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ELECTROMAGNETIC BRAKE MOTOR

INDEX

Characteristics of ELECTROMAGNETIC BRAKE MOTOR

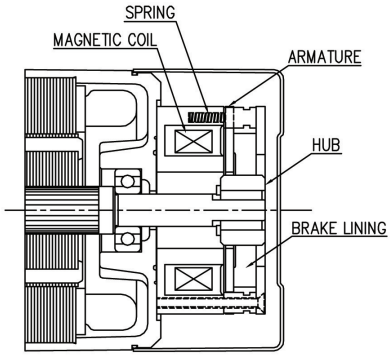
Overview of Electromagnetic Brake Motor

- The electromagnetic brake of AC non-excitation run type is mounted at the back of the motor to enable the motor to stop instantly when the power is turned off, and the load maintained.
- The induction motor cannot stop instantaneously even when the power is turned off while being used as a source of dynamic force.
  Instead, it runs further by 30-40 rotations. The reversible motor also makes 5-6 additional rotations(provided no-load). Therefore, brake pack shall be used to make an instantaneous stop. Although an electric brake brake pack can make an instantaneous stop, it cannot hold torque.(The over run is less than one rotation on no-load)
- Therefore, the electromagnetic brake motor is employed if the load should be maintained.
- The electromagnetic brake of AC non-excitation run type is mounted at the back of the motor for operation.
- The electromagnetic motor makes 1-4 times of over run rotation at the time the power is turned off if the electromagnetic brake motor unit is loaded.
- The frequent instantaneous directional changes are possible from normal to reverse, and vice versa.
  With a simple control, it is possible to make 6 stops per minute. (However, more than 3 seconds of stoppage is required.)
- The motor and the brake can use the same power source. The rectifying circuit is embedded in the brake and so the brake can use the same AC source as the motor uses.

2. Electromagnetic Brake of Non-excitation Run Type

(1) Structure and Operation Principle

- 〈Fig.1〉 shows a structural diagram of the electromagnetic brake motor. SPG's electromagnetic brake motor is a non-excitation run type. When the voltage is applied to the coil, the armature that is suppressed by the spring is pulled to thrust the spring to make a gap between the armature and the brake to release the braking force and then, the motor shaft can start turning freely.
  Also, when the voltage to the coil turns off (opens), the brake lining is put under the pressure created by the armature in conjunction with the elasticity of the spring, exerting the braking force to stop the motor shaft.



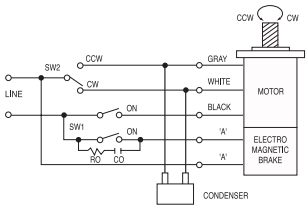
〈Fig.2〉 STRUCTURAL DIAGRAM OF THE ELECTROMAGNETIC BRAKE

(2) Characteristic of Electromagnetic Brake

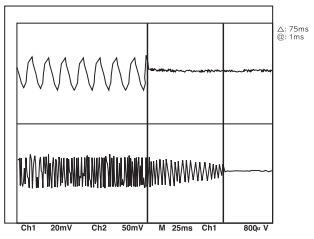
- The electromagnetic brake of AC non-excitation run type can be connected directly to the motor. When the power source is turned off, the motor stops instantaneously and the load is maintained. The retention force is 0.5 kgf · cm~ 10kgf · cm. This type of brake is best suited if a safer brake is required when the power is turned off, because the retention force is maintained when the power turns off.

(3) Braking Time Difference by Connection Method

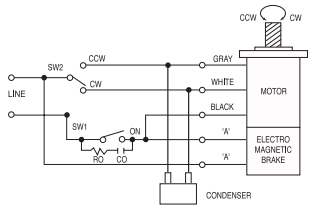
- The connection can be made as shown in 〈Fig. 2〉. However, the method shown in 〈Fig. 3〉 is also possible if a simpler connection method is sought for. In case of 〈Fig. 3〉, the braking time takes longer roughly by 50msec than that of 〈Fig. 2〉, resulting in the increased overrun.
  This is because the braking action lags about 50msec by the magnet even after the brake's excitation is vanished, because the magnetic energy of the motor can act on the excitation winding of the electronic brake's magnet when the braking takes place.



