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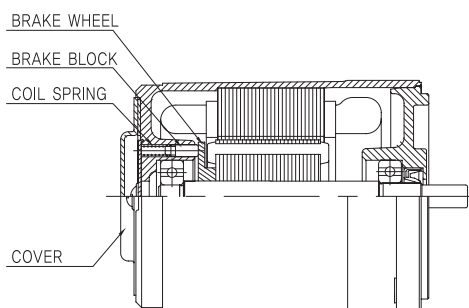
# REVERSIBLE MOTORS

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# Characteristics of REVERSIBLE MOTOR



<Fig. 1>

## 1. Characteristics of REVERSIBLE MOTOR

- The reversible motor is a condenser type single phase induction motor. Thus, its general characteristics are the same as those of the induction motor.
- Frequent reverse operation is possible. The reversible motor has a temporary brake device built inside the motor to facilitate the operation in normal direction as well as reverse. Also, the main and sub coils of the stator have their windings manufactured with the same method to guarantee the identical characteristics between them (Refer to <Fig. 2>).
- Also, it has a higher starting torque to facilitate frequent changes in rotational direction from normal direction to reverse direction, and vice versa, within a short time (Refer to <Fig. 3>).
- It secure staying power with BRAKE BLOCK that prevents OVER RUN when stopping. It has excellent instantaneous stop force.(refer to the Photo 1))
- The changeover switch can help the motor reverse its rotational direction easily within a short time so that it is suitable for such operation that changes the rotational direction frequently from normal to reverse, and vice versa. Therefore, this motor is called a reversible motor.
- The rated operating time is 30 minutes. Since the reversible motor is designed to be capable of controlling the directional changes in rotation, the loss input is larger and the temperature can rise higher compared with the induction motor. Hence, the rated operating time is limited to 30 minutes.
- Thus, 30 minutes of rated operating time means that the motor can have at least 30 minutes of non-stop operation within the safe upper limit of the temperature rise.
- In general, the reversible motor has the same characteristics as the induction motor in terms of number of rotations, characteristics of torque, voltage and condenser.

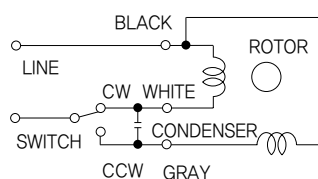
PHASE	SIZE	OUTPUT (W)	MODEL	HOLDING TORQUE		OVER RUN
				(g · cm)	(N · cm)	
Single phase	□60mm	6	S6R06G□	50	0.5	4
	□70mm	15	S7R15G□	130	1.3	5
	□80mm	15	S8R15G□	150	1.5	5
		25	S8R25G□	150	1.5	5
	□90mm	40	S9R40G□ ( )	400	4.0	6
		60	S9R60G□ ( )	400	4.0	6
90		S9R90G□ ( )	400	4.0	6	

<Table 1> HOLDING TORQUE and OVER RUN of REVERSIBLE MOTOR

## 2. BRAKE Structure

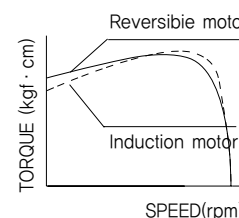
- The temporary brake of the reversible motor has characteristics as follows.
  - ① A frictional load applied to improve frequent reversal operation.
  - ② Reduces overrun.
  - ③ Provides a little holding torque.
- The reversible motor has characteristics described above due to its general use for remote controlling purpose. Thus, structurally, as shown in (Fig. 1), the brake rod is forced towards the brake wheel by a spring to make them contact each other.
- Since the brake structure described above has a limitation in terms of a frictional load, SPG adjusted the brake power to be about 10% of the motor output torque.
- The figures representing the holding torque and the overrun in <Table 1> may have more or less deviations for each motor. They may also have some discrepancies depending on the operating duration and the ambient temperature. It is advised therefore that the table figures should be used only for reference purpose.
- The rated torque, starting torque, and electric current of the reversible motor were measured in the Circumstances where the temporary brake rod is installed in the motor. Therefore, there will be no problem even if the corresponding table figures are used when selecting a motor. The conservative selection of a motor is recommended, however, because the figures may have some deviation depending on the brake rod employed to the motor.
- Attention is required for a case has shown that the holding torque may fall below the figures in <Table 1> in the initial phase of operation.

CIRCUIT DIAGRAM (C.W)

