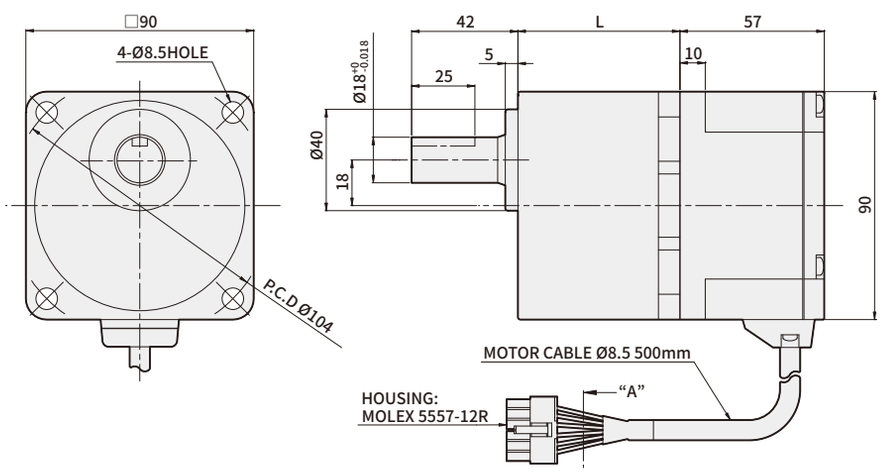
K9BS150NC

(Weight : 1.3Kg)

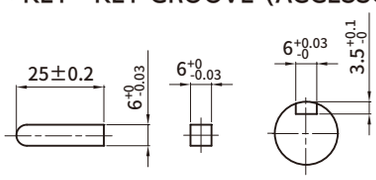


K9BH150NC + K9H□B

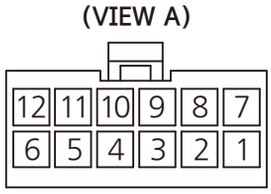
(weight : 2.6Kg)



* KEY · KEY GROOVE (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K9BH150NC	K9H□B	5~20	45	M8 P1.25×75
		30~100	58	M8 P1.25×90
		200	64	M8 P1.25×95

* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing bolt set. (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

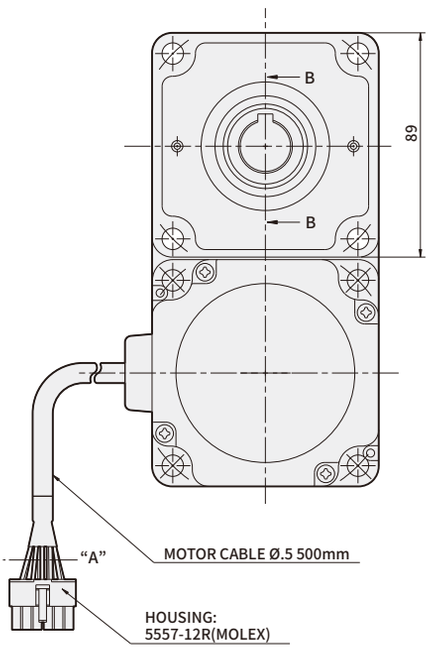
PIN No.	COLOR	SIGNAL
1	GRAY	W
2	-	-
3	-	-
4	ORANGE	Hw
5	WHITE	Hv
6	BROWN	Hu
7	PURPLE	V
8	BLUE	U
9	GREEN& YELLOW	FG
10		(DRAIN)
11	YELLOW	Vcc
12	GREEN	Ground

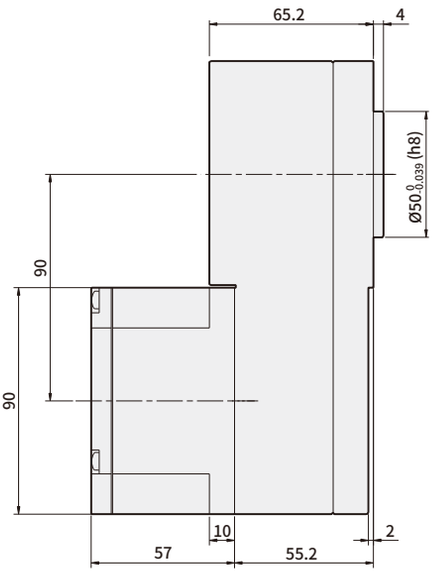
BRUSHLESS DC MOTOR UNIT - B Series

DIMENSIONS

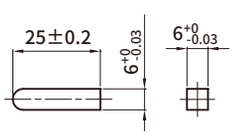
K9BH150NC + K9H□BTH

(Weight : 3.4Kg)

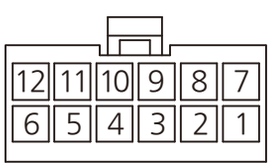


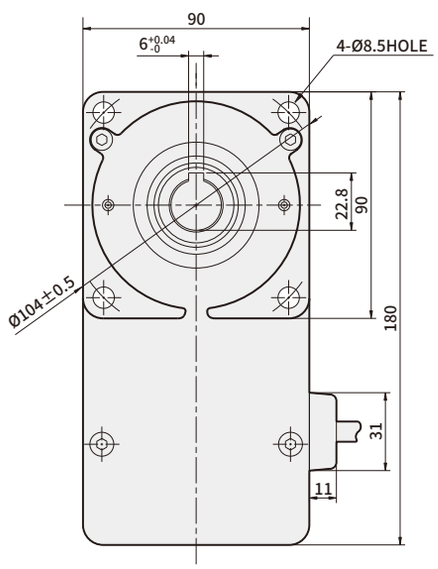


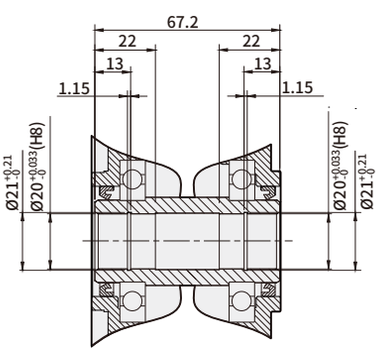
*KEY (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)







SECTION B-B

MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K9BH150NC	K9H□BTH	5~200	M8 P1.25×90

* In □ of name, it represents a deceieration ratio.
* Mounting bolt sets are included in flat type gearbox.
  M8×90L (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

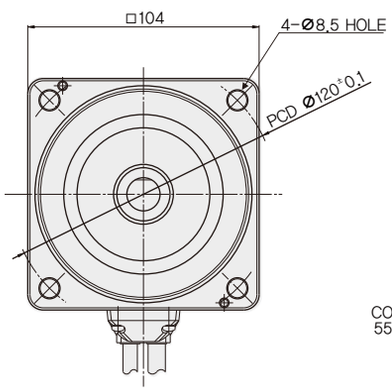
PIN No.	COLOR	SIGNAL
1	GRAY	W
2	-	-
3	-	-
4	ORANGE	Hw
5	WHITE	Hv
6	BROWN	Hu
7	PURPLE	V
8	BLUE	U
9	GREEN& YELLOW	FG
10		(DRAIN)
11	YELLOW	Vcc
12	GREEN	Ground

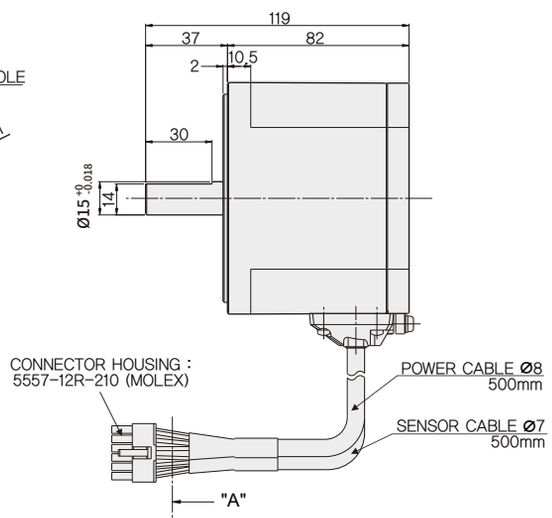
BRUSHLESS DC MOTOR UNIT - B Series

200W 400W □104mm AC voltage input

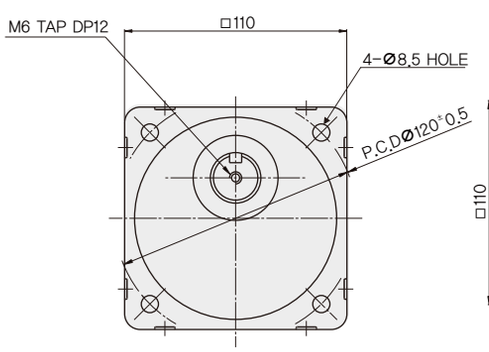
DIMENSIONS

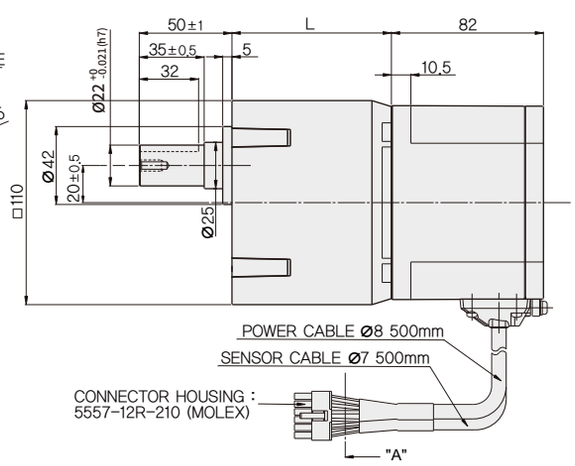
K10BS200NC
K10BS400NC
(Weight : 2.4Kg)





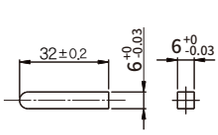
K10BH200NC + K10H□BU
K10BH400NC + K10H□BU
(Weight : 5.4Kg)



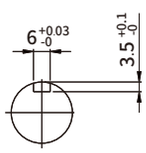


* KEY · KEY GROOVE (ACCESSORY)

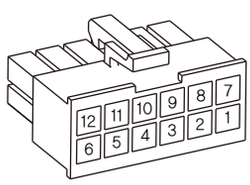
□ KEY



○ KEY GROOVE



* CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K10BH200NC	K10H□BU	5~20	60	M8 P1.25×95
K10BH400NC		30~50	72	M8 P1.25×110
		100~200	86	M8 P1.25×120

* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing bolt set (normal WASHER, SPRING, WASHER, cube nut; 4 each)

* PIN MAP

PIN No.	COLOR	SIGNAL
1	GRAY	W
2	-	-
3	-	-
4	ORANGE	Hw
5	WHITE	Hv
6	BROWN	Hu
7	PURPLE	V
8	BLUE	U
9	GREEN-YELLOW	FG
10	-	-
11	YELLOW	Vcc
12	GREEN	Ground

Specification

Product name	GEAR TYPE	K6BH20NU	K6BH20NC	K8BH40NU	K8BH40NC	K9BH90NU	K9BH90NC	K9BH150NC	K10BH200NC	K10BH400NC
	D-CUT TYPE	K6BS20NU	K6BS20NC	K8BS40NU	K8BS40NC	K9BS90NU	K9BS90NC	K9BS150NC	K10BS200NC	K10BS400NC
Rating output (continuous) W		20		40		90		150	200	400
Power input	Voltage V	100~115	200~230	100~115	200~230	100~115	200~230	200~230	200~230	200~230
	Frequency Hz	50/60								
	Rating input current A	0.95	0.55	1.45	0.85	2.55	1.45	2.1	2.8	5.6
	Maximum input current A	1.55	0.9	2.5	1.4	3.9	2.4	4	5.1	7.8
Rating torque N·m(kgf·cm)		0.1(1.0)		0.2(2.0)		0.45(4.5)		0.49(4.9)	0.65(6.5)	1.3(13)
Starting torque N·m(kgf·cm)		0.12(1.2)		0.24(2.4)		0.54(5.4)		0.63(6.3)	1.15(11.5)	1.8(18)
Rating rotation speed r/min		2,000						3,000		
Speed control range r/min		100~2,000						100~3,000	100~4,000	
Allowed inertia load moment of motor	J kg·m^2	0.5×10^{-4}		1.8×10^{-4}		5.8×10^{-4}		5.8×10^{-4}	8.75×10^{-4}	15×10^{-4}
Speed change rate	Load	less than or equal to ±1% (0~Rating torque, If rotating at the rated speed)								
	Voltage	less than or equal to ±1% (Power voltage ±10%, If rotation at the rated speed No load)								
	Temperature	less than or equal to ±1% (0~+40℃, If rotation at the rated speed No load)								

Common Specification

Items	Specifications
Rotation speed setting method	Controller panel's speed
Acceleration time/ deceleration time	0.5~10 seconds : 2000r/min no load (It may change depending on the load size). To set acceleration time, it is set at slow start on the front panel. To set deceleration time, it is set at slow stop.
Input signal	Photo coupler input method, operating at input resistance of 10kΩ DC 12V±10%,Common in EXT, CW, and CCW
Output signal	Open collector output, External use conditions: less than 26.4V 10mA, common in SPEED OUT/ALARM OUT
Protection function	If the following protection function is operating, then control unit alarm signal gets generated and motor stops automatically. ● Overload protection function : If more than the rated torque is applied to the motor for more than 5 seconds ● Overvoltage protection function : If voltage applied to the control unit goes over the upper bound of the rating voltage allowance ● Open phase protection : If cable sensor line gets disconnected during motor operation ● Undervoltage protection : If voltage applied to the control unit is less than the lower bound of the rating voltage allowance ● Over speed protection : If motor rotation speed is faster than 2500r/min
Motor insulation class	E Type(120℃)
Rated time	Continuous

Normal specifications

Items		Motor	Control unit
Insulation Resistance		After continuously operating at room temperature and humidity, it should begreater than 100㏁ between coil and case when measured with DC 500V MEGA TESTER	Protection ground terminal and power input should be greater than 100㏁ when measure with DC 500V MEGA TESTER
Dielectric Strength		After continuously operating at room temperature and humidity, there shouldn't be any problem if 60㎐, 1500V is applied for more than 1 minute between coil and case	There shouldn't be nay problem if 60㎐, 1500V is applied for more than 1 minute between protection ground terminal and power input
Temperature rise		After operating continuously at room temperature and humidity, the temperature increase should be less than 60℃ and less than 50℃ of temperature increase on the case surface when measure with thermo couple	
Used environment	Used Ambient temperature	0℃~+40℃ (There should not be any freeze)	
	Used Ambient Humidity	less than 85% (no dew condensation)	
	Ambient environment	No corrosive gas or dusts	
Conservation environment	Ambient temperature	-25 ~ +70℃ (There should not be any freeze)	
	Ambient Humidity	less than 85% (no dew condensation)	
Protection class		IP65(Except for the mounting part on the output part)	IP10

Delivery effciency of gearhead

Unit = N·m

	Deceleration ratio	5	10	15	20	30	50	100	200
Product name	K6H□B	90%				86%			81%
	K8H□B	90%				86%			81%
	K9H□B	90%				86%			81%
	K10H□BU	90%				86%		81%	
	K6H□BTH	80%	85%						
	K8H□BTH	85%							
	K9H□BTH	85%							

Allowed torque of combination type

Unit = N·m

Product name	Deceleration ratio	5	10	15	20	30	50	100	200
	Speed control range[r/min]	20~400	10~200	6.7~133	5~100	3.3~67	2~40	1~20	0.5~10
K6BH20N■ + K6H□B		0.45	0.9	1.4	1.8	2.6	4.3	6	6
K8BH40N■ + K8H□B		0.9	1.8	2.7	3.6	5.2	8.6	16	16
K9BH90N■ + K9H□B		2	4.1	6.1	8.1	11.6	19.4	30	30
K6BH20N■ + K6H□BTH		0.4	0.85	1.3	1.7	2.6	4.3	8.5	17
K8BH40N■ + K8H□BTH		0.85	1.7	2.6	3.4	5.1	8.5	17	34
K9BH90N■ + K9H□BTH		1.9	3.8	5.7	7.7	11.5	19.1	38.3	68
Product name	Deceleration ratio	5	10	15	20	30	50	100	200
	Speed control range[r/min]	20~600	10~300	6.7~200	5~150	3.3~100	2~60	1~30	0.5~15
K9BH150N■ + K9H□B		2.4	4.7	7.1	9.5	13.6	22.7	30	30
K9BH150N■ + K9H□BTH		2	4.1	6.2	8.3	12.4	20.8	41.6	68
Product name	Deceleration ratio	5	10	15	20	30	50	100	200
	Speed control range[r/min]	20~800	10~400	6.7~267	5~200	3.3~133	2~80	1~40	0.5~20
K10BH200NC + K10H□BU	100~3000r/min	2.9	5.9	8.8	11.7	16.8	28	52.7	70
	4000r/min	2.0	4.1	6.1	8.1	11.6	19.4	36.5	63
K10BH400NC + K10H□BU	100~3000r/min	5.9	11.7	17.6	23.4	33.5	55.9	70	70
	4000r/min	4.3	8.6	12.8	17.1	24.5	40.9	63	63

* In dimension, in ■ of name represents power voltage U(single-phase 100~115V), and C(single-phase 200~230V)
* Rotation direction shows the same ☐ color as the motor. In other cases, it's the opposite.
* Flat Gearbox viewed from front side is opposite rotation direction with motor.
* Flat Gearbox viewed from back side is same rotation direction with motor.