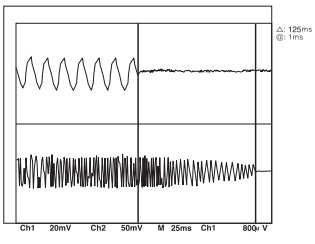
〈Fig.2〉 NORMAL CONNECTION



(Model S8R25GA-E is used for measurement.)



〈Fig.3〉 SIMPLIFIED CONNECTION



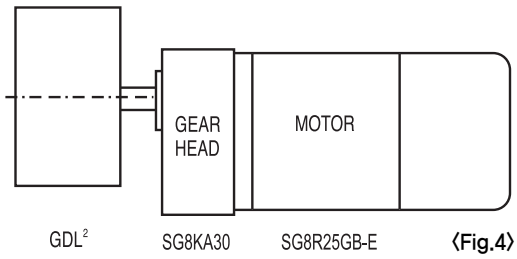
(Model S8R25GA-E is used for measurement.

※ Note) The colors of the electromagnetic brake lead wire shown in 〈Fig. 2〉, 〈Fig. 3〉 : single-phase AC110V is blue, single-phase AC220V is orange and three-phase 380~440V is yellow.

SIZE (㎜)	Output (W)	Voltage (V)	Frequency (Hz)	Ampere (A)	Input (W)	BRAKE TORQUE (kg · cm)	BRAKE TORQUE (N · m)
□60	6	Single-phase 100(V) Single-phase 200(V) Three-phase 200(V)	50/60	0.06	3.0	0.5	0.05
□70	15			0.07	3.0	1.0	0.1
□80	15			0.10	4.5	2.0	0.2
	25			0.10	4.5	2.0	0.2
□90	40			0.15	7.0	3.0	0.3
	60			0.15	7.0	5.0	0.5
	90			0.15	7.0	5.0	0.5
□80	25	Three-phase 400(V)	50/60	0.03	6.3	4.0	0.4
	40			0.04	8.5	5.0	0.5
□90	60			0.04	8.5	5.0	0.5
	90			0.04	8.5	10.0	1.0

〈Table1〉 BRAKE SPECIFICATION
(FAIL-SAFE ELECTRO MAGNETIC BRAKE TYPE)

3. Operating time, Braking Characteristics



〈Fig.4〉

(1) Take S8R25GB-E as an example and let it be combined with S8KA30B to drive the inertia body(GDL²=1000kgf · cm²). To calculate the operating time, braking time, and overrun under the power source frequency of 60Hz, convert the load's inertia moment to the motor shaft as follows.

$$GDM^2 = \frac{GDL^2}{i^2}\ [kgf \cdot cm^2] = \frac{1000}{30^2} = 1.1\ [kgf \cdot cm^2]$$

GDL² : Fly wheel effect of load [kgf · cm²]
GDM² : Fly wheel effect at motor shaft [kgf · cm²]
i : Ratio of gearhead

- The inertia moment expressed in SI unit can be calculated by the following expression.