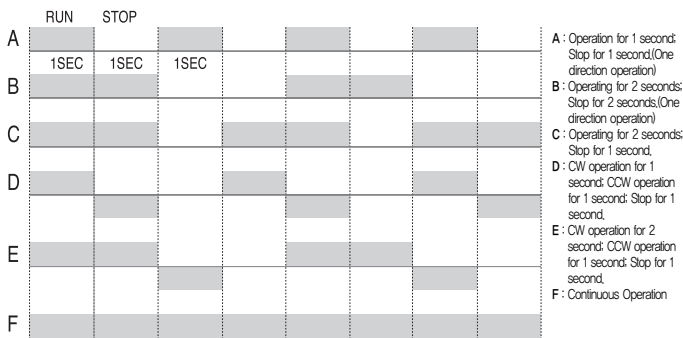


<Fig. 2>

SPEED- TORQUE CURVE



<Fig. 3>



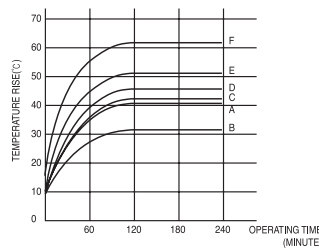
(Fig.4) OPERATING CYCLE

### 3. Operating Time and Temperature Rise

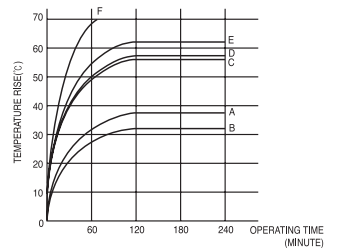
- Although 30 minutes of rated operating time is specified for the reversible motor, the rated operating time may change depending on the operation conditions if the operation frequently repeats stop and run (On-Off) within a short period of time.
- If the reversible motor frequently repeats stop and run(On-Off) within a short time, the starting current increases and cause the motor temperature to rise. However, longer rated operating time may be obtained by allowing the motor to remain stop longer, because the stoppage can provide a chance of natural cooling for the motor and decrease its temperature.
- The conditions of the intermittent(On-Off) operation are determined as shown in A – F of (Fig. 4). F stands for continuous operation.
- The characteristics shown in (Fig. 5) through (Fig. 8) represent the measurements of the motor for 200V 50/60Hz. Naturally, the characteristics of the motor for 220V 60Hz will have better characteristic values than 200V 60W due to the increase of the voltage by 10%. Therefore, it is encouraged to operate the motor at a temperature below the ambient temperature.
- The temperature rise measurement is performed when the motor, under no-load, is prevented from transferring its internal heat to the outside through the motor's external contact points using thermograph. This method of measurement can provide the highest possible temperature rise.
- Especially, if either a load or an inertia load is greater than the motor's rated torque, it requires longer time to start or reverse the direction, resulting in a greater temperature rise, which requires a user's attention.
- The specified temperature rise of the reversible motor is 60°C ( $\Delta T$  value) in general, and be careful not to exceed the temperature. Also, the greater the output of the motor is, the shorter the operating time becomes.
- There is a case that the motor alone is used, but mostly the motor is used in combination with the gearhead. Hence, when the motor of S8R25GD is used with no-load in combination with the gearhead of S8KA50B, the temperature rise draws an L curve as shown in (Fig. 9) and the temperature rise becomes lower and the operating time becomes longer by about 30 minutes as compared with the motor shown in (Fig. 7).
- (Table 2) shows various heat radiation plates for mounting surface. The table indicates that the temperature decreases by about 6°C when the diameter of the heat radiation plate is

doubled, and greater heat conductivity of aluminum decelerates the temperature rise compared to that of the steel. Painting the aluminum will additionally lower the temperature by about 3°C.

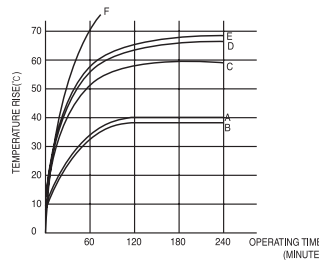
- Although the principle is to keep the coil temperature below the specified temperature for the insulation class, it is possible to continue the operation if the motor housing surface temperature remains lower than 90°C. The temperature of the motor varies depending on the load, operating cycle, motor's mounting method, and ambient temperature.



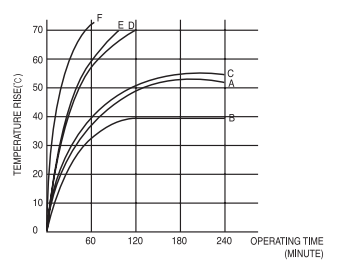
(Fig.5) INTERMITTENT OPERATION OF S6R06GD(WITHOUT GEAR HEAD)



(Fig.6) INTERMITTENT OPERATION OF S7R15GD(WITHOUT GEAR HEAD)



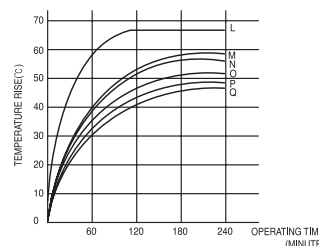
(Fig.7) INTERMITTENT OPERATION OF S8R25GD(WITHOUT GEAR HEAD)



(Fig.8) INTERMITTENT OPERATION OF S9R40GD(WITHOUT GEAR HEAD)

TEMPERATURE CURVE	TYPE OF HEAT RADIATION PLATE		
	DIA METER(mm)	MATERIAL	PAINTING
L	—	—	—
M	200	IRON	NO PAINTING
N	200	ALUMINUM	NO PAINTING
O	400	IRON	NO PAINTING
P	400	ALUMINUM	NO PAINTING
Q	400	ALUMINUM	BLACK

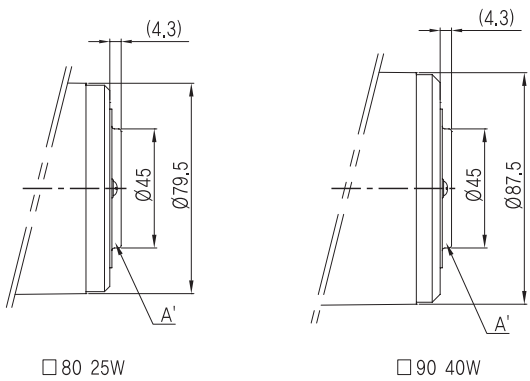
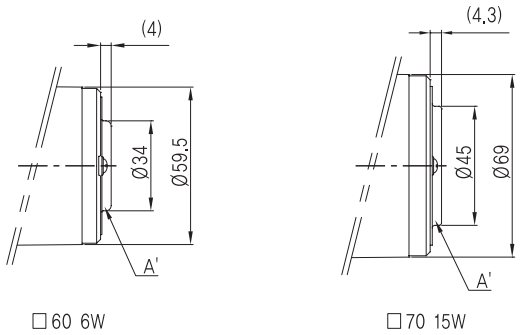
(Table2) TYPE OF HEAT RADIATION PLATE (THICK 1.5mm)



(Fig.9) INTERMITTENT OPERATION OF S8R25GD + S8KA50B + HEAT RADITION PLATE

### 4. External Structure

- The CE marked reversible motor has a cover 'A' assembled to the back side of the motor to improve dust-proof and water-proof. (Refer to the figure below)
- As a result, the motor is 4.0mm longer than induction motor lengthwise, which requires the user's attention.