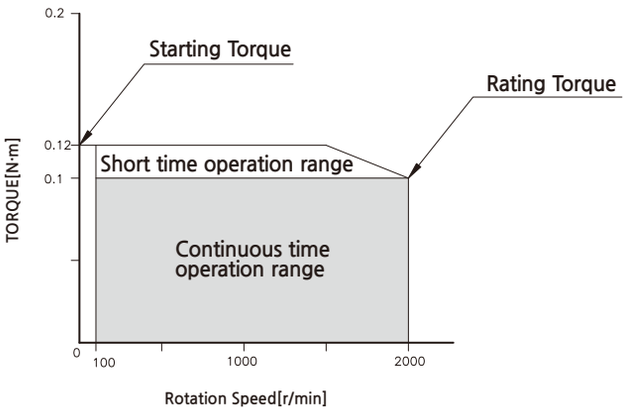
Allowed overhang load and allowed thrust

Product name		Deceleration ratio	Allowed overhand load				Allowed thrust load	
			From the end of output part 10mm		From the end of output part 20mm			
			N	kgf	N	kgf	N	kgf
GEARED MOTOR	K6BH20N■ + K6H□B	5	100	10	150	15	40	4
		10,15,20	150	15	200	20		
		30,50,100,200	200	20	300	30		
	K8BH40N■ + K8H□B	5	200	20	250	25	100	10
		10,15,20	300	30	350	35		
		30,50,100,200	450	45	550	55		
	KPBH90N■ (K9BH150NC) + K9H□B	5	300	30	400	40	150	15
		10,15,20	400	40	500	50		
		30,50,100,200	500	50	650	65		
	K10BH200NC (K10BH400NC) + K10H□BU	5,10,15,20	550	55	800	80	200	20
		30,50	1000	100	1250	125	300	30
		100,200	1400	140	1700	170	400	40
	K6BH20N■ + K6H□BTH	5,10	450	45	370	37	200	20
		15~200	500	50	400	40		
	K8BH40N■ + K8H□BTH	5,10	800	80	660	66	400	40
		15~200	1200	120	1000	100		
	K9BH90N■ (K9BH150N■) + K9H□BTH	5,10	900	90	770	77	500	50
		15,20	1300	130	1110	111		
		30,50,100,200	1500	150	1280	128		
MOTOR	K6BS20N■		70	7	100	10	·Be careful not to weigh thrust. If it's inevitable, keep it under 50% of the motor weight.	
	K8BS40N■		120	12	140	14		
	K9BS90N■,K9BS150NC		160	16	170	17		
	K10BS200NC,K10BS400NC		197	19.7	220	22		

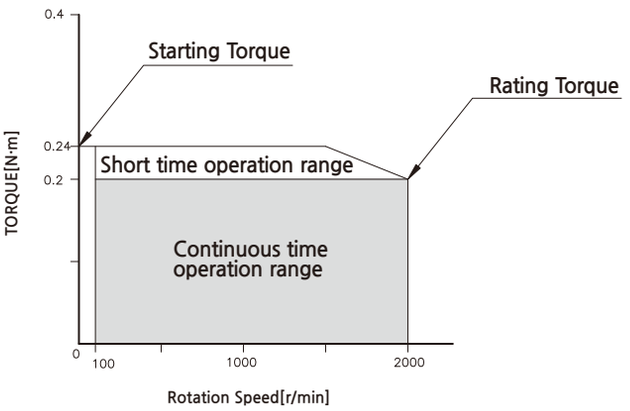
* In dimension, in ■ of name represents power voltage U(single-phase 100~115V),and C(single-phase 200~230V).
* In □ of name, it represents a deceleration ratio.
* Permissible overhang load can be withdrawn by calculation.

Rotation speed - torque characteristic

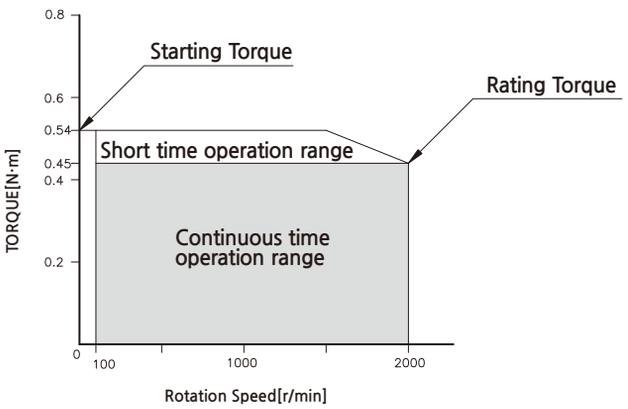
K6BS20N■ / K6BH20N■



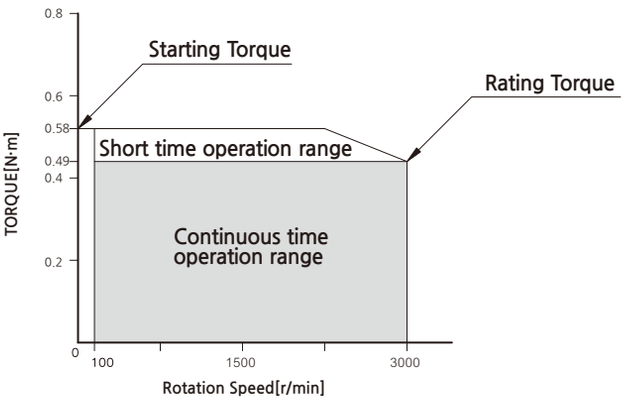
K8BS40N■ / K8BH40N■



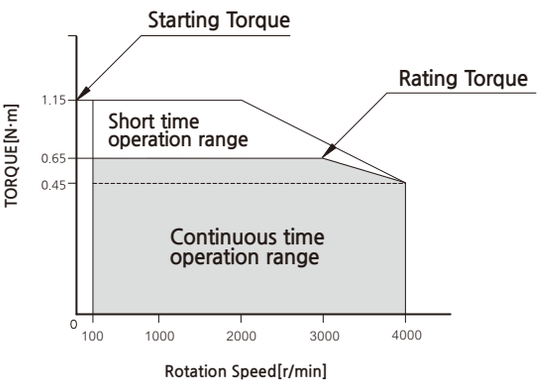
K9BS90N■ / K9BH90N■



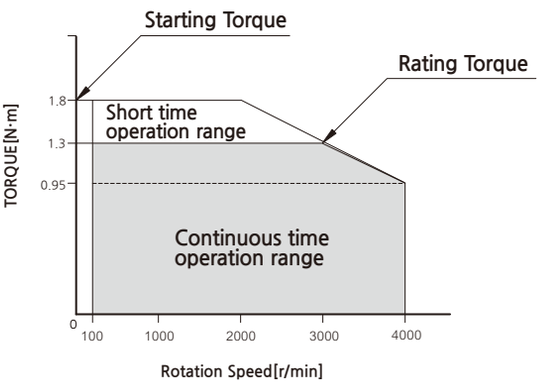
K9BS150NC / K9BH150NC



K10BS200NC



K10BS400NC



* In Dimension, in ■ of name represents power voltage U(single-phase 100~115V), C(single-phase 200~230V)

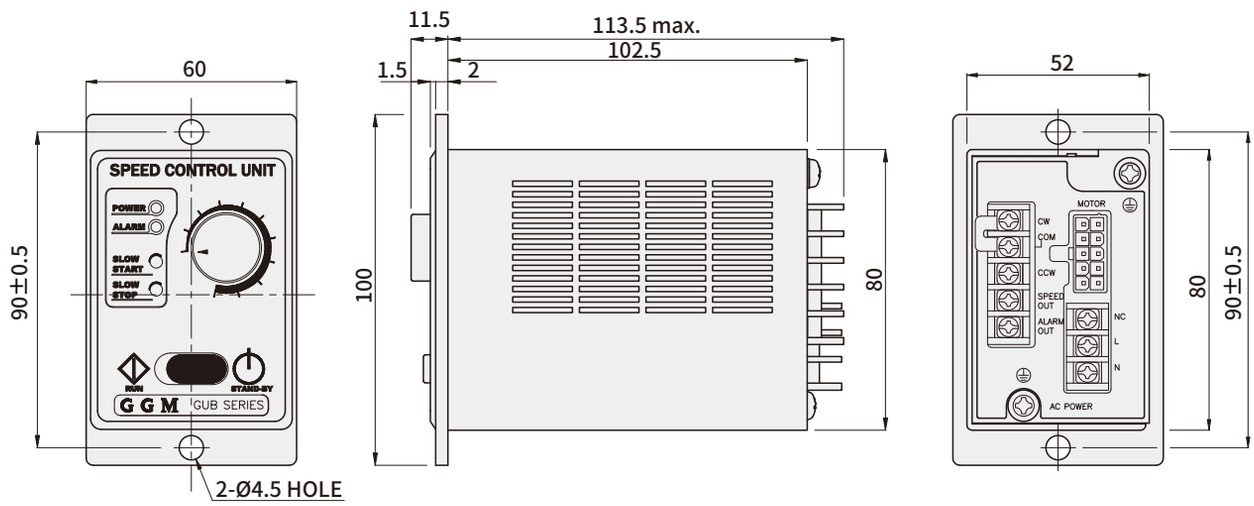
BLDC SPEED CONTROL UNIT

GUB

GUB-C-20, GUB-U-20
GUB-C-40, GUB-U-40
GUB-C-90, GUB-U-90

B Series motor applied product

Product appearance and characteristics



- Easy connection, easy manipulation

  Motor and wire get easily connected by just connecting speed control unit connector.
  Volume in front face can simply set up motor rotation speed.

- External control function

  On/off, change of rotation direction and instant stop can be controlled through outside signal(sequencer or relay signal).
  Also, separate volume and direct power can be accessed from outside and speed setting is possible by external signal.

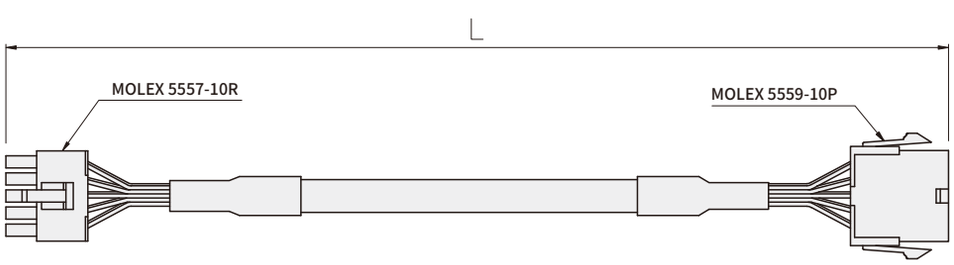
- Slow start, slow down functions

  Motor is maneuvered at the set accleration time and stopped at the set deceleration time.
  This acceleration and deceleration times can be controlled within 0.5~10 seconds.

■ Extension cable

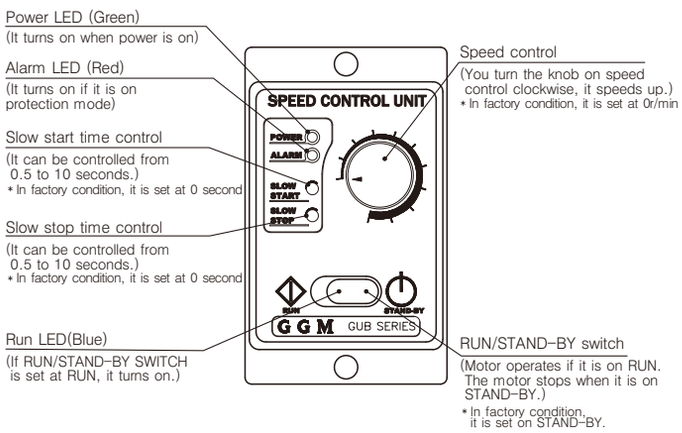
Buy extension cable to additionally extend between motor and control(optional)

-DIMENSION

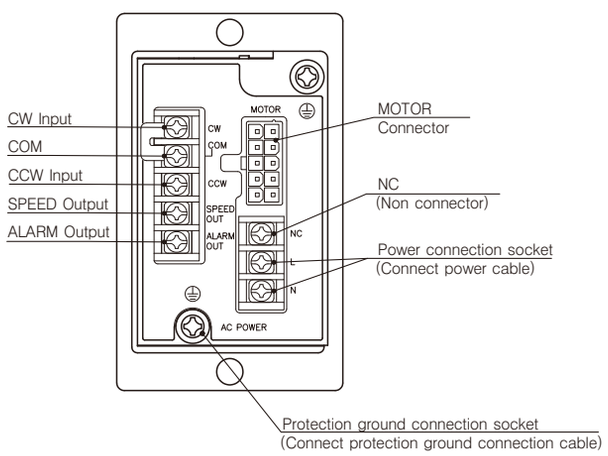


MODEL	L(extension cable length)
KBEW-1	1m
KBEW-2	2m
KBEW-3	3m
KBEW-5	5m
KBEW-10	10m

Name and functions of each part



Input/output signal connection socket



※ Caution

· RUN/STAND-BY SWITCH is not power switch.
· When you are stopping motor for a long time, turn the control unit off.

Access motor and control unit

■ **Access motor and control unit**

Connect connector of motor cable to control unit. Push in until clicks. Do not manipulate extension cable(optional) when you are extending motor and control unit. Do not peel off cable cover or ground and touch shield wire.

■ **Power access**

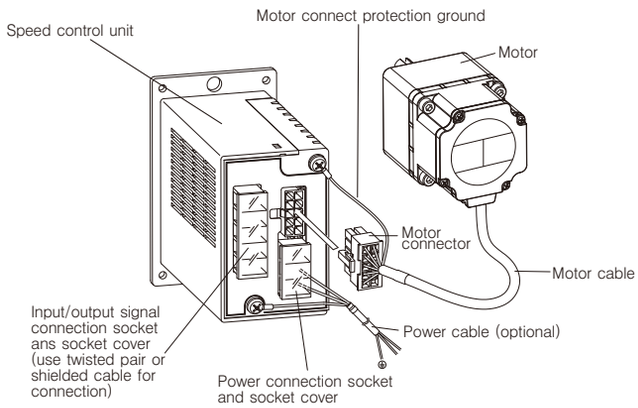
Connect accessory power cable to the control unit contact socket. If you are not usingt accessory power cable, use a cable that is bigger than AWG22(0.34mm^2). When connecting, use insulation attached round type crimp terminal.

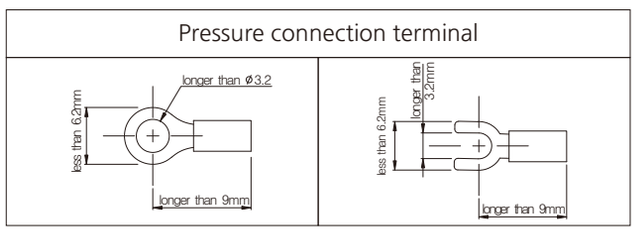
■ **Ground**

Use a cable bigger than AWG18(0.75mm^2) for protection ground connection cable.