$$i = \frac{GD^2}{4g}\ [kgf \cdot cm^2] \qquad g : 9.80665\ [m/s^2]$$

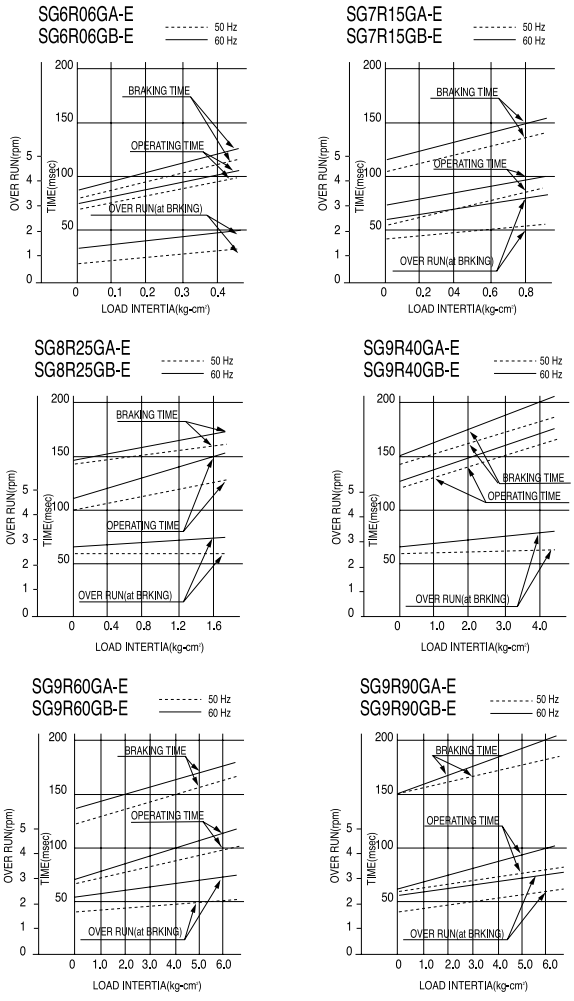
(2) OVER RUN

- As shown in 〈Fig. 5〉, the overrun of the motor shaft is NM ≒ 2.5 revolutions. Hence, the gearhead's output shaft has the overrun as follows.

$$N_G = \frac{N_M}{i^2} = \frac{2.5}{30} = 0.08\ \text{revolutions}(28.8^\circ)$$

(3) Operating Time and Braking Time

- As shown in 〈Fig.5〉, the operating time t1 ≒ 130 [msec], and the braking time t2 ≒ 170 [msec].
- The operating time of the brake motor is a sum of the motor's operating time and the electronic brake's open time. Thus, if the electronic brake is left open in advance, the motor can be started quickly.
- It is advised that the brake should be open at least 10msec before the motor starts operating.



〈Fig.5〉 Operating Time and Breaking Time

GENERAL SPECIFICATION OF ELECTROMAGNETIC BRAKE 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℃ or less increase measured by thermometer after rated operation.
Insulation Class	Class B(130℃)
Overheat Protection Device	Built-in thermal protector (automatic return type) : Open 120℃±5℃ Close 76℃±15℃
Ambient Temperature	-10℃ ~ 40℃
Ambient Humidity	85% maximum(non condensing)

6W ELECTROMAGNETIC BRAKE MOTOR

□60㎜ LEAD WIRE TYPE

■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type
						Current	Speed	Torque							
		Phase	(V)	(Hz)		(A)	(r/min)	(kgf · cm)	(mN · m)	(kgf · cm)	(mN · m)	(μF)			
SG6R06GA-E SG6R06DA-E SG6R06SA-E	4	1	100	50	S2(30min)	0.28	1300	0.44	44	0.80	80	4.5 (250V)	IP23	B(130)	Z.P.
				60		0.33	1550	0.37	37	0.74	74				
		1	110	60		0.28	1600	0.36	36	0.74	74	3.5 (250V)			
		1	115	60		0.28	1600	0.36	36	0.80	80				
SG6R06GB-E SG6R06DB-E SG6R06SB-E	4	1	200	50	S2(30min)	0.14	1300	0.44	44	0.70	70	1.0 (450V)	IP23	B(130)	Z.P.
				60		0.14	1600	0.36	36	0.70	70				
		1	220	50		0.14	1300	0.44	44	0.65	65	0.8 (450V)			
				60		0.13	1600	0.36	36	0.65	65				
		1	230	50		0.14	1300	0.44	44	0.70	70				
				60		0.13	1600	0.35	35	0.70	70				