### GENERAL SPECIFICATION OF REVERSIBLE MOTORS

ITEM	Specification
Insulation Resistance	100MΩ or more when 500V megger is applied between the windings and the housing after rated motor operation under normal ambient temperature and humidity
Dielectric Strength	Sufficient to withstand 1500V at 50/60Hz applied between the windings and the case after rated motor operation under normal ambient temperature and humidity for 1min.
Temperature Rise	80°C or less increase measured by thermometer after rated operation.
Insulation Class	Class B(130°C)
Overheat Protection Device	Built-in thermal protector (automatic return type) : Open 120°C±5°C Close 76°C±15°C
Ambient Temperature	-10°C ~ 40°C
Ambient Humidity	85% maximum(non condensing)





# 6W

REVERSIBLE MOTOR

□ 60mm LEAD WIRE TYPE



## ■ MOTOR

Model	Poles	Voltage		Freq. (Hz)	Duty	Rated Load				Starting Torque		Capacitor ( $\mu$ F)	Degree of Protection	Insulation Classification	Protected Type
		Phase	(V)			Current (A)	Speed (r/min)	Torque		(kgf · cm)	(mN · m)				
				(kgf · cm)				(mN · m)							
SG6R06GA SG6R06DA SG6R06SA	4	1	100	50	S2(30min)	0.25	1250	0.46	46	0.68	68	4.5 (250V)	IP23	B(130)	Z.P.
				60		0.30	1500	0.38	38	0.68	68				
		1	110	60		0.25	1550	0.37	37	0.68	68	3.5 (250V)			
				60		0.25	1550	0.37	37	0.68	68				
SG6R06GB SG6R06DB SG6R06SB	4	1	200	50	S2(30min)	0.12	1250	0.46	46	0.54	54	1.0 (450V)	IP23	B(130)	Z.P.
				60		0.12	1500	0.37	37	0.54	54				
		1	220	50		0.12	1250	0.46	46	0.50	50	0.8 (450V)			
				60		0.12	1550	0.37	37	0.50	50				
		1	230	50		0.12	1250	0.45	45	0.58	58				
				60		0.12	1550	0.37	37	0.58	58				

- ❖ All the model of SG series received UL, TÜV, CCC certificate.
- ❖ output 6W product is Impedance Protected, 15~90W product is Thermally Protected type.
- ❖ Depend on the voltage, the capacitors are divided into two model. Please inquire separately when operational voltage is AC 100V or 200V.

## ■ GEARED MOTOR – 50Hz

Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360
		r/min	300	250	200	167	150	120	100	83.3	75.0	60.0	50.0	41.6	37.5	30.0	25.0	20.0	16.6	15.0	12.5	10.0	8.3	7.5	6.0	5.0
SG6KA□	kgf·cm	2.10	2.50	3.11	3.73	4.14	5.20	6.21	7.50	8.30	10.4	11.9	14.2	15.8	19.8	23.7	29.7	35.6	39.6	47.5	55.9	60.0	60.0	60.0	60.0	60.0
SG6DA□	N·m	0.21	0.25	0.31	0.37	0.41	0.52	0.62	0.75	0.83	1.04	1.19	1.42	1.58	1.98	2.37	2.97	3.56	3.96	4.75	5.59	6.00	6.00	6.00	6.00	6.00
SG6SA□																										

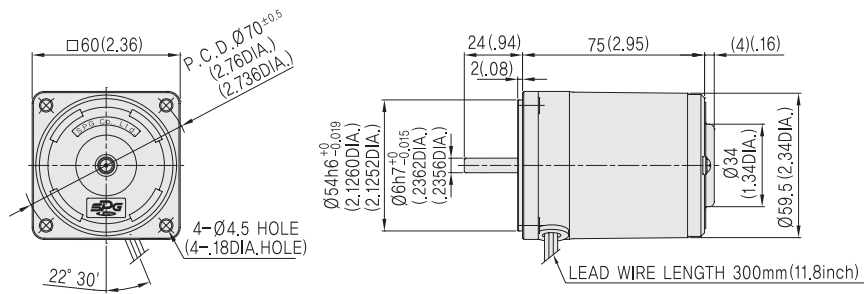
## ■ GEARED MOTOR – 60Hz

Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360
		r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0
SG6KA□	kgf·cm	1.71	2.10	2.60	3.10	3.42	4.30	5.13	6.20	6.84	8.60	9.80	11.8	13.1	16.3	19.6	24.5	29.4	32.7	39.2	46.2	55.4	60.0	60.0	60.0	60.0
SG6DA□	N·m	0.17	0.21	0.26	0.31	0.34	0.43	0.51	0.62	0.68	0.86	0.98	1.18	1.31	1.63	1.96	2.45	2.94	3.27	3.92	4.62	5.54	6.00	6.00	6.00	6.00
SG6SA□																										

- ❖ Among GEAR HEAD model names, □ is reduction gear ratio.
- ❖ Value of the chart is allowable torque of reduction gear of GEARED MOTOR.
- ❖ Regarding direction of rotation, in case of □, its reduction gear ratio has same direction with MOTOR's and in case of □, its reduction gear ratio has the opposite direction of MOTOR's.
- ❖ rotation speed is calculated with synchronous rotation number of MOTOR(50Hz : 1500 r/min, 60Hz : 1800 r/min). Actual rotation speed can be less than (2~20%) depend on the size of the load 2~20%.

### MOTOR

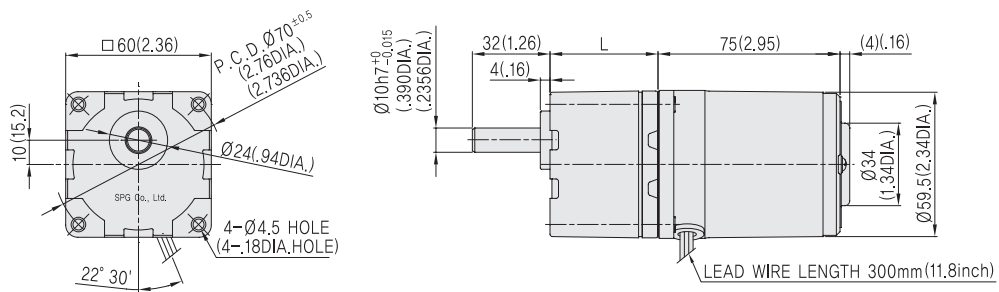
Unit : mm(inch)



MOTOR OUTPUT SHAFT	GEAR TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG6R06G□	SG6R06D□	SG6R06S□

### GEARED MOTOR

Unit : mm(inch)



GEAR HEAD OUTPUT SHAFT	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG6KA□	SG6DA□	SG6SA□

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG6□A□	5~25	34	0.28
		30~120	38	0.33
		150~360	43	0.37
MOTOR	SG6R06□□			0.74