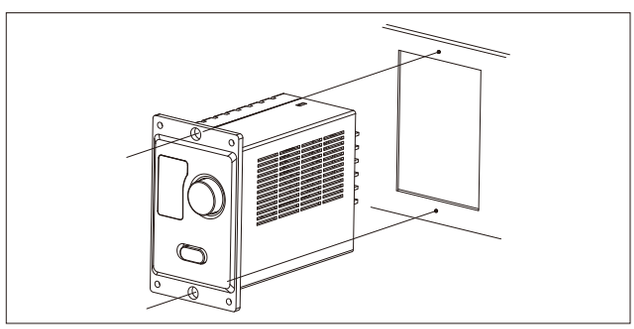
Operation

■ Rotation direction is when you look at it from output axis of motor. CW is clockwise and CCW is counterclockwise.

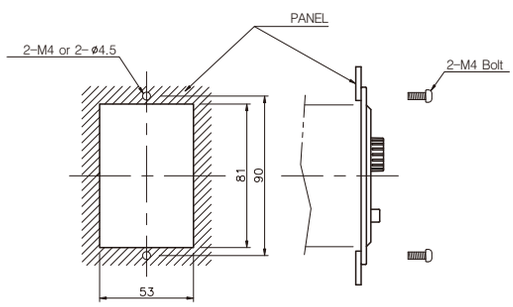




· Attach control unit to a vibration-resistant flat metal plate.
· When you are using mounting hole of control unit, tighten with M4 screws and nuts.
· When installing control unit, let one of the vents face downwards.
· Control unit should installed more than 25mm away from the mounting box and other equipment in the mounting box horizontally and 50mm away from them vertically.



Control unit panel manufacturing plan

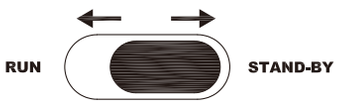


※ Caution

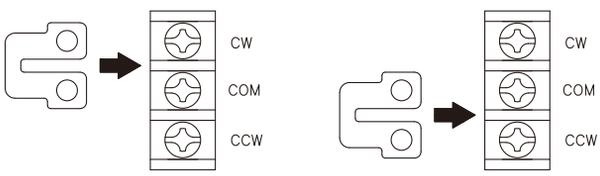
· Keep the torque of fixing screw less than 10kgf·cm. If it is fixed with more than 10kgf·cm torque, the control unit might break.

When only operating with the main part

■ If you turn RUN/STANDY-BY SWITCH to RUN, then the motor rotates.
If you turn RUN/STANDY-BY SWITCH to STAND-BY,then the motor stop.

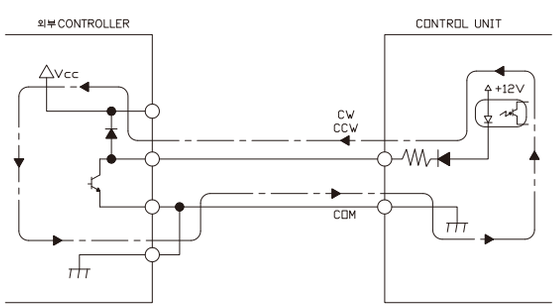


■ The rotation direction is determined by the short bar connection status on the back of the control unit. connect accessory short bar between CW-COM and CCW-COM. Do not use short bar for other purposes.



Controller of transister output type

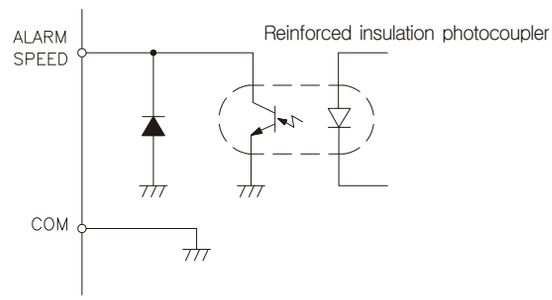
■ Use small size connection TYPE relay to open and close DC 12V, 5mA
■ CW(clockwise)operation :
If it is set at CW and on, then the motor rotates clockwise, If CW input is off, then the motor stops.
■ CCW(counterclockwise)operation :
If it is set at CCW and on, then the motor rotates counterclockwise. If CCW input is off, then the motor stops.
■ If CW and CCW are put in at the same time and on, then the motor stops instantly. At then moment, instant reverse operation is not possible.
■ Do not give more than 20msec of time interval between CW signal and CCW signal inputs.
■ Do not use SSR(SOLID STATE RELAY) on power ON/OFF Motor control unit may break.
■ **If you are using controller with clamp cliode installed, be careful of power on/off order.**
- Power ON : CONTROLLER ON → CONTROL UNIT ON
- Power OFF : CONTROL UNIT OFF → CONTROLLER OFF



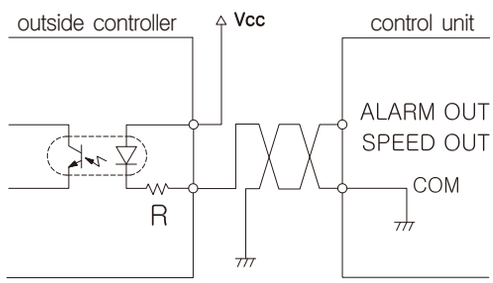
When you connect like the diagram above, if you turn the control unit power on first or if you turn the controller off while control unit is on, then the electricity flows and motor rotates.
There is a chance that motor might rotate due to power capacity difference even if you turn the power on and off at the same time. Controller should be turned on first and control unit is off first in case of power.

Signal output circuit

Output circuit



Example of output circuit connection



■ Signal output is open collector output.
■ Use power of less than DC26.4V to connect restricted resistance with less than 10㎃.

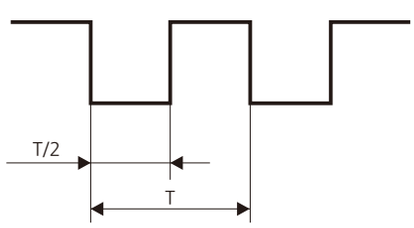
SPEED OUT

If synchronizes with motor operation that it creates 30 pulses signal per 1 rotation of motor output axis. Measure speed out frequency to calculate motor rotation speed.

■ Motor Rotation speed [RPM] = $\frac{\text{SPEED OUT Frequency(Hz)}}{15} \times 60$

■ SPEED OUT Frequency(Hz) = $\frac{1}{T}$

■ **SPEED OUT TERMINAL are on the controller back.**



ALARM OUTPUT

In the following case, control unit protection function gets turned on and alarm out gets also turned on (L-LEVEL). Then, the motor stops. In this case, it is shown with LED light on or off. Check the protection details.

※ **When you are providing power, if the LED light turns on instantaneously, that is not a sign of malfunctioning.**

LED flickering

- If torque that is greater that the rating is applied to the motor for motor for more than 5 seconds or if the motor rotation direction changes quickly or turns on/off.

LED on

- If there is a problem with motor feedback signal due to motor cable disconnection and connector connection problem
- If load is being carried downwards or too much load is operated on
- If voltage applied to driver is AC100V or is less than 70% if AC200V
- Motor speed exceeds 2800r/min

When you access by following the direction above, alarm output will be off when control unit is (H-LEVEL) and on when control unit is(L-LEVEL), stop the motor and turn off the control unit.
If there is no problem with motor cable, check other use conditions (load torque, operation pattern and power voltage) Remove the reasons of protection mode and reapply power to reset alarm output

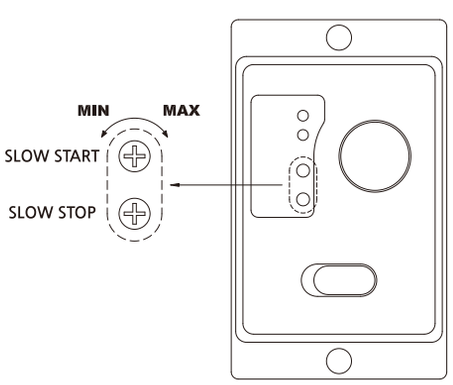
- When you extend input/output signal cable, do it for less than 2m. Try to make it as short as possible to minimize noise.
- input/output signal cable should be separated from power cable and motor cable.

SLOW START

Motor response speed can be set between 0.5~10 seconds (at 2000rpm)

SLOW STOP

If you are stopping motor from outside, you can set the motor stopping time time at 0.5-10 seconds (at 2000rpm)



- If you turn it clockwise, the time gets longer.
- When you are changing the setting, use accurate cross screwdriver.
- In factory condition, it is set at the shortet time possible.

BLDC SPEED CONTROL UNIT

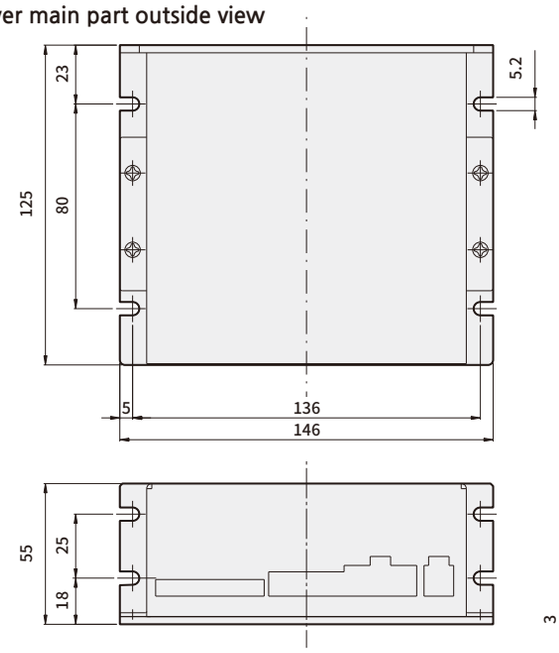
GUB

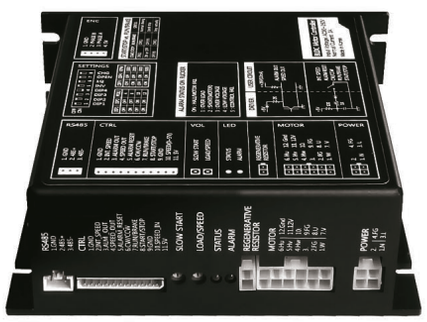
GUB-C-150
GUB-C-200

B Series Motor applied product

Produc appearance

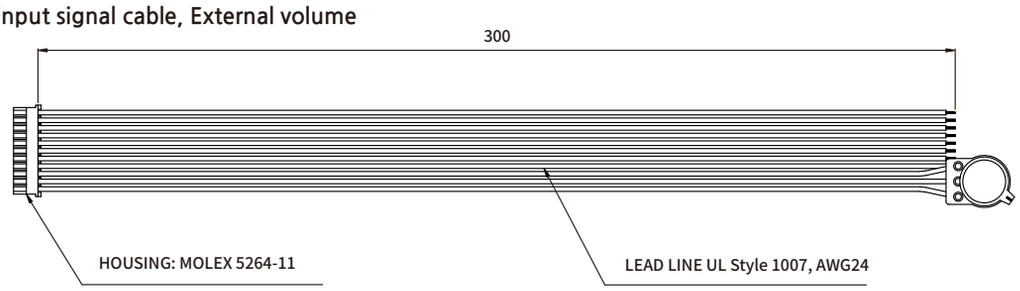
■ Driver main part outside view



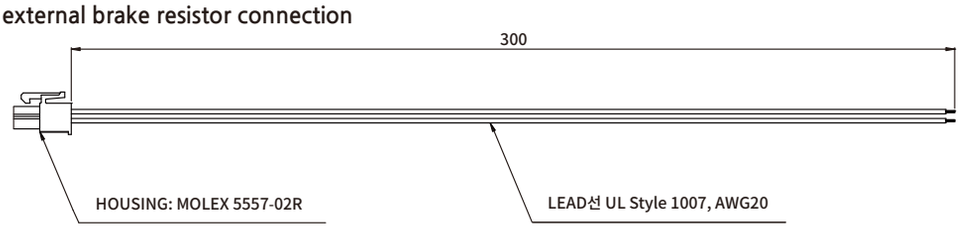


[Accessory]

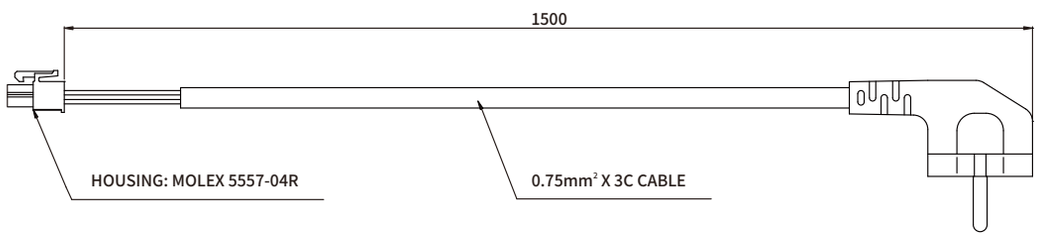
■ Driver input signal cable, External volume



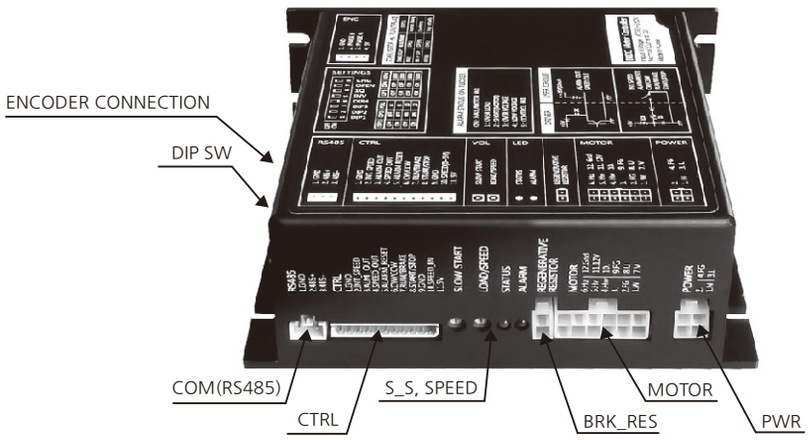
■ Cable for external brake resistor connection



■ Driver power cable



Name and functions of each part



1. Input/output specification

Items	Details	Note
External size(mm)	146 × 125 × 55	
Power input, Controller output	AC200~230V, Normal 2.5A	
Signal	Input : Pull-Off, Output : Open-Collector Type	PLC available
Communication(option)	RS485 1ch, 9600bps, Refer to additional communication spec sheet.	PLC available
Speed range	100~3,000rpm	
Speed variation ratio	Less than ±1%	

2. LED Specifications

Pin No.	Signal name	COLOR	Explanation
1	ALARM	RED	- Light on : motor hall sensor signal malfunction - Over load : It flickers every 1 second - Motor disconnection : twice continuous flickering repeat - Over voltage : three times continuous flickering repeat - Low voltage : four times continuous flickering repeat - Control failure : five times continuous flickering repeat
2	STATUS	GREEN	- It flickers every 1 second under normal condition

3. Input/output signals (MOLEX 5267-117)

Signal line is at pull-up internally. If it is L(GND), in other words, if the signal line is connected with GND or if electric potential is at GND, level, NC(disconnected with GND), then it gets turned off.

Pin No.	Signal name	Direction Color	Details
1	GND	BLACK	Ground
2	INT_SPEED	IN GREEN	ON : Set the speed by internal volume(LOAD/SPEED) OFF : Set the current by internal volume and speed by external volume(SPEED_IN)
3	ALARM	OUT PURPLE	When alarm occurs, the signal is OFF(HIGH), and at normal condition, the output is ON(L). If there is any alarm, the alarm LED is blink according to the alarm status.
4	SPEED_OUT	OUT ORANGE	Output pulse according to motor's phase variation by outputting pulse according to BLDC motor's speed. Output 30pulse signals per motor one rotation.
5	ALM_RESET	IN GREY	If controller stops by any alarm, then user must remove the cause of alarm, and restart controller using ALM_RESET Restart condition : alarm signal change ON to OFF
6	DIR	IN BROWN	Used to set the motor direction. CW : Connected to the GND(ON) CCW : Disconnected to the GND(OFF) If DIP_SW, CHG is ON and DIR is ON, the motor turns to CW. If controlled by communication, this signal is used as a limit-switch(to run motor, must to connected to GND)
7	RUN/BRAKE	IN WHITE	ON(L) : Run the motor. OFF : Quick stop of motor(BRAKE ON), and hold stop.
8	START/STOP	IN MAGENTA	ON : Ready to motor run. OFF : Stop motor naturally If DIP_SW, CHG is ON and SART/STOP is ON, the motor turns to CCW direction. If controlled by communication, this signal is used as a limit-switch(to run motor, must to connected to GND)
9	GND	BLUE	Ground
10	SPEED_IN	IN YELLOW	Set the motor speed. The range is from 0 to 5V DC.
11	5V	OUT RED	Used to supply 5V DC to the external volume. Do not use other usage but speed input.