# 15W

REVERSIBLE MOTOR

70mm LEAD WIRE TYPE



## ■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type				
		Phase	(V)			(Hz)	Current	Speed	Torque		(kgf·cm)					(mN·m)			
				(A)					(r/min)	(kgf·cm)		(mN·m)							
SG7R15GA SG7R15DA SG7R15SA	4	1	100	50	S2(30min)	0.39	1300	1.10	110	1.20	120	7.5 (250V)	IP23	B(130)	T.P.				
				60		0.45	1600	0.90	90	1.20	120								
		1	110	60		0.37	1600	0.90	90	1.20	120	6.0 (250V)							
1	115	60	0.37	1600		0.90	90	1.20	120										
SG7R15GB SG7R15DB SG7R15SB	4	1	200	50		S2(30min)	0.19	1250	1.10	110	1.20	120				1.8 (450V)	IP23	B(130)	T.P.
				60			0.24	1550	0.90	90	1.20	120							
		1	220	50	0.18		1300	1.10	110	1.20	120	1.5 (450V)							
				60	0.21		1550	0.90	90	1.20	120								
		1	230	50	0.19		1300	1.10	110	1.30	130								
				60	0.21		1600	0.90	90	1.40	140								

- ❖ All the model of SG series received UL, TÜV, CCC certificate.
- ❖ output 6W product is Impedance Protected, 15~90W product is Thermally Protected type.
- ❖ Depend on the voltage, the capacitors are divided into two model. Please inquire separately when operational voltage is AC 100V or 200V.

## ■ GEARED MOTOR – 50Hz

Model	Ratio	r/min																										
		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360		
SG7KA□	kgf·cm	5.20	6.21	7.80	9.32	10.4	12.9	15.5	18.6	20.7	25.9	29.7	35.6	39.6	49.5	59.3	74.2	89.0	98.9	100	100	100	100	100	100	100		
SG7DA□	N·m	0.52	0.62	0.78	0.93	1.04	1.29	1.55	1.86	2.07	2.59	2.97	3.56	3.96	4.95	5.93	7.42	8.90	9.89	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
SG7SA□																												

## ■ GEARED MOTOR – 60Hz

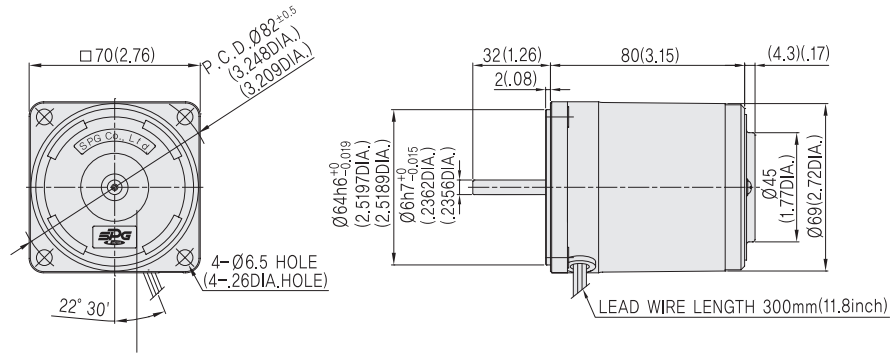
Model	Ratio	r/min																										
		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360		
SG7KA□	kgf·cm	4.20	5.02	6.30	7.53	8.40	10.5	12.6	15.1	16.7	20.9	24.0	28.8	32.0	40.0	48.0	60.0	72.0	80.0	96.0	100	100	100	100	100	100		
SG7DA□	N·m	0.42	0.50	0.63	0.75	0.84	1.05	1.26	1.51	1.67	2.09	2.40	2.88	3.20	4.00	4.80	6.00	7.20	8.00	9.60	10.0	10.0	10.0	10.0	10.0	10.0		
SG7SA□																												

- ❖ Among GEAR HEAD model names, □ is reduction gear ratio.
- ❖ Value of the chart is allowable torque of reduction gear of GEARED MOTOR.
- ❖ Regarding direction of rotation, in case of ■, its reduction gear ratio has same direction with MOTOR's and in case of □, its reduction gear ratio has the opposite direction of MOTOR's.
- ❖ rotation speed is calculated with synchronous rotation number of MOTOR(50Hz : 1500 r/min, 60Hz : 1800 r/min). Actual rotation speed can be less than (2~20%) depend on the size of the load 2~20%.



## MOTOR

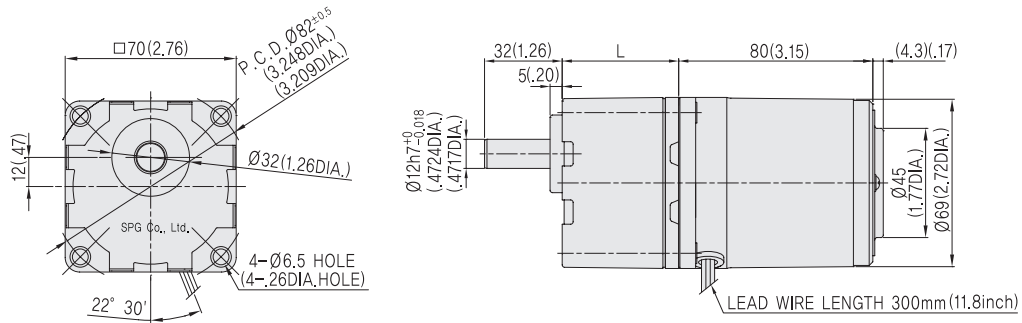
Unit : mm(inch)



MOTOR OUTPUT SHAFT	GEAR TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG7R15G□	SG7R15D□	SG7R15S□

## GEARED MOTOR

Unit : mm(inch)



GEAR HEAD OUTPUT SHAFT	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG7KA□	SG7DA□	SG7SA□

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG7□A□	5~120	43	0.42
		150~360	48	0.52
MOTOR	SG7R15□□			1.08



# 25W

REVERSIBLE MOTOR

80mm LEAD WIRE TYPE



## ■ MOTOR

Model	Poles	Voltage		Freq. (Hz)	Duty	Rated Load				Starting Torque		Capacitor ( $\mu$ F)	Degree of Protection	Insulation Classification	Protected Type
		Phase	(V)			Current (A)	Speed (r/min)	Torque		(kgf·cm)	(mN·m)				
								(kgf·cm)	(mN·m)						
SG8R25GA SG8R25KA SG8R25DA SG8R25SA	4	1	100	50	S2(30min)	0.57	1250	1.90	0.19	2.20	0.22	10.0 (250V)	IP23	B(130)	T.P.
				60		0.64	1550	1.50	0.15	2.30	0.23				
		1	110	60		0.51	1600	1.50	0.15	2.10	0.21	8.0 (250V)			
				60		0.51	1600	1.50	0.15	2.40	0.24				
SG8R25GB SG8R25KB SG8R25DB SG8R25SB	4	1	200	50	S2(30min)	0.28	1200	2.00	0.20	1.90	0.19	2.5 (450V)	IP23	B(130)	T.P.
				60		0.34	1450	1.60	0.16	1.90	0.19				
		1	220	50		0.26	1250	1.90	0.19	2.20	0.22	2.0 (450V)			
				60		0.28	1500	1.60	0.16	2.10	0.21				
		1	230	50		0.26	1300	1.90	0.19	2.30	0.23				
				60		0.28	1550	1.50	0.15	2.60	0.26				

- ❖ All the model of SG series received UL, TÜV, CCC certificate.
- ❖ output 6W product is Impedance Protected, 15~90W product is Thermally Protected type.
- ❖ Depend on the voltage, the capacitors are divided into two model. Please inquire separately when operational voltage is AC 100V or 200V.