4. Motor connector specification (Power cable 5557-04 to motor side)

Name	Pin	Pin name	Function	Remark(external harness)
MOTOR MOLEX 5566-12	1, 7, 8	W, V, U	Motor windings	MOLEX, 5557-12
	4, 5, 6	Hw, Hv, Hu	Hall sensor	
	9	FG	Frame ground	
	10	NC		
	11, 12	12V, GND	Hall sensor input voltage, Ground	
AC_INPUT MOLEX 5566-04	1, 3	AC	AC 110~220 (±10%)	MOLEX, 5557-04
	4	FG	Frame ground(FG)	
RS485 Yeonho Electronics SMAW250-03	1	GND	RS485 connector(Option)	SMH250-03
	2	485+		
	3	485-		
ENC SMAW250-04	1~4	GND, B, A, 5V	Encoder connector(PHASE_A, PHASE_B) (Option)	SMH250-04
BRK_RES MOLEX, 5566-02		Regenerative resistor connector Use resistor range of 50~100Ω and more than 50watts power recommanded.		MOLEX, 5557-02
CTRL MOLEX, 5267-11		Control in/out signals. Refer to the below table.		MOLEX, 5264-11

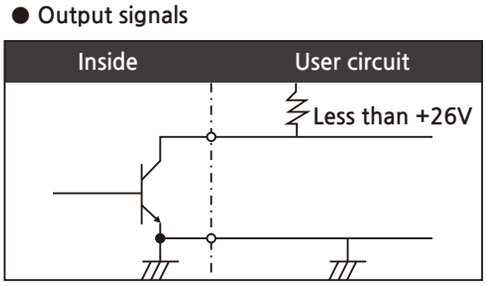
5. Control conditions by the signals, START/STOP and RUN/BRAKE

To run the motor, connect RUN/BRAKE and START/STOP to GND
To stop the motor(free state), disconnect the signal START/STOP from the ground(GND).
When motor running, and wants to stop quickly. Disconnect RUN/BRAKE from GND

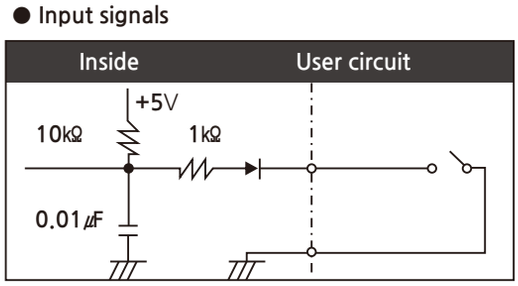
START/STOP	RUN/BRAKE	Operation status
ON(L)	ON(L)	Normal operation
ON(L)	OFF(H)	Instant stop
OFF(H)	ON(L)	Automatic stop due to inertia of motor and load

Input/output signals in the form(User Control connection-related)

● Output signals



● Input signals



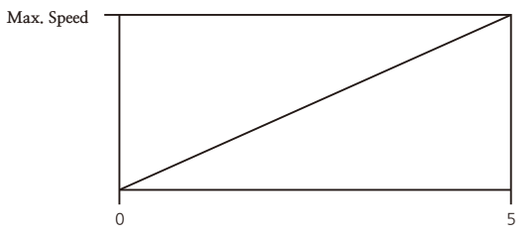
For output circuit : the pull-up resistance must be set not to over 10mA.

Ex) At 24V input, the max. value of pull-up resistor is 24V/0.01A = 2.4kΩ.

6. Internal variable resistance

■ Maximum allowed load setting and internal speed setting

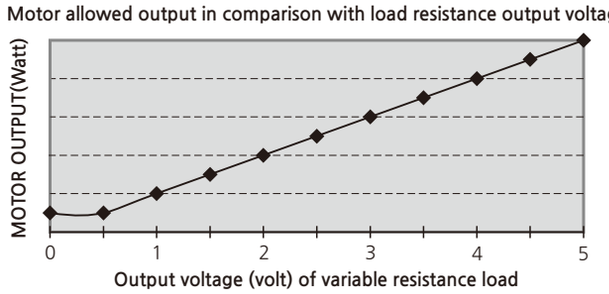
When the signal, INT_SPEED of CTRL is ON, the motor speed is controlled by internal volume(LOAD/SPEED).



Motor speed vs. external voltage : SPEED_IN

or the INT_SPEED is OFF, it is used to limit max. Current of motor.
Motor's current limits is in proportion to the rotating amount of variable resistor in clockwise direction. And it is changed to max allowable current.

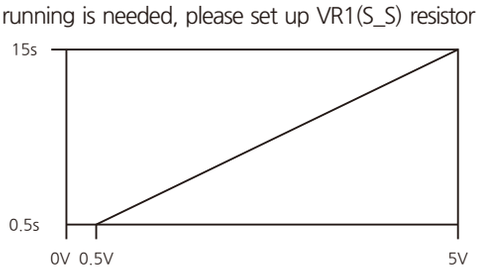
Motor allowed output in comparison with load resistance output voltage



Output voltage (volt) of variable resistance load

■ Deceleration and acceleration(VR1) : S_S(Slow Start)

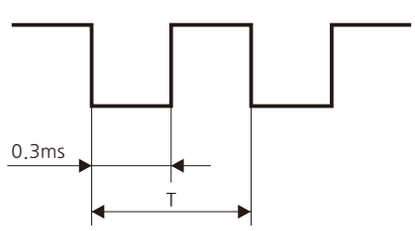
Decide motor's acceleration and deceleration slope.
As variable resistor is max value, motor's reaching time from stop status to max speed is 15 seconds as min value (below 1 scale) is setup, motor's reaching time is within 0.5 seconds.
As rapid acceleration, deceleration running is needed, please set up VR1(S_S) resistor to below 1 scale (minimum value)



-Under 1 scale set : less than 0.2s to the max. speed.
-1~9 scale set => 0.5s~15s

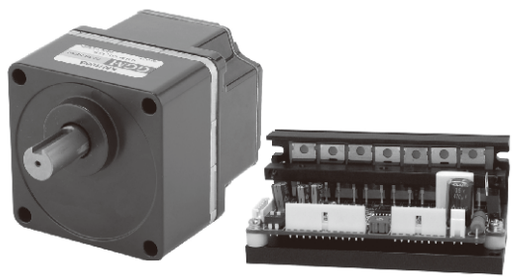
7. Speed output (SPEED_OUT)

30pulses per one revolution.



BRUSHLESS DC MOTOR UNIT

L Series



BLDC Motor and driver unit for
DC24V input speed control

- Output : 30~100W
- Speed control range : 100~3000 r/min(30W, 50W, 100W)
  100~4000 r/min (200W, 400W)
- Speed change ratio : less than or equal to ±1%(Load)

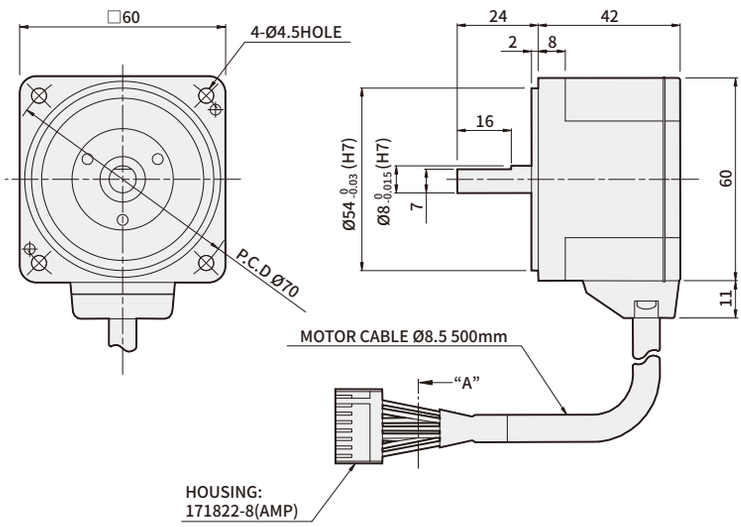
BRUSHLESS DC MOTOR UNIT - L Series

30W □60mm DC24V Input

DIMENSIONS

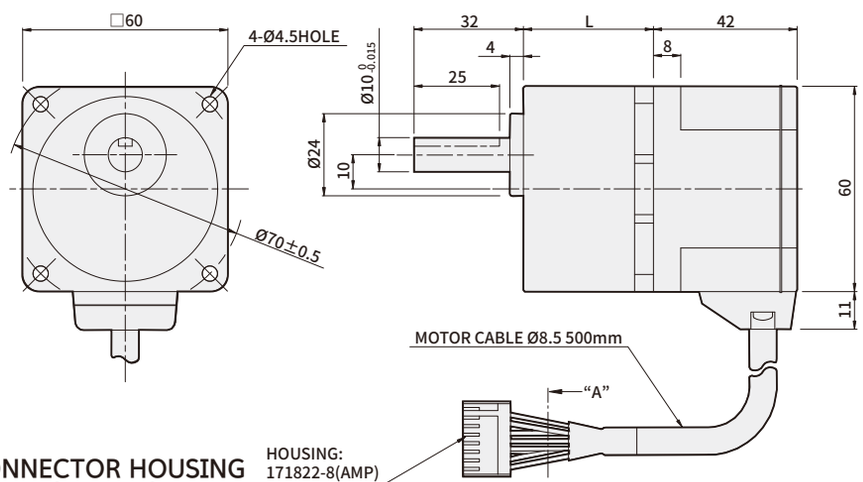
K6LS30N2

(Weight : 0.5Kg)

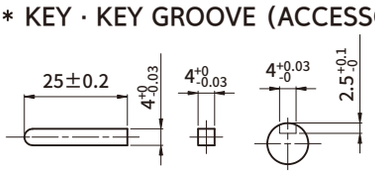


K6LH30N2 + K6H□B

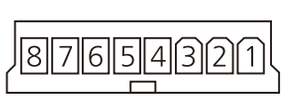
(Weight : 0.9Kg)



* KEY · KEY GROOVE (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K6LH30N2	K6H□B	5~20	34	M4 P0.7×50
		30~100	38	M4 P0.7×55
		200	43	M4 P0.7×60

* PIN MAP

PIN No.	COLOR	SIGNAL
1	GRAY	W
2	PURPLE	V
3	BLUE	U
4	YELLOW	Vcc
5	GREEN	Ground
6	ORANGE	Hw
7	WHITE	Hv
8	BROWN	Hu

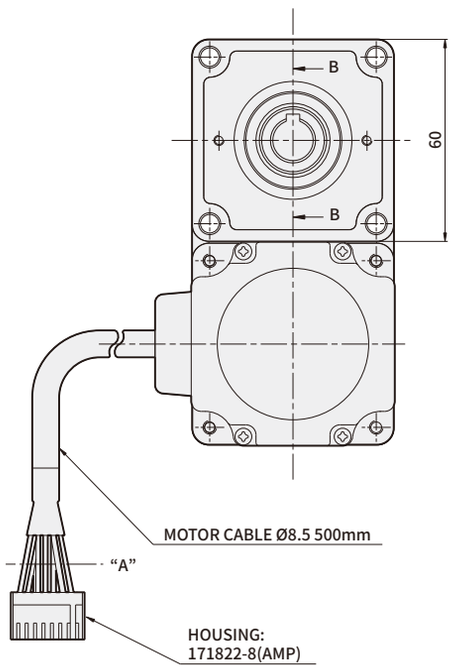
* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing bolt set. (flat washer, spring washer, hexagonal nut 4pcs each)

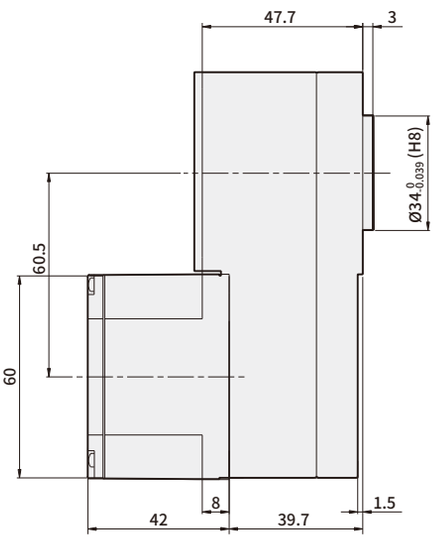
BRUSHLESS DC MOTOR UNIT - L Series

DIMENSIONS

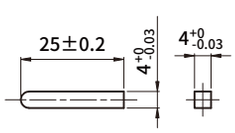
K6LH30N2 + K6H□BTH

(Weight : 1.2Kg)

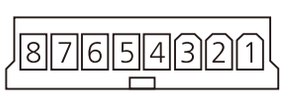


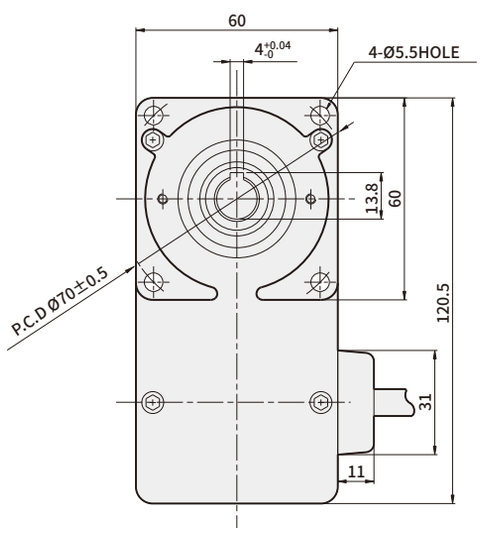


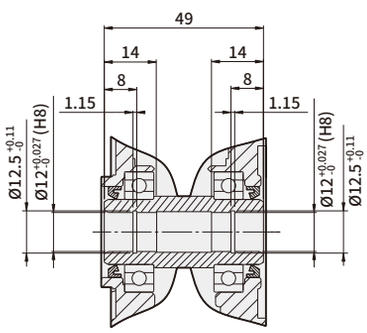
* KEY (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)







SECTION B-B

MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K6LH30N2	K6H□BTH	5~200	M5 P0.8×65

* In □ of name, it represents a deceleration ratio.
* Mounting bolt sets are included in flat type gearbox.
  M5×65L (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

PIN No.	COLOR	SIGNAL
1	GRAY	W
2	PURPLE	V
3	BLUE	U
4	YELLOW	Vcc
5	GREEN	Ground
6	ORANGE	Hw
7	WHITE	Hv
8	BROWN	Hu

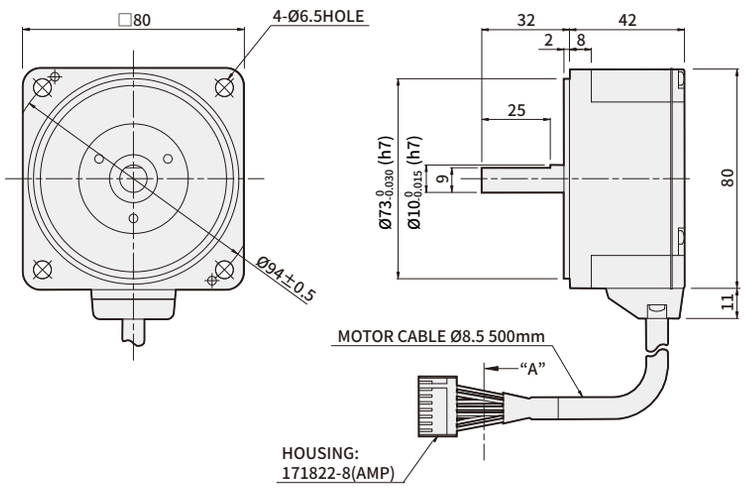
BRUSHLESS DC MOTOR UNIT - L Series

50W □80mm DC24V Input

DIMENSIONS

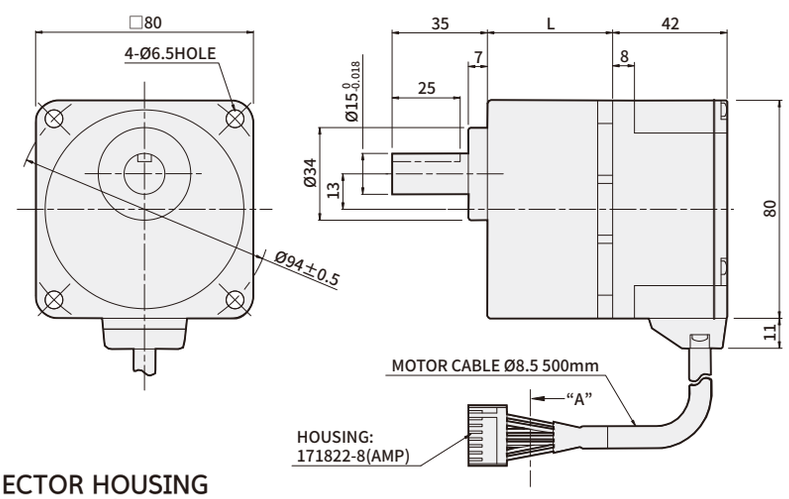
K8LS50N2

(Weight : 0.8Kg)