## ■ GEARED MOTOR – 50Hz

Model	Ratio	r/min																											
		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360			
SG8KA <input type="checkbox"/>	kgf·cm	8.90	10.7	13.4	16.0	17.8	22.3	26.7	32.1	35.6	44.6	51.1	61.3	68.1	85.1	102	128	153	160	160	160	160	160	160	160	160			
SG8DA <input type="checkbox"/>	N·m	0.89	1.07	1.34	1.60	1.78	2.23	2.67	3.21	3.56	4.46	5.11	6.13	6.81	8.51	10.2	12.8	15.3	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0			
SG8SA <input type="checkbox"/>																													

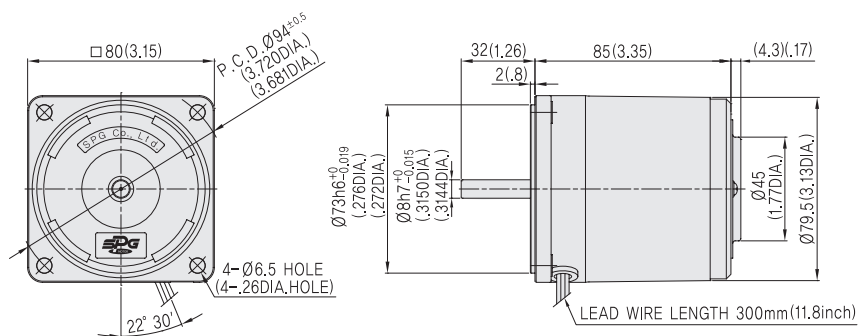
## ■ GEARED MOTOR – 60Hz

Model	Ratio	r/min																											
		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360			
SG8KA <input type="checkbox"/>	kgf·cm	7.30	8.80	10.9	13.1	14.6	18.2	21.9	26.2	29.2	36.5	41.8	50.2	55.7	69.7	83.6	105	125	139	160	160	160	160	160	160	160			
SG8DA <input type="checkbox"/>	N·m	0.73	0.88	1.09	1.31	1.46	1.82	2.19	2.62	2.92	3.65	4.18	5.02	5.57	6.97	8.36	10.5	12.5	13.9	16.0	16.0	16.0	16.0	16.0	16.0	16.0			
SG8SA <input type="checkbox"/>																													

- ❖ Among GEAR HEAD model names,  is reduction gear ratio.
- ❖ Value of the chart is allowable torque of reduction gear of GEARED MOTOR.
- ❖ Regarding direction of rotation, in case of , its reduction gear ratio has same direction with MOTOR's and in case of , its reduction gear ratio has the opposite direction of MOTOR's.
- ❖ rotation speed is calculated with synchronous rotation number of MOTOR(50Hz : 1500 r/min, 60Hz : 1800 r/min). Actual rotation speed can be less than (2~20%) depend on the size of the load 2~20%.

## MOTOR

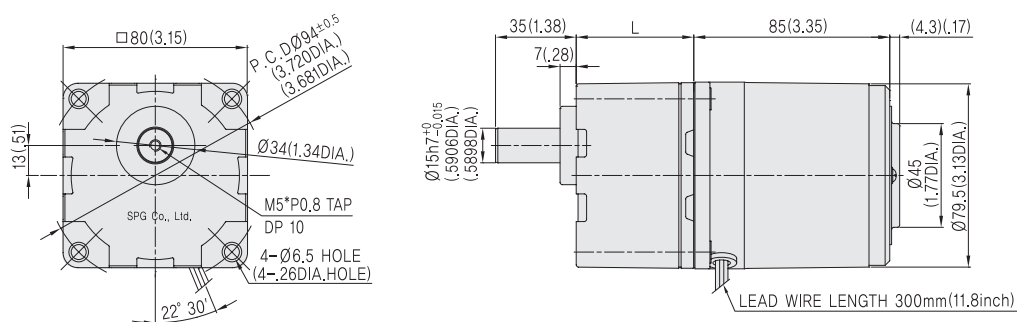
Unit : mm(inch)



MOTOR OUTPUT SHAFT	GEAR TYPE	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG8R25G□	SG8R25K□	SG8R25D□	SG8R25S□

## GEARED MOTOR

Unit : mm(inch)



GEAR HEAD OUTPUT SHAFT	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG8KA□	SG8DA□	SG8SA□

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG8□A□	5~25	41	0.61
		30~120	46	0.72
		150~360	51	0.80
MOTOR	SG8R25□□			1.49



# 40W

REVERSIBLE MOTOR

90mm LEAD WIRE TYPE



## ■ MOTOR

Model	Poles	Voltage		Freq. (Hz)	Duty	Rated Load				Starting Torque		Capacitor (μF)	Degree of Protection	Insulation Classification	Protected Type
		Phase	(V)			Current (A)	Speed (r/min)	Torque		(kgf·cm)	(mN·m)				
				(kgf·cm)				(mN·m)							
SG9R40GA SG9R40KA SG9R40DA SG9R40SA	4	1	100	50	S2(30min)	0.81	1300	2.90	0.29	3.60	0.36	16.0 (250V)	IP23	B(130)	T.P.
				60		1.03	1600	2.40	0.24	3.70	0.37				
		1	110	60		0.78	1600	2.40	0.24	3.50	0.35	12.0 (250V)			
				60		0.78	1600	2.40	0.24	3.60	0.36				
SG9R40GB SG9R40KB SG9R40DB SG9R40SB	4	1	200	50	S2(30min)	0.40	1300	2.90	0.29	3.70	0.37	4.0 (450V)	IP23	B(130)	T.P.
				60		0.50	1500	2.40	0.24	3.90	0.39				
		1	220	50		0.38	1300	2.90	0.29	4.00	0.40	3.5 (450V)			
				60		0.43	1600	2.40	0.24	4.00	0.40				
		1	230	50		0.38	1300	2.80	0.28	4.20	0.42				
				60		0.43	1600	2.40	0.24	4.30	0.43				

- ❖ All the model of SG series received UL, TÜV, CCC certificate.
- ❖ output 6W product is Impedance Protected, 15~90W product is Thermally Protected type.
- ❖ Depend on the voltage, the capacitors are divided into two model. Please inquire separately when operational voltage is AC 100V or 200V.