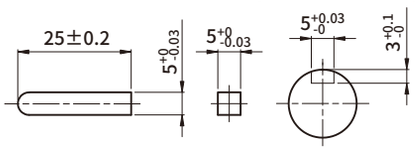


K8LH50N2 + K8H□B

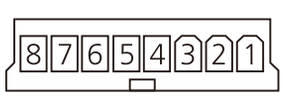
(Weight : 1.7Kg)



* KEY · KEY GROOVE (ACCESSORY)



* CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K8LH50N2	K8H□B	5~20	41	M6 P1.0×65
		30~100	46	M6 P1.0×70
		200	51	M6 P1.0×75

* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing bolt set. (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

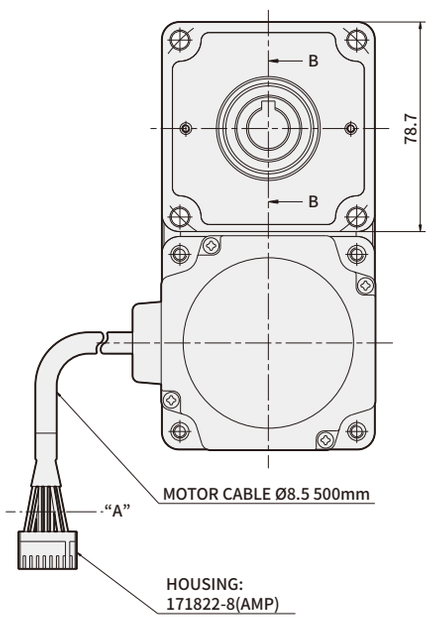
PIN No.	COLOR	SIGNAL
1	GRAY	W
2	PURPLE	V
3	BLUE	U
4	YELLOW	Vcc
5	GREEN	Ground
6	ORANGE	Hw
7	WHITE	Hv
8	BROWN	Hu

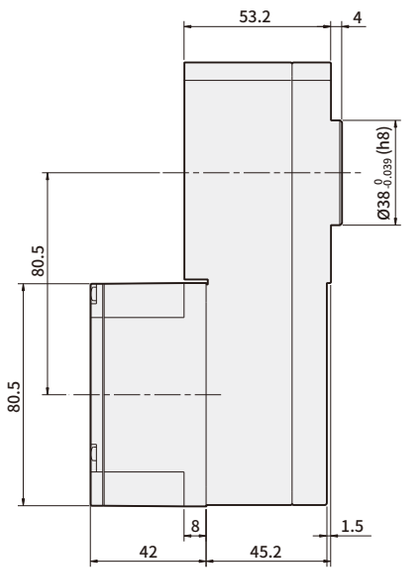
BRUSHLESS DC MOTOR UNIT - L Series

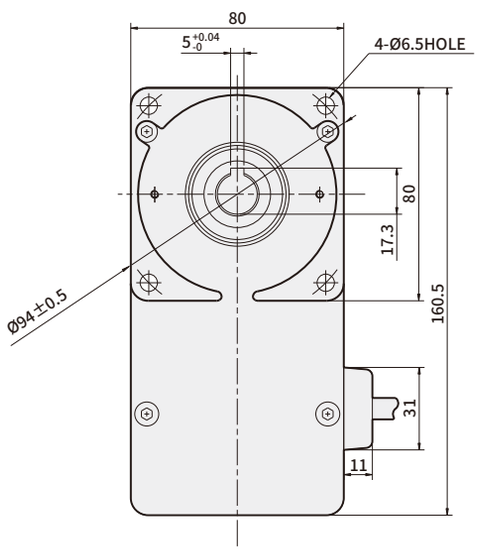
DIMENSIONS

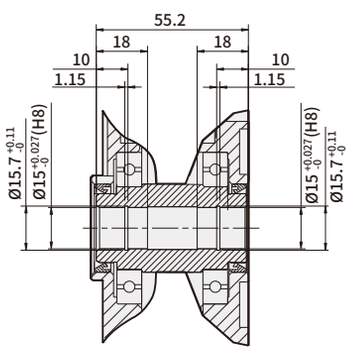
K8LH50N2 + K8H□BTH

(Weight : 2.3Kg)



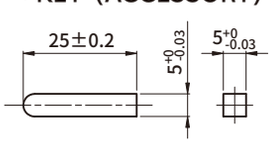




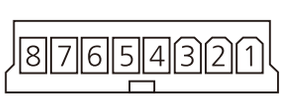


SECTION B-B

＊KEY (ACCESSORY)



＊CONNECTOR HOUSING (VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K8LH50N2	K8H□BTH	5~200	M6 P1.0×70

＊ In □ of name, it represents a deceleration ratio.
＊ Mounting bolt sets are included in flat type gearbox.
M6×70L (flat washer, spring washer, hexagonal nut 4pcs each)

＊ PIN MAP

PIN No.	COLOR	SIGNAL
1	GRAY	W
2	PURPLE	V
3	BLUE	U
4	YELLOW	Vcc
5	GREEN	Ground
6	ORANGE	Hw
7	WHITE	Hv
8	BROWN	Hu

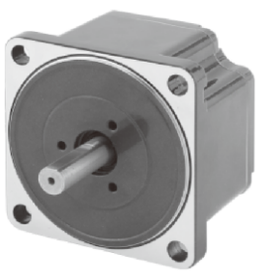
BRUSHLESS DC MOTOR UNIT - L Series

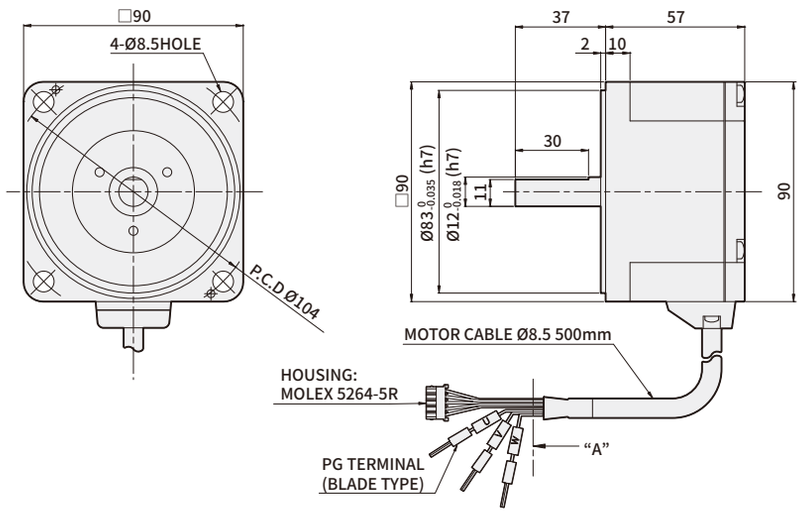
100W □90mm DC24V Input

DIMENSIONS

K9LS100N2

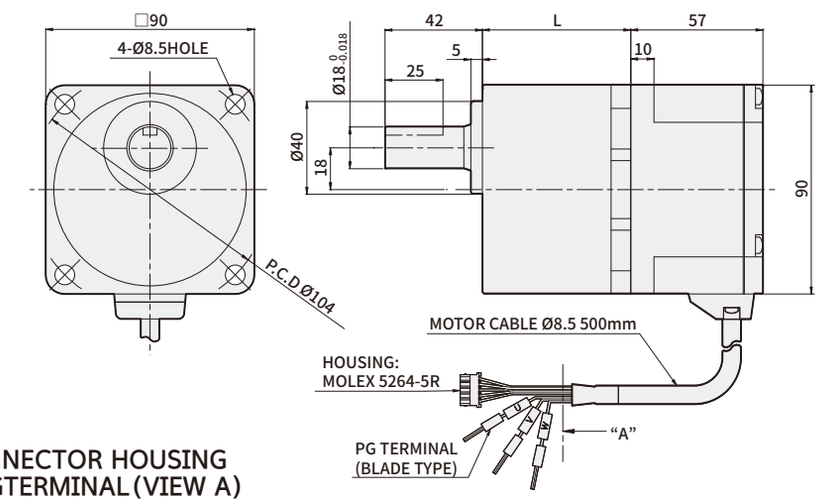
(Weight : 1.3Kg)



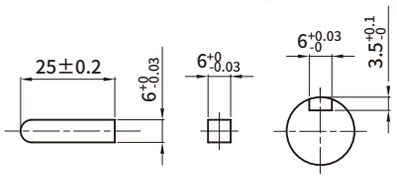


K9LH100N2 + K9H□B

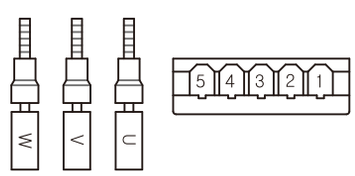
(weight : 2.6Kg)



*KEY · KEY GROOVE (ACCESSORY)



*CONNECTOR HOUSING & PGTERMINAL(VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K9LH100N2	K9H□B	5~20	45	M8 P1.25×75
		30~100	58	M8 P1.25×90
		200	64	M8 P1.25×95

* PIN MAP

PIN No.	COLOR	SIGNAL
1	BROWN	Hu
2	WHITE	Hv
3	ORANGE	Hw
4	GREEN	Ground
5	YELLOW	Vcc
-	BLUE	U
-	PURPLE	V
-	GRAY	W

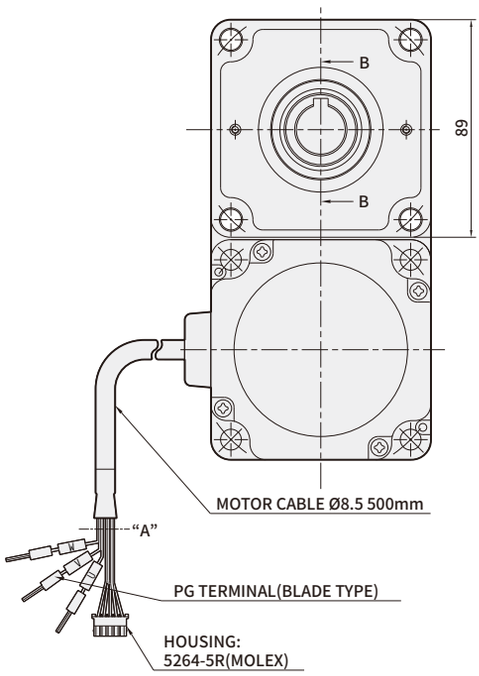
* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing blolt set. (flat washer, spring washer, hexagonal nut 4pcs each)

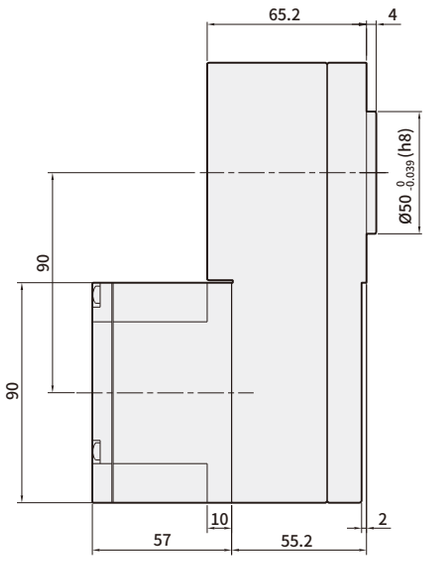
BRUSHLESS DC MOTOR UNIT - L Series

DIMENSIONS

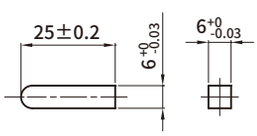
K9LH100N2 + K9H□BTH

(Weight : 3.4Kg)

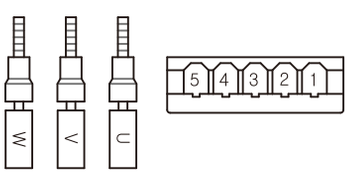


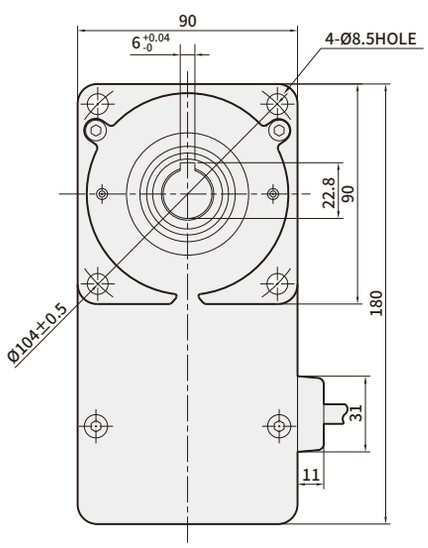


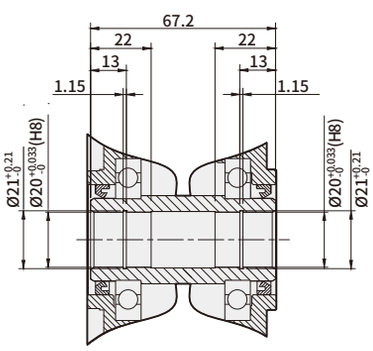
* KEY (ACCESSORY)



* CONNECTOR HOUSING & PGTERMINAL(VIEW A)







SECTION B-B

MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	FIXING BOLT
K9LH100N2	K9H□BTH	5~200	M8 P1.25×90

* In □ of name, it represents a deceleration ratio.
* Mounting bolt sets are included in flat type gearbox.
  M8×90L (flat washer, spring washer, hexagonal nut 4pcs each)