## ■ GEARED MOTOR – 50Hz

Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300
	r/min	300	250	200	167	150	120	100	83.3	75.0	60.0	50.0	41.6	37.5	30.0	25.0	20.0	16.6	15.0	12.5	10.0	8.3	7.5	6.0	5.0
SG9KB <input type="checkbox"/>	kgf·cm	13.4	16.1	20.1	24.1	26.8	33.5	40.2	48.3	51.3	64.1	76.9	92.3	103	128	154	192	231	256	290	300	300	300	300	300
SG9DB <input type="checkbox"/>	N·m	1.34	1.61	2.01	2.41	2.68	3.35	4.02	4.83	5.13	6.41	7.69	9.23	10.3	12.8	15.4	19.2	23.1	25.6	29.0	30.0	30.0	30.0	30.0	30.0
SG9SB <input type="checkbox"/>																									

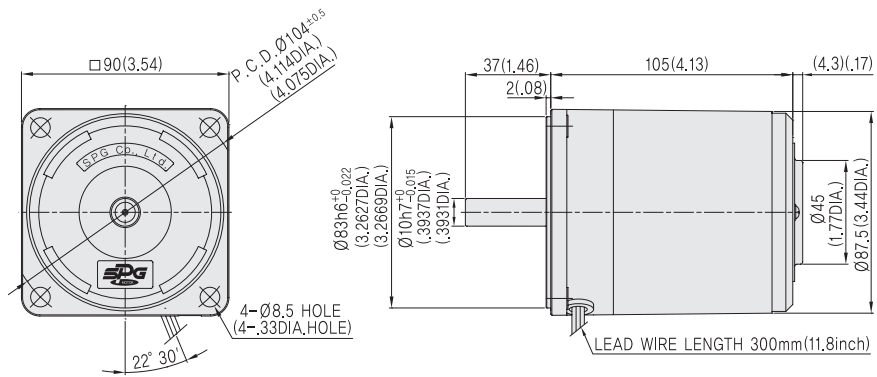
## ■ GEARED MOTOR – 60Hz

Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0
SG9KB <input type="checkbox"/>	kgf·cm	10.9	13.1	16.3	19.6	21.8	27.2	32.7	39.2	41.6	52.0	62.4	74.9	83.2	104	125	156	187	208	235	294	300	300	300	300
SG9DB <input type="checkbox"/>	N·m	1.09	1.31	1.63	1.96	2.18	2.72	3.27	3.92	4.16	5.20	6.24	7.49	8.32	10.4	12.5	15.6	18.7	20.8	23.5	29.4	30.0	30.0	30.0	30.0
SG9SB <input type="checkbox"/>																									

- ❖ Among GEAR HEAD model names,  is reduction gear ratio.
- ❖ Value of the chart is allowable torque of reduction gear of GEARED MOTOR.
- ❖ Regarding direction of rotation, in case of , its reduction gear ratio has same direction with MOTOR's and in case of , its reduction gear ratio has the opposite direction of MOTOR's.
- ❖ rotation speed is calculated with synchronous rotation number of MOTOR(50Hz : 1500 r/min, 60Hz : 1800 r/min). Actual rotation speed can be less than (2~20%) depend on the size of the load 2~20%.

### MOTOR

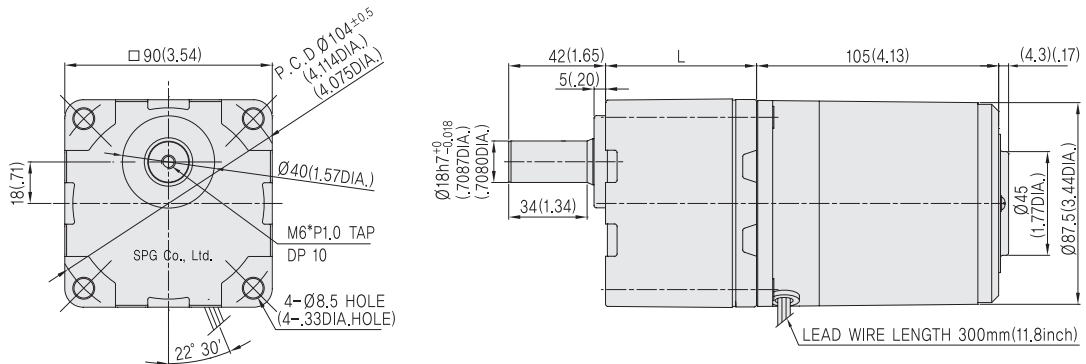
Unit : mm(inch)



MOTOR OUTPUT SHAFT	GEAR TYPE	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG9R40G□	SG9R40K□	SG9R40D□	SG9R40S□

### GEARED MOTOR

Unit : mm(inch)



GEAR HEAD OUTPUT SHAFT	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG9KB□	SG9DB□	SG9SB□

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG9□B□	5~20	45	0.85
		25~100	58	1.15
		120~300	64	1.30
MOTOR	SG9R40□□			2.34



# 60W

REVERSIBLE MOTOR

90mm LEAD WIRE TYPE



## ■ MOTOR

Model	Poles	Voltage		Freq. (Hz)	Duty	Rated Load				Starting Torque		Capacitor ( $\mu$ F)	Degree of Protection	Insulation Classification	Protected Type
		Phase	(V)			Current (A)	Speed (r/min)	Torque (kgf·cm) (mN·m)		(kgf·cm)	(mN·m)				
SG9R60GA SG9R60KA SG9R60DA SG9R60SA	4	1	100	50	S2(30min)	1.24	1300	4.40	0.44	5.10	0.51	25.0 (250V)	IP23	B(130)	T.P.
				60		1.53	1600	3.60	0.36	5.30	0.53				
		1	110	60		1.18	1600	3.60	0.36	5.00	0.50	20.0 (250V)			
				60		1.18	1600	3.50	0.35	5.60	0.56				
SG9R60GB SG9R60KB SG9R60DB SG9R60SB	4	1	200	50	S2(30min)	0.53	1300	4.30	0.43	5.60	0.56	6.0 (450V)	IP23	B(130)	T.P.
				60		0.61	1600	3.50	0.35	6.20	0.62				
		1	220	50		0.56	1350	4.20	0.42	5.60	0.56	5.0 (450V)			
				60		0.5	1650	3.50	0.35	5.80	0.58				
		1	230	50		0.59	1350	4.20	0.42	6.10	0.61				
				60		0.49	1650	3.50	0.35	6.60	0.66				

- ❖ All the model of SG series received UL, TÜV, CCC certificate.
- ❖ output 6W product is Impedance Protected, 15~90W product is Thermally Protected type.
- ❖ Depend on the voltage, the capacitors are divided into two model. Please inquire separately when operational voltage is AC 100V or 200V.

## ■ GEARED MOTOR – 50Hz

Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	
		r/min	300	250	200	167	150	120	100	83.3	75.0	60.0	50.0	41.6	37.5	30.0	25.0	20.0	16.6	15.0	12.5	10.0	8.3	7.5	6.0	5.0
SG9KB <input type="checkbox"/>	kgf·cm	19.7	23.7	29.6	35.5	39.4	49.3	59.1	71.0	75.3	94.2	113	136	151	188	226	283	300	300	300	300	300	300	300	300	
SG9DB <input type="checkbox"/>	N·m	1.97	2.37	2.96	3.55	3.94	4.93	5.91	7.10	7.53	9.42	1.13	13.6	15.1	18.8	22.6	28.3	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
SG9SB <input type="checkbox"/>																										

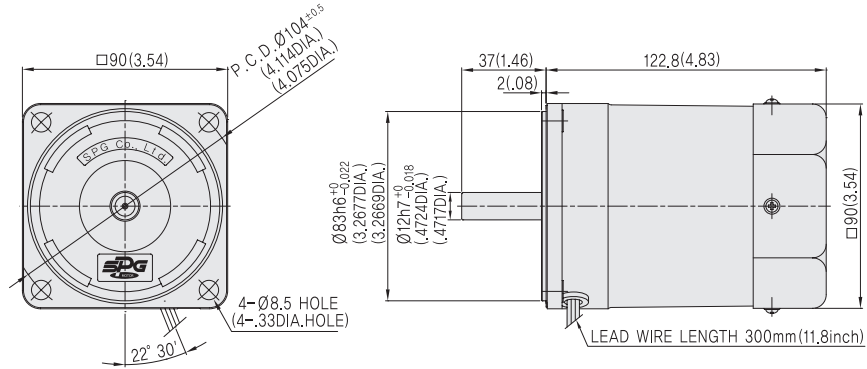
## ■ GEARED MOTOR – 60Hz

Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300
		r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2
SG9KB <input type="checkbox"/>	kgf·cm	16.5	19.8	24.8	29.7	33.0	41.3	49.6	59.5	63.1	78.9	94.7	114	126	158	189	237	284	300	300	300	300	300	300	300
SG9DB <input type="checkbox"/>	N·m	1.65	1.98	2.48	2.97	3.30	4.13	4.96	5.95	6.31	7.89	9.47	11.4	12.6	15.8	18.9	23.7	28.4	30.0	30.0	30.0	30.0	30.0	30.0	30.0
SG9SB <input type="checkbox"/>																									

- ❖ Among GEAR HEAD model names,  is reduction gear ratio.
- ❖ Value of the chart is allowable torque of reduction gear of GEARED MOTOR.
- ❖ Regarding direction of rotation, in case of , its reduction gear ratio has same direction with MOTOR's and in case of , its reduction gear ratio has the opposite direction of MOTOR's.
- ❖ rotation speed is calculated with synchronous rotation number of MOTOR(50Hz : 1500 r/min, 60Hz : 1800 r/min). Actual rotation speed can be less than (2~20%) depend on the size of the load 2~20%.

## MOTOR

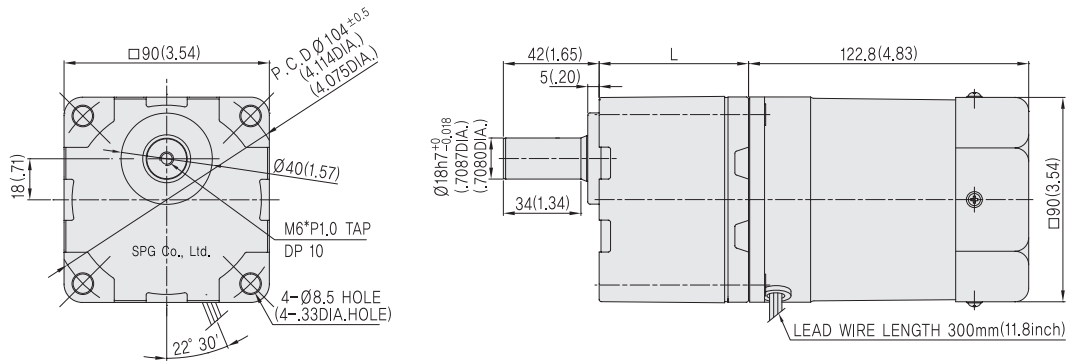
Unit : mm(inch)



MOTOR OUTPUT SHAFT	GEAR TYPE	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG9R60□	SG9R60□	SG9R60□	SG9R60S□

## GEARED MOTOR

Unit : mm(inch)



GEAR HEAD OUTPUT SHAFT	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG9KB□	SG9DB□	SG9SB□

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG9□B□	5~20	45	0.85
		25~100	58	1.15
		120~300	64	1.30
MOTOR	SG9R60□□			2.48