* PIN MAP

PIN No.	COLOR	SIGNAL
1	BROWN	Hu
2	WHITE	Hv
3	ORANGE	Hw
4	GREEN	Ground
5	YELLOW	Vcc
-	BLUE	U
-	PURPLE	V
-	GRAY	W

BRUSHLESS DC MOTOR UNIT - L Series

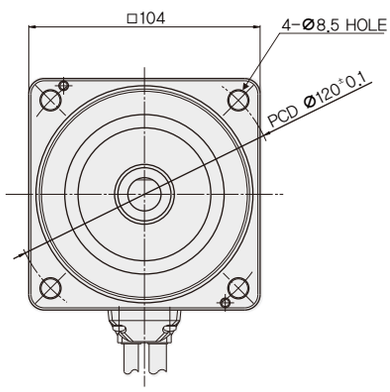
200W
400W

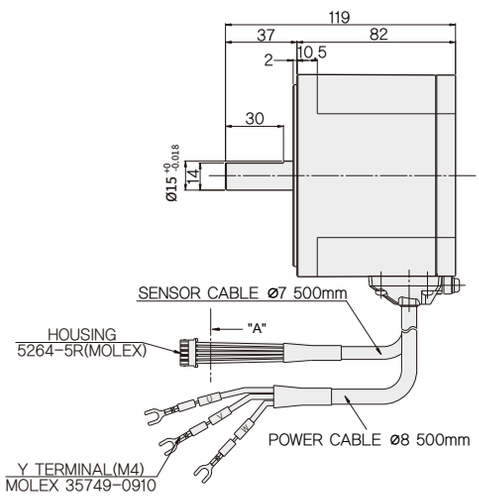
□104mm

DC24V Input
DC48V Input

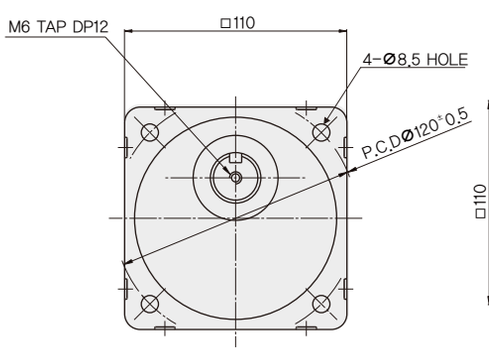
DIMENSIONS

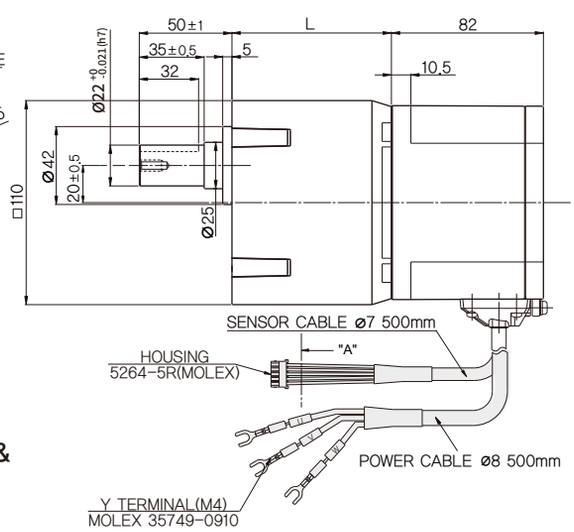
K10LS200N2 (24V)
K10LS400N9 (48V)
(Weight : 2.4Kg)





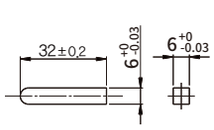
K10LH200N2 + K10H□BU
K10LH400N9 + K10H□BU
(Weight : 5.4Kg)



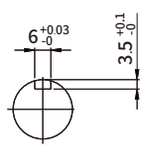


* KEY · KEY GROOVE (ACCESSORY)

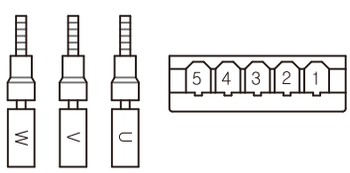
☼ KEY



○ KEY GROOVE



*CONNECTOR HOUSING & PGTERMINAL(VIEW A)



MOTOR PRODUCT NAME	GEARHEAD PRODUCT NAME	DECELERATION RATIO	L	FIXING BOLT
K10LH200N2	K10H□BU	5~20	60	M8 P1.25×95
		30~50	72	M8 P1.25×110
K10LH400N9		100~200	86	M8 P1.25×120

* PIN MAP

PIN No.	COLOR	SIGNAL
1	BROWN	Hu
2	WHITE	Hv
3	ORANGE	Hw
4	GREEN	Ground
5	YELLOW	Vcc
-	BLUE	U
-	PURPLE	V
-	GRAY	W

* In □ of name, it represents a deceleration ratio.
* Geared motor is included with fixing bolt set (normal WASHER, SPRING, WASHER, cube nut; 4 each)

Specification

Product name			K6LH30N2	K8LH50N2	K9LH100N2	K10LH200N2	K10LH400N9
	GEAR TYPE						
	STRAIGHT TYPE		K6LS30N2	K8LS50N2	K9LS100N2	K10LS200N2	K10LS400N9
Rating output (continuous)		W	30	50	100	200	400
Power input	Rating voltage	V	DC24				DC 48
	Rating voltage allowance		±10%				
	Rating input current	A	2.1	3.1	6	13	11
	Rating output current	A	3.7	5.4	9.8	25	18
Rating torque		N·m(kgf·cm)	0.12	0.2	0.4	0.65	1.3
Starting torque		N·m(kgf·cm)	0.15	0.24	0.5	1.15	1.8
Rating rotation speed		r/min	2500			3000	
Speed control range		r/min	100~3000			100~4000	
Allowed inertia load moment of round shaft type		$J\times10^{-4}$ kg·m^2	1.8	3.3	5.6	8.75	15
Rotor inertia moment		$J\times10^{-4}$ kg·m^2	0.086	0.234	0.61	0.61	0.66
Speed change rate	Load		Less than or equal to ±1% : condition 0-rated torque, rated rotation speed, rated voltage, room temperature				
	Voltage		Less than or equal to ±1% : condition rating voltage ±10%, rating rotation speed, no load, room temperature				
	Temperature		Less than or equal to ±1% : condition surrounding temperature 0~+40℃, rating rotation speed, no load, rating voltage				

* The usage duration for starting torque is within 5 seconds at less than 2000 r/min
* Each specification value is the characteristic of motor by itself

Common specifications

Product name	Specification
Rotation speed setting method	● Set up by external potentiometer ● Set up by external DC 0~5V
Acceleration time deceleration time	0.5~10 seconds : set at 2000 r/min when there is no load (it may change depending on the size of the load) Accleration time and deceleration control equipment to control at the same time
Input signal	Internal full-up input method, external input voltage read as greater than 2v high(off) same at all input ports
Output signal	Open collector output, common for speed out/alarm out, if input voltage from out side is applied to connector #2 pin, then it comes out through the applied power. Everything else is internal 5V ouput UI(CTRL)
Protection function	If the following protection mode comes on, cotrol unit alarm signal is shown. Motor stops automatically. ● Overload protection mode : If torque that is greater than the rating is applied to the motor for more than 5 seconds ● Overvoltage protection : If voltage applied to the control unit goes over the upper bound of the rating allowance ● Open phase protection : If cable sensor line gets disconnected during motor operation ● Undervoltage protection : If voltage applied to the control unit is less than the lower bound of th rating voltage allowance ● Over speed protection : If motor rotation speed is faster than 2500 r/min
Motor insulation class	E TYPE(120℃)
Maximum extension distance	MOTOR - CONTROL UNIT 2m
Rated time	Continuous

* Like weight carried being downwards, L SERIES cannot control motor speed through weight.
  Motor gets stopped automatically through overvoltage protection of load is being carried downwards or it is heavier than allowed load inertia.

Normal specifications

Items		Motor	Control unit
Insulation Resistance		After being operated continuously at room temperature and humidity, the value measured between coil and vase by DC 500V MEGA is greater than or equal to 100㏁	After being operated continuously at room temperature and humidity, the value measured between heatproof plate and power input is greater than or equal to 100㏁
Dielectric Strength		After being operated continuously at room temperature and humidity, there shouldn't be any problem between coil and case even when AC 0.5kV is applied for 1 minute	No problem when 50Hz, AC 0.5kV is applied for one minute No problem when AC 0.5kV is applied for one minute
Used environment	Used Ambient temperature	0℃~+50℃ (should not freeze)	
	Used Ambient Humidity	less than or equal to 85% (not from dews)	
	Vibration	Altitude less than 1000m	
	Ambient environment	Cannot be used under special circumstances such as with corrosive gas, dust, radioactive material, magnetic and vacuum	
	Vibration	Should not apply constant vibration or huge impact according to the JIS C 60068-2-6 sine wave vibration test method Frequency range : 10~55Hz, peak amplitude : 0.15mm, sweet direction : 3 direction(X,Y,Z), number of sweeps : 20 times	
Conservation environment	Ambient temperature	-25 ~ +70℃ (should not freeze)	
	Ambient Humidity	less than or equal to 85% (not form dews)	
	Altitude	Altitude less than 3000m	
Insulation class		UL, CSA STANDARD A TYPE(105℃), EN STANDARD E TYPE(120℃)	
Protection class		IP65	IP00

* Preservation environment is a short-term value, which includes transportation.
* Do not measure insulation resistance and pressure resistance while motor and driver are connected

Delivery effciency of gearhead

Unit = N·m

Product name	Deceleration ratio	5	10	15	20	30	50	100	200
	K6H□B	90%				86%			81%
	K8H□B	90%				86%			81%
	K9H□B	90%				86%			81%
	K10H□BU	90%				86%		81%	
	K6H□BTH	80%	85%						
	K8H□BTH	85%							
	K9H□BTH	85%							

Allowed torque of combination type

Unit = N·m

Product name	Deceleration ratio	5	10	15	20	30	50	100	200
	Speed control range[r/min]	20~600	10~300	6.7~200	5~150	3.3~100	2~60	1~30	0.5~15
K6BH30N2 + K6H□B	100~2500r/min	0.54	1.1	1.6	2.2	3.1	5.2	6	6
	3000r/min	0.3	0.54	0.81	1.1	1.5	2.6	5.2	6
K8BH50N2 + K8H□B	100~2500r/min	0.9	1.8	2.7	3.6	5.2	8.6	16	16
	3000r/min	0.45	0.9	1.4	1.8	2.6	4.3	8.6	16
K9BH100N2 + K9H□B	100~2500r/min	1.8	3.6	5.4	7.2	10.3	17.2	30	30
	3000r/min	0.9	1.8	2.7	3.6	5.2	8.6	17.2	30
K6BH30N2 + K6H□BTH	100~2500r/min	0.48	1	1.5	2	3.1	5.1	10.2	17
	3000r/min	0.2	0.51	0.77	1	1.5	2.6	5.1	10.2
K8BH50N2 + K8H□BTH	100~2500r/min	0.85	1.7	2.6	3.4	5.1	8.5	17	34
	3000r/min	4.3	8.5	13	17	26	4.3	8.5	17
K9BH100N2 + K9H□BTH	100~2500r/min	1.7	3.4	5.1	6.8	10.2	17	34	68
	3000r/min	0.85	1.7	2.6	3.4	5.1	8.5	17	34
Product name	Deceleration ratio	5	10	15	20	30	50	100	200
	Speed control range[r/min]	20~800	10~400	6.7~267	5~200	3.3~133	2~80	1~40	0.5~20
K10LH200N2 + K10H□BU	100~3000r/min	2.9	5.9	8.8	11.7	16.8	28	52.7	70
	4000r/min	2.0	4.1	6.1	8.1	11.6	19.4	36.5	63
K10LH400N9 + K10H□BU	100~3000r/min	5.9	11.7	17.6	23.4	33.5	55.9	70	70
	4000r/min	4.3	8.6	12.8	17.1	24.5	40.9	63	63

* Rotation direction shows the same ☐ color as the motor. In other cases, it's the opposite.
* Flat Gearbox viewed from front side is opposite rotation direction with motor.
* Flat Gearbox viewed from back side is same rotation direction with motor.

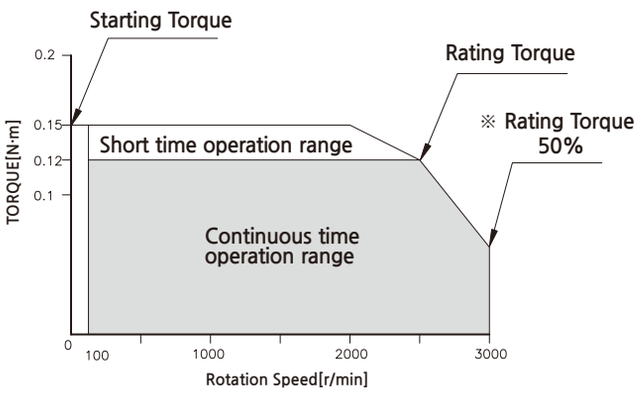
Allowed overhang load and allowed thrust

Product name		Deceleration ratio	Allowed overhand load				Allowed thrust load	
			From the end of output part 10mm		From the end of output part 20mm			
			N	kgf	N	kgf	N	kgf
GEARED MOTOR	K6LH30N2 + K6H□B	5	100	10	150	15	40	4
		10,15,20	150	15	200	20		
		30,50,100,200	200	20	300	30		
	K8LH50N2 + K8H□B	5	200	20	250	25	100	10
		10,15,20	300	30	350	35		
		30,50,100,200	450	45	550	55		
	K9LH100N2 + K9H□B	5	300	30	400	40	150	15
		10,15,20	400	40	500	50		
		30,50,100,200	500	50	650	65		
	K10LH200N2 (K10LH400N9) + K10H□BU	5,10,15,20	550	55	800	80	200	20
		30,50	1000	100	1250	125	300	30
		100,200	1400	140	1700	170	400	40
	K6LH30N2 + K6H□BTH	5,10	450	45	370	37	200	20
		15~200	500	50	400	40		
	K8LH50N2 + K8H□BTH	5,10	800	80	660	66	400	40
		15~200	1200	120	1000	100		
	K9LH100N2 + K9H□BTH	5,10	900	90	770	77	500	50
		15,20	1300	130	1110	111		
		30,50,100,200	1500	150	1280	128		
MOTOR	K6LS30N2		70	7	100	10	·Be careful not to weigh thrust. If it's inevitable, keep it under 50% of the motor weight.	
	K8LS50N2		120	12	140	14		
	K9LS100N2		160	16	170	17		
	K10LS200N2,K10LS400N9		197	19.7	220	22		

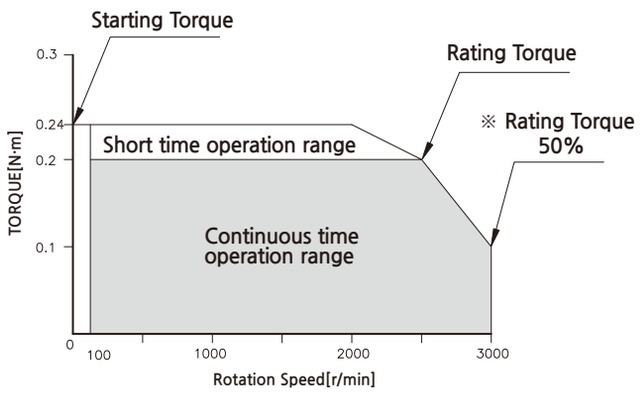
* In □ of name, it represents a deceleration ratio.
* Permissible overhang load can be withdrawn by calulation.

Rotation speed- torque characteristic

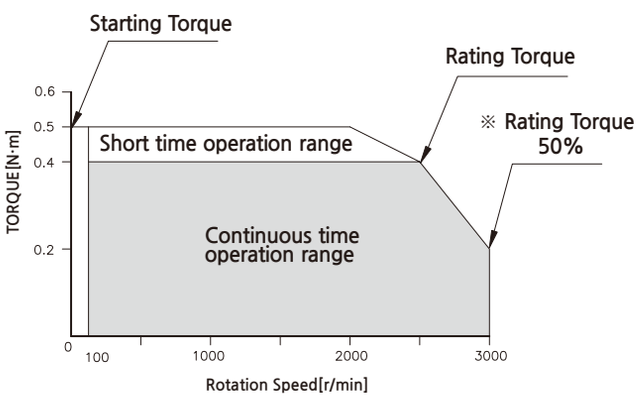
K6LS30N2 / K6LH30N2



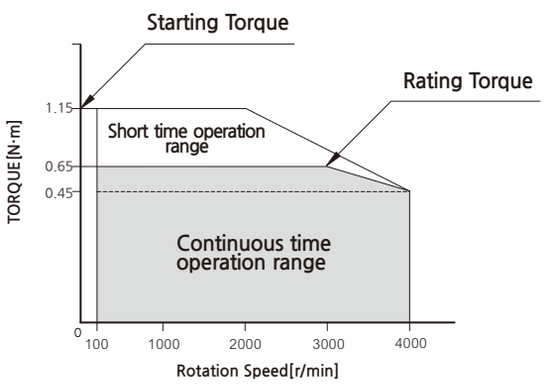
K8LS50N2 / K8LH50N2



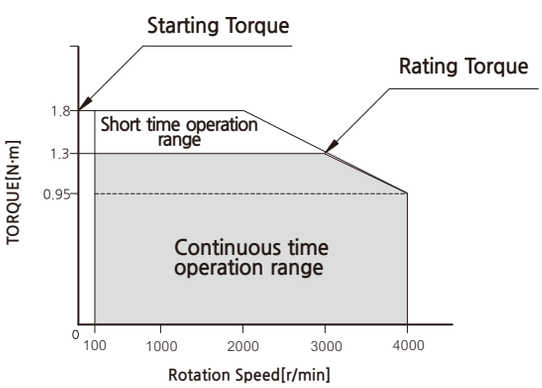
K9LS100N2 / K9LH100N2



K10LS200N2/K10LH200N2



K10LS400N9/K10LH400N9



※ DC24V is the value without cable extension.

BLDC SPEED CONTROL UNIT

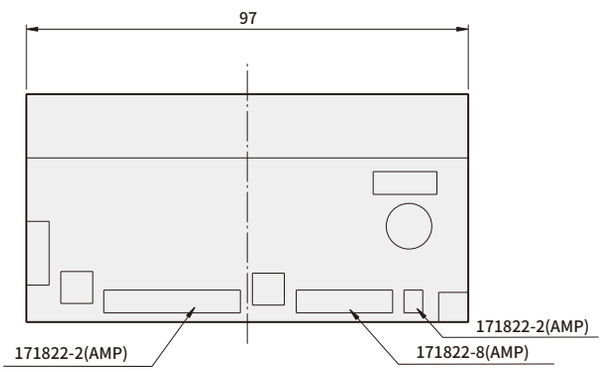
GUL

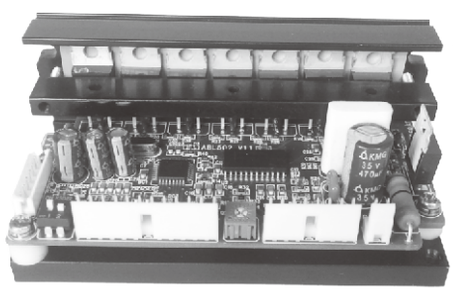
GUL-2-30
GUL-2-50

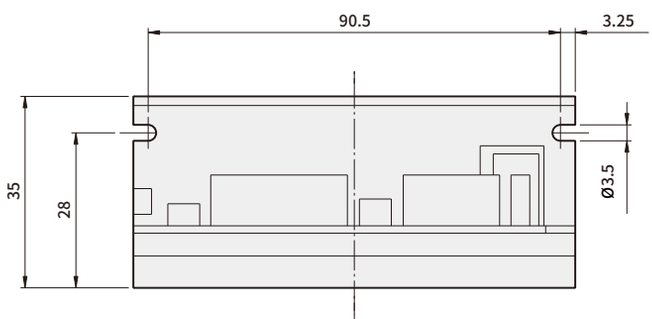
L Series motor applied product

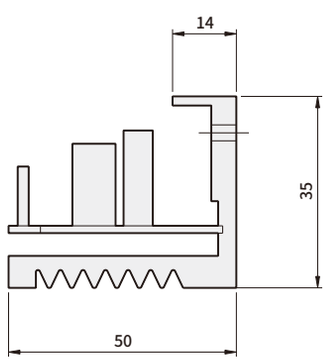
Product appearance

■ Driver main part outside view



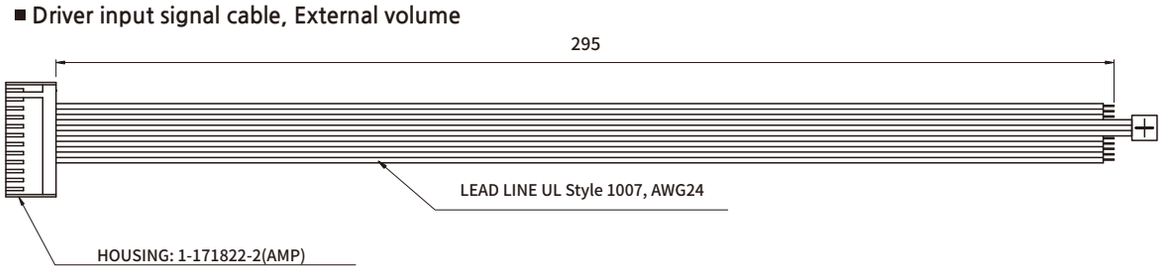




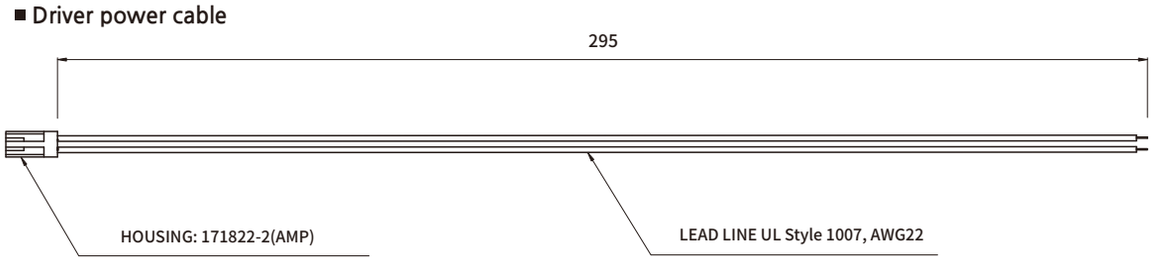


[Accessory]

■ Driver input signal cable, External volume



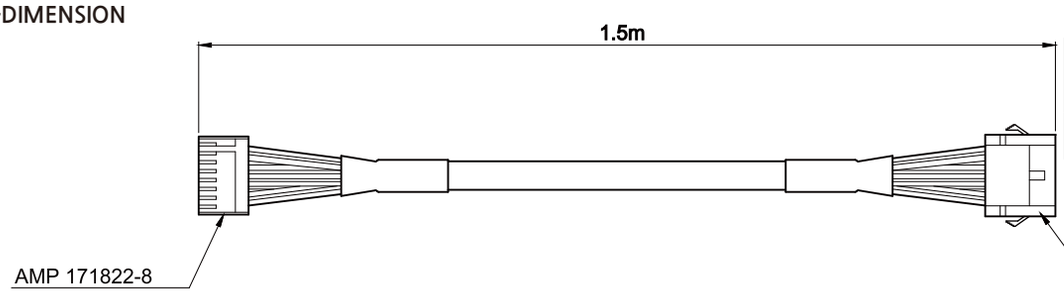
■ Driver power cable



■ Extension cable

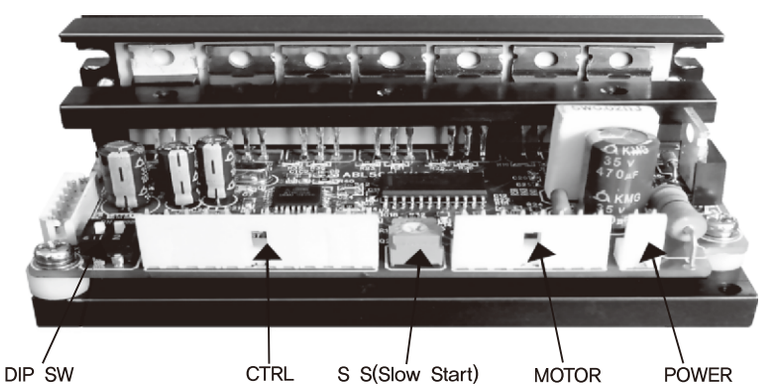
Buy extension cable to additionally extend between motor and control (optional)

-DIMENSION



MODEL	L(extension cable length)
KLEW-1.5	1.5m

Name and functions of each part



1. Input /output specification

Items	Details	Note
External size	97 × 50 × 42	
Power input, Controller output	DC24V rated current 2A, Maximum current 5A	
Operation object	DC24V, BLDC Motor	
Control	Input signal type : Pull-Up, Output signal type : Open-Collector	PLC connected control

2. LED specification

No.	Sign	Color	Details
1	STATUS	GREEN	It flickers every 1 second under normal condition.
2	ALARM	RED	It flickers if system is overloaded. If there is problem with motor whole sensor, then it turns on.

3. DIP switch specification

Pin No.	Status	Details	Model name	Applied motor
1	OFF	Maximum limit current 3.5A	GUL-2-30	K6L□30N2
	ON	Maximum limit current 5A	GUL-2-50	K8L□50N2

4. Input / output signals CTRL (AMP, 171825-12)

Pin No.	Signal name	Direction	Color	Explanation
1	ALARM	OUT	Brown	If control unit is under alarm or overload, then the signal line becomes H(5V) and LED turns on. If there is problem with motor connection, LED turns on. Under the normal condition, it is turned off (Gnd) and LED gets turned off also.
2	SPEED_OUT	OUT	Red	Pulse gets released according to the image changes in the motor in response to BLDC motor speed. Output 30pulse signals per motor one rotation.
3	GND	Ground	Orange	
4	GND	Ground	Yellow	
5	SPEED_IN	IN	Green	It is direct power input for speed control. The range is between 0V and 5V. Within this range, motor gets controlled proportionally.
6	5V	OUT	Blue	Supplying direct power (DC5V) should be used as variable resistant Vcc to input speed with support from outside. It should not be used for any other purposes.
7	ALM_RESET	IN	Purple	If control unit stops due to overload, then remove the source of alarm and forcefully restart. ON→OFF then RESTART.
8	CHG	-	Brown	If it is on, then internal S_S volume is used to control speed. If it is off, then S_S volume is used to set acceleration and deceleration times.
9	CW/CCW	IN	Gray	If you look at from the axis. When the signal wire is connected with GND, then it rotates CW. In other cases, it rotates CCW.
10	RUN/BRAKE	IN	White	If it is on (L), then the motor operates. If you turn it to off during motor operation, then it stops instantaneously. (Brake on) If signal wire is off, then the motor does not operate. Wait a few minutes before restarting (after brake on).
11	START/STOP	IN	Black	If it is on, then the motor is ready to rotate. If you turn it to off during motor operation, then it stops automatically.
12	NC			

5. START/STOP and RUN/BRAKE

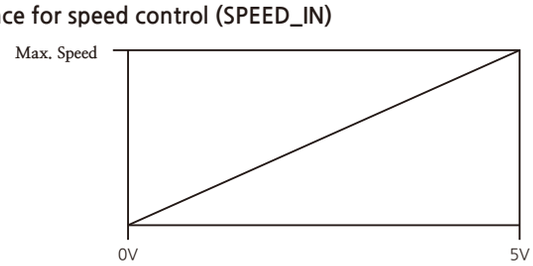
START/STOP	RUN/BRAKE	Operation status
ON(L)	ON(L)	Normal operation
ON(L)	OFF(H)	Instant stop
OFF(H)	ON(L)	Automatic stop due to inertia of motor and load

6. Variable resistance

■ **Setting acceleration and deceleration speeds : S_S (SLOW START)**

Slope of motor' s acceleration and deceleration is decided. Acceleration and deceleration are possible in parallel with variable resistance, VR2's output voltage. If the variable resistance is at minimum, then the time it takes motor to reach the maximum speed from the stop is 10 seconds. If variable resistance at maximum (at maximum value, greater than 90%, greater than 9 markings), then it takes about 0.1 sec to reach the maximum speed. If you need to rapidly accelerate or decelerate, then you should keep the resistance marking at 9 (at maximum).

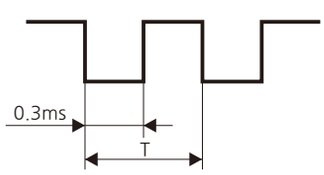
■ **External variable resistance for speed control (SPEED_IN)**



Motor speed vs. external voltage : SPEED_IN

7. SPEED output (SPEED_OUT)

30pulses per one revolution.



BLDC SPEED CONTROL UNIT

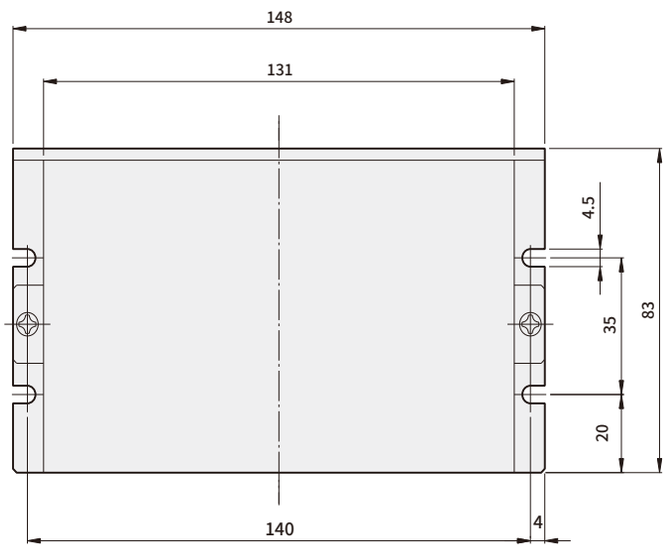
GUL

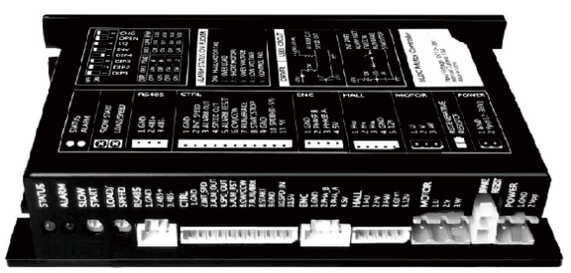
GUL-2-100

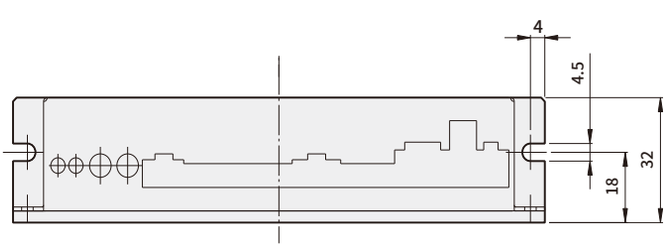
L Series motor applied product

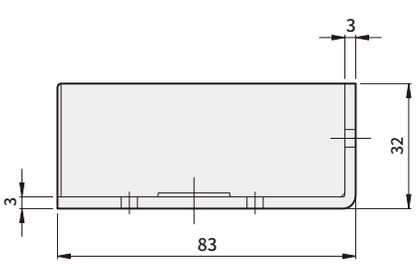
Product appearance

■ Driver main part outside view



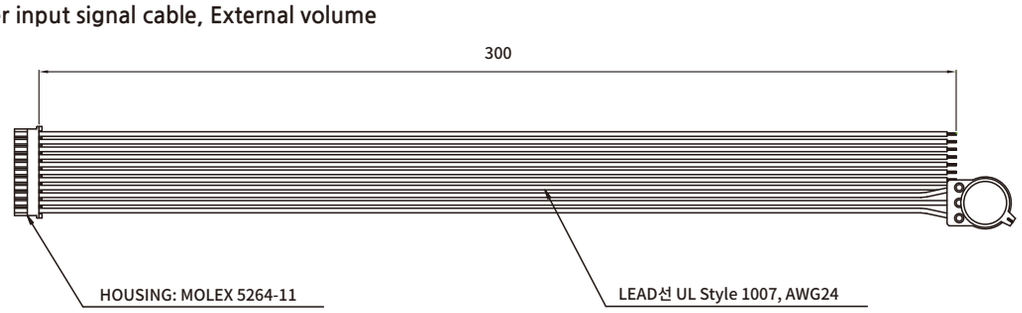




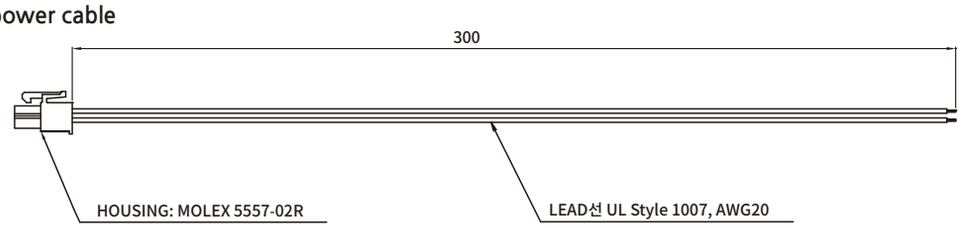


[Accessory]

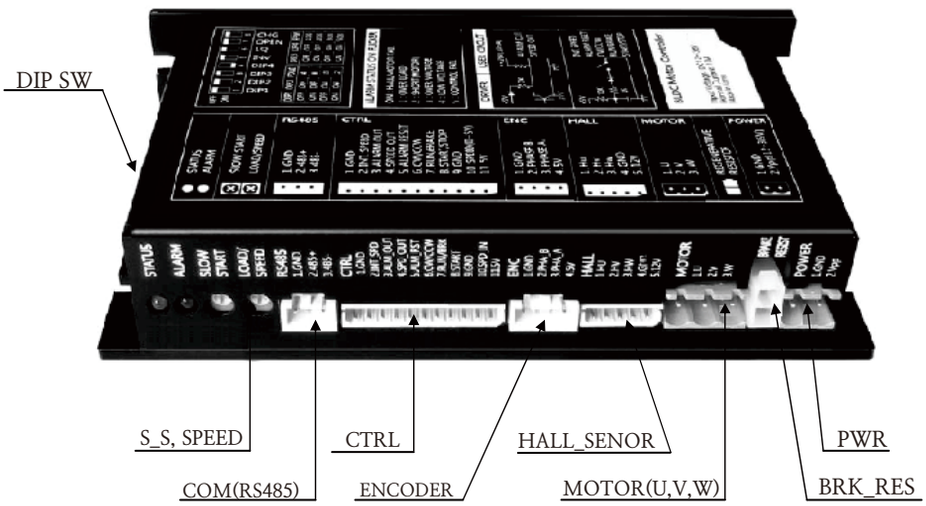
■ Driver input signal cable, External volume



■ Driver power cable



Name and functions of each part



1. Input / Output specification

Items	Details	Note
External size(mm)	146 × 125 × 55	
Power input, Controller output	DC24V(±10%), Normal 10A	
Signal system	Input signal type : Pull-Up, Output signal type : Open-Collector	
Communication(Option)	RS485 1ch, Baudrate : 19, 200bps, 1 stop bit, no-parity	
Speed range	100~3,000rpm	
Speed variation ratio	Less than ±1%	

2. LED specifications

Pin No.	Naming	Color	Number of blink	Contents
1	ALARM	RED	0 (Series lighting) 1 2 3 4 5	- Motor hall sensor signal failure or inverse direction in rotating speed signal.(INV) - Overload : Blink every 1 second. - Short circuit of motor coil or current more than 30% of rated current. - Input voltage is higher than upper limit. - Input voltage is lower than lower limit. - The motor speed is not within ±15% of reference speed during 5s.
2	STATUS	GREEN	1	- Blink every 1 second normally.