# 90W

REVERSIBLE MOTOR

90mm LEAD WIRE TYPE



## ■ MOTOR

Model	Poles	Voltage		Freq. (Hz)	Duty	Rated Load				Starting Torque		Capacitor (μF)	Degree of Protection	Insulation Classification	Protected Type
		Phase	(V)			Current (A)	Speed (r/min)	Torque		(kgf·cm)	(mN·m)				
				(kgf·cm)				(mN·m)							
SG9R90GA SG9R90KA SG9R90DA SG9R90SA	4	1	100	50	S2(30min)	1.78	1250	6.70	0.67	7.50	0.75	35.0 (250V)	IP23	B(130)	T.P.
				60		2.21	1550	5.60	0.56	7.70	0.77				
		1	110	60		1.88	1600	6.60	0.66	8.30	0.83	30.0 (250V)			
				60		1.86	1600	5.40	0.54	9.00	0.90				
SG9R90GB SG9R90KB SG9R90DB SG9R90SB	4	1	200	50	S2(30min)	0.88	1250	6.90	0.69	8.10	0.81	8.0 (450V)	IP23	B(130)	T.P.
				60		1.15	1500	5.70	0.57	8.20	0.82				
		1	220	50		0.77	1250	6.70	0.67	8.10	0.81	7.0 (450V)			
				60		0.97	1550	5.50	0.55	8.30	0.83				
		1	230	50		0.77	1300	6.60	0.66	9.30	0.93				
				60		0.97	1550	5.40	0.54	8.90	0.89				

- ❖ All the model of SG series received UL, TÜV, CCC certificate.
- ❖ output 6W product is Impedance Protected, 15~90W product is Thermally Protected type.
- ❖ Depend on the voltage, the capacitors are divided into two model. Please inquire separately when operational voltage is AC 100V or 200V.

## ■ GEARED MOTOR – 50Hz

Model	Ratio	r/min																					
		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200
SG9KC <input type="checkbox"/>	kgf·cm	31.1	37.3	46.6	56.0	62.2	77.7	93.3	107	119	149	178	214	238	297	357	400	400	400	400	400	400	400
SG9DC <input type="checkbox"/>	N·m	3.11	3.73	4.66	5.60	6.22	7.77	9.33	10.7	11.9	14.9	17.8	21.4	23.8	29.7	35.7	40.0	40.0	40.0	40.0	40.0	40.0	40.0
SG9SC <input type="checkbox"/>																							

## ■ GEARED MOTOR – 60Hz

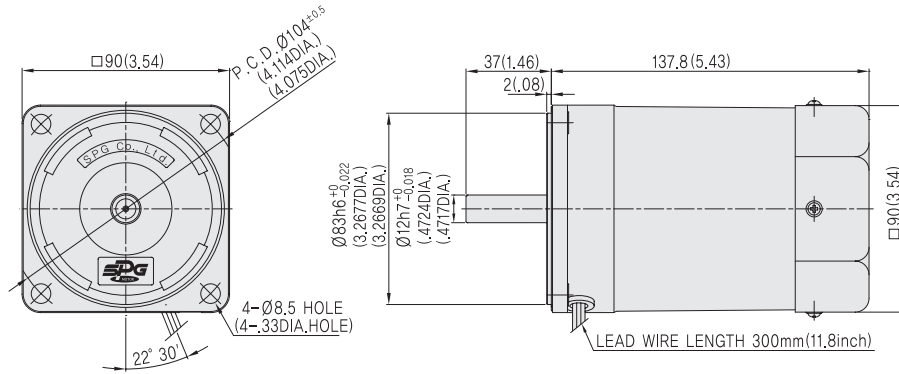
Model	Ratio	r/min																					
		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200
SG9KC <input type="checkbox"/>	kgf·cm	25.7	30.8	38.5	46.2	51.3	64.1	77.0	88.2	98.0	123	147	177	196	245	294	346	400	400	400	400	400	400
SG9DC <input type="checkbox"/>	N·m	2.57	3.08	3.85	4.62	5.13	6.41	7.70	8.82	9.80	12.3	14.7	17.7	19.6	24.5	29.4	34.6	40.0	40.0	40.0	40.0	40.0	40.0
SG9SC <input type="checkbox"/>																							

- ❖ Among GEAR HEAD model names,  is reduction gear ratio.
- ❖ Value of the chart is allowable torque of reduction gear of GEARED MOTOR.
- ❖ Regarding direction of rotation, in case of , its reduction gear ratio has same direction with MOTOR's and in case of , its reduction gear ratio has the opposite direction of MOTOR's.
- ❖ rotation speed is calculated with synchronous rotation number of MOTOR(50Hz : 1500 r/min, 60Hz : 1800 r/min). Actual rotation speed can be less than (2~20%) depend on the size of the load 2~20%.



## MOTOR

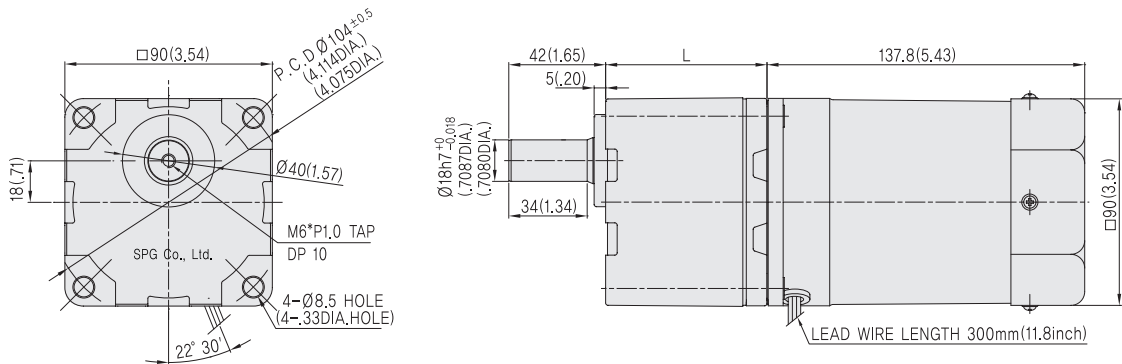
Unit : mm(inch)



MOTOR OUTPUT SHAFT	GEAR TYPE	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG9R90G□	SG9R90K□	SG9R90D□	SG9R90S□

## GEARED MOTOR

Unit : mm(inch)



GEAR HEAD OUTPUT SHAFT	KEY TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG9KC□	SG9DC□	SG9SC□

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG9□C□	5~15	45	0.85
		18~40	58	1.15
		50~200	70	1.42
MOTOR	SG9R90□□			2.97