3. Motor connector specification

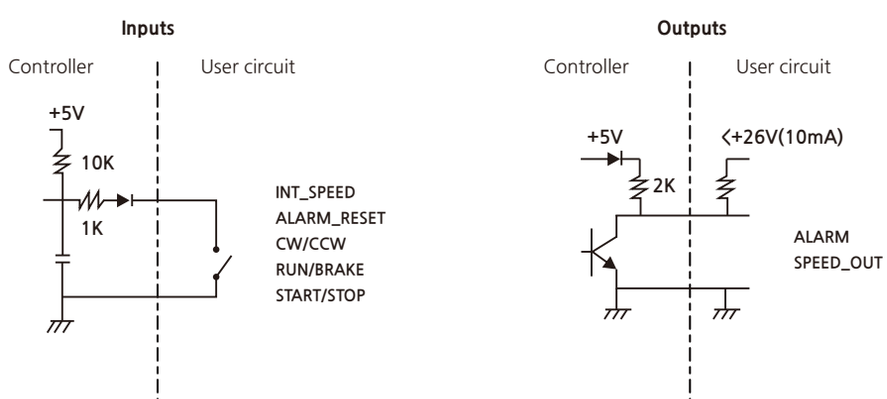
Connector Name	Pin No.	Naming	Details	Note
HALL_SENOR MOLEX, 5267-05	1~3	Hw, Hv, HU	Hall sensor signal input	MOLEX, 5264-05
	4, 5	Gnd, 12V	Hall sensor power	
MOTOR BR508LH-3	1~3	U, V, W	Motor power line	
PWR BR508LH-2	1	Gnd	Ground	
	2	V+	24V (±10%)	
RS485 Yeonho Electronics SMAW250-03	1	GND	RS485 connector	SMH250-03
	2	485+		
	3	485-		
ENC SMAW250-04	1~4	GND, B, A, 5V	Encoder input (PHASE_A, PHASE_B) (Option)	SMH250-04
BRK_RES MOLEX, 5566-02		It is used especially in minus load circumstance, in large load inertia or in high speed operation. The external regenerative brake resistor in range of 5 to 10Ω is recomended and the power rating of the resistor needs to be determined properly. (5Ω resistor with 50W is recommended for 200W load.)		MOLEX, 5557-02
CTRL MOLEX, 5267-11		Input/output signals for controlling motor controller Refer to CTRL connector below.		MOLEX, 5264-11

4. Input/output signals (MOLEX 5267-11)

Signal line is at pull-up internally. If it is L (GND), in other words, if the signal line is connected with GND or if electric potential is at GND level, NC (disconnected with GND), then it gets turned off.

Pin No.	Signal name	Direction	Color	Details
1	GND		BLACK	Ground
2	INT_SPEED	IN	GREEN	ON : Set the speed by internal volume(LOAD/SPEED) OFF : Set the speed by external volume(SPEED_IN) and limit the load current by internal volume(LOAD/SPEED)
3	ALARM	OUT	PURPLE	When alarm occurs, the output transistor is ON (L). At normal condition, the output transistor is OFF. If there is any alarm, the alarm LED blinks according to the alarm status. To drive ALARM output in reverse, invert it by using communication command or DIP_SW.
4	SPEED_OUT	OUT	ORANGE	Output pulses are came out proportional to the BLDC motor speed. The number of pulses per revolution is 30 pulses.
5	ALM_RESET	IN	GREY	The signal restarts controller after removing the cause of any alarm. To actually reset the controller, turn OFF ALARM_RESET from ON while keeping START/STOP off or speed command in zero.
6	DIR	IN	BROWN	Used to set rotating direction. CW : Connceted to the GND (ON) CCW : Disconnected from the GND (OFF) CW/CCW is the rotating direction when motor is viewed from rotor. If DIR is ON while CHG at DIP_SW setting is ON, the motor turns to CW. If controlled by communication, this is used as CW limit-switch. Therefore it must be conected to GND.
7	RUN/BRAKE	IN	WHITE	ON(L) : Motor starts to run. OFF : Turning OFF the signal during motor run makes the motor stop quickly.
8	START/STOP	IN	MAGENTA	ON : Motor starts to run. OFF : Turning OFF the signal during motor run makes the motor stop in free run. If START/STOP is ON while CHG at DIP_SW setting is ON, the motor turns to CCW. If controlled by cummunication, this signal is used as CCW limit-switch. Therefore it must be connected to GND.
9	GND		BLUE	Ground
10	SPEED_IN	IN	YELLOW	Analog input to adjust the motor speed. The range is from 0 to 5V DC.
11	5V	OUT	RED	Used to supply 5V DC to the external volume. Do not use it for another purpose.

■ Input/output signals



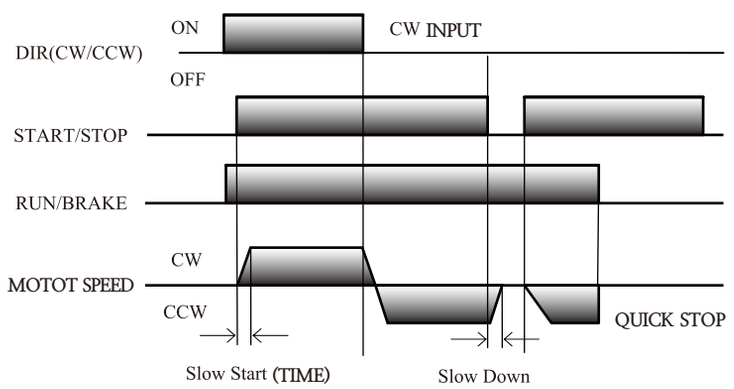
Basic procedure to run the motor is as follows.
Set the rotation direction in CW or CCW by using DIR
Turn ON RUN/BRAKE while START/STOP is ON
Adjust speed command by applying command voltage to SPEED_IN

For quick stop, turn OFF RUN/BRAKE as the table below. To stop the motor in free run state, turn OFF START/STOP signal.

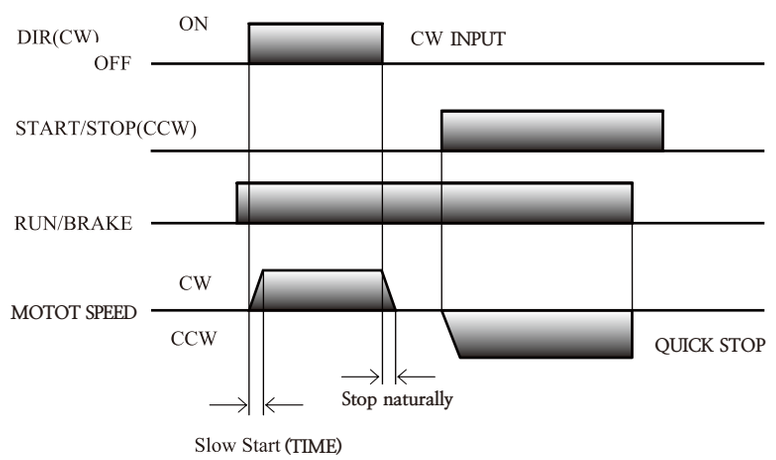
5. Control conditions by START/STOP and RUN/BRAKE (Applied when CHG(position 8 in DIP_SW) is off)

START/STOP	RUN/BRAKE	State
ON(L)	ON(L)	Normal driving
ON(L)	OFF(H)	Quick stop
OFF(H)	ON(L)	Free run stop depending on load inertia

■ **When CHG signal, No.8 in DIP_SW, is OFF**
Motor moves when RUN/BRAKE and START/STOP are ON.



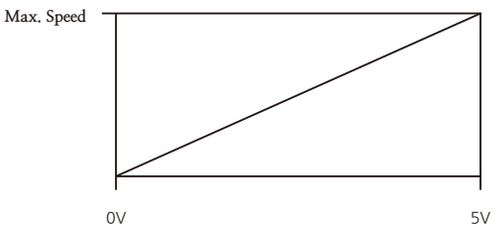
■ **When CHG signal, NO.8 in DIP_SW, is ON**
Motor moves when RUN/BRAKE is ON.



6. Internal variable resistance(LOAD/SPEED)

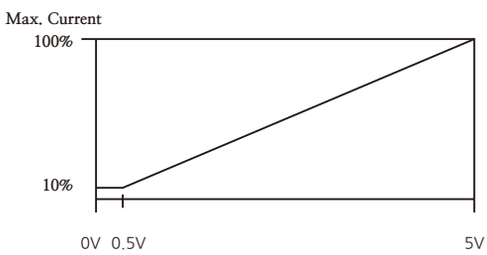
■ Maximum allowed load setting and internal speed setting : (LOAD/SPEED) :

When INT_SPEED at Pin2 in CTRL connector is turned ON, internal volume



Input voltage at LOAD/SPEED (V)

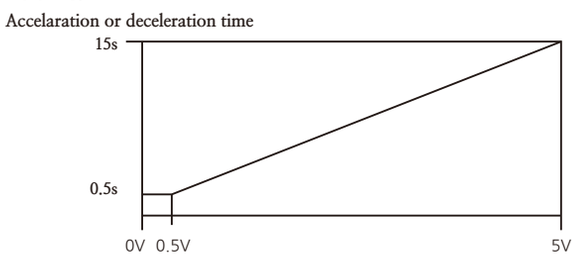
When INT_SPEED at Pin 2 in CTRL connector is turned OFF, internal volume LOAD/SPEED is used to limit the maximum current of motor. Allowable maximum current increases as the volume is turned in CW.



Input Voltage at LOAD/SPEED (V)

■ Acceleration/deceleration rate, internal speed setting/current limit : SS(Slow Start), SD(Slow Down)

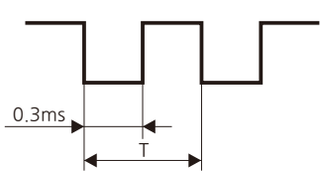
Slow start and slow down determines the slope of acceleration and deceleration. When these volume are set to maximum, acceleration time from stop to maximum speed or deceleration time from maximum to stop is about 15 sec. Acceleration or deceleration time at the lowest level is within 0.5sec although actual speed depends on motor status. SS volume sets both acceleration and deceleration slope equally in the case of controller without SD volume.



Input voltage on S_S(Slow Start)

7. SPEED output (SPEED_OUT)

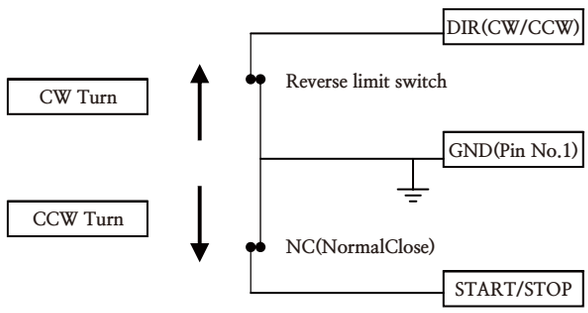
Output signal on the number of poles, 10
30pulses per one revolution.



■ Safety switches and driving condition when communition command used I/O

If you use communication command, then the controller users the CTRL signals as limit switchs for system safety.
Set the DIR(CW/CCW) and START/STOP signals to ON(connected to GND) to drive motor.
The relationship of the moving direction and the signals.
CW direction running should be on status in sixth DIR pin, CCW direction running should be on status in eighth START/STOP pin.
Prevent in advance controller breakage and device breakage by incorrect operation when limit switch connect to sixth, eighth signal cable and control motor in locked condition of device like lift.

Reference direction (Speed and position control)	RUN/BRAKE		Motor status
	DIR(CW/CCW)	START/STOP	
CW Reverse	ON	X	Driving
	OFF	X	Stop
CCW Forward	X	ON	Driving
	X	OFF	Stop



Wiring condition on the moving direction and limit switches

■ Analyzing failure and treatment

Check out according to below items when motor's operation is not normally executed.

Items	Cause	Solutions
Motor don't move	RUN/BRAKE and START/STOP signals are not ON status.	Set the RUN/BRAKE and START/STOP inputs to ON(connection to GND) status.
	DIP SW No.8 CHG is not ON and RUN/BRAKE is not ON or, DIR or START/STOP are not ON.	Set RUN/BRAKE to ON, and wants to move to CW direction, set DIR to ON or CCW direction, START/STOP to ON.
	When using the internal volume, LOAD/SPEED as a speed input, CTRL connector No.2, INT_SPEED is not ON.	Set the INT_SPEED to ON.
	External speed setting device (external variable resistor volume) failure.	Check out if voltage 0~5V is input at CTRL connector tenth pin.
	The external volume(speed in)is malfunction.	At the CTRL connector No.10, check 0~5V input voltage.
	Alarm LED ON.	Check out motor's hall sensor connection. Check motor connector disconnection and connection failure.
Stop during rotation	Protection function operation.	Check out LED flickering number. Identify LED specification by flickering number.
control malfunction with wanted speed and motor has no power.	Internal volume, LOAD/SPEED is not proper setting.	Turn this volume to CCW direction to increase limit of max. current.
Wrong direction	DIR signal is not proper	Set the valid status of DIR(CW/CCW) signal.
	Gearhead connected.	The direction of axis is depend on the gearhead ratio. Change the DIR status.
Unstable run or vibration	Motor axis is not aligned well with load axis.	Check if coupling is well and then use flexible coupling if it is not well aligned.
	Dsturbed by external noise	Eliminate noise source by applying noise filter or metal case when the system is affected by strong EMI source such as welder. Check if shield wires is being used for signal line or add ferrite beads on the lines.
	Type of motor is not correct.	Set the correct number of motor poles by DIP_SW no.1~4
Motor does not stop quickly	Motor stop is being done by START/STOP.	Stop the motor by RUN/BRAKE input.
	Load inertia is too large.	Decrease load inertia or increase the friction of load
Motor does not stop quickly	Setting of SS(SlowStart) or SD(SlowDown) is not proper.	Set the volume SS or SD properly by turning it in CW or CCW.
Motor runs in max. Speed and then stops shortly while alarm LED is on	Connection for encoder lines or motor line is wrong.	Set the DIP_SW no.5, INV to ON. And reboot the controller.
Running noise is high and correspondance is low.	The motor is drived by 1Q mode.	Set the DIP_SW no.6, 1Q to OFF, the motor is drived by sine wave PWM.

MEMO