❖ 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	4.1
SG6KA□ SG6DA□ SG6SA□	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
	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

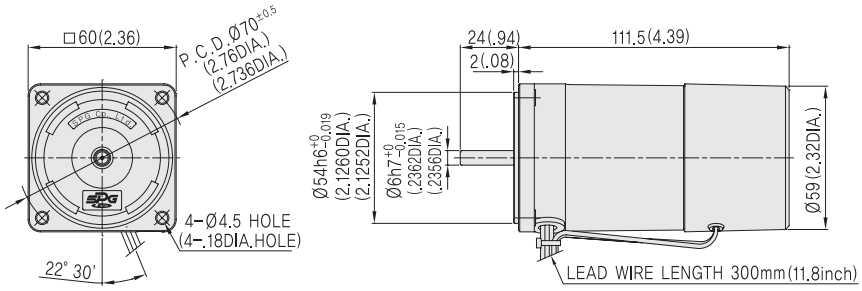
■ GEARED MOTOR – 60Hz

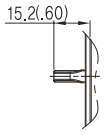
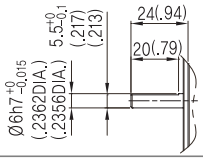
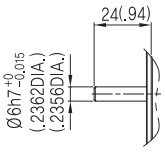
Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0	5.0
SG6KA□ SG6DA□ SG6SA□	kgf·cm	1.71	2.10	2.60	3.10	3.42	4.30	5.13	6.20	6.84	8.60	9.80	11.8	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
	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

❖ 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

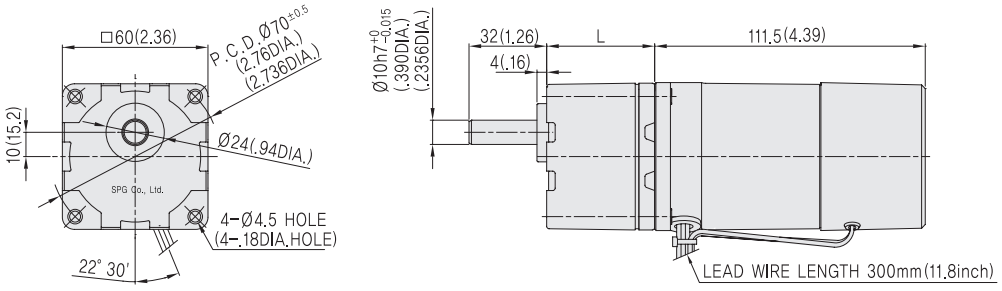
Unit : mm(inch)

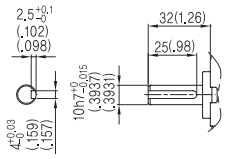
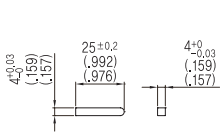
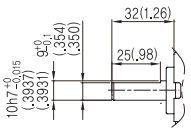
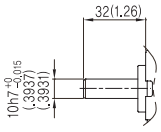


MOTOR OUTPUT SHAFT	GEAR TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG6R06G□-E	SG6R06D□-E	SG6R06S□-E
			

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□□-E			0.95

15W ELECTROMAGNETIC BRAKE MOTOR

□70㎜ LEAD WIRE TYPE

■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type
						Current	Speed	Torque							
		Phase	(V)	(Hz)		(A)	(r/min)	(kgf · cm)	(mN · m)	(kgf · cm)	(mN · m)	(μF)			
SG7R15GA-E	4	1	100	50	S2(30min)	0.41	1300	1.10	110	1.30	130	7.5 (250V)	IP23	B(130)	T.P.
SG7R15DA-E				60		0.47	1600	0.90	90	1.30	130				
SG7R15SA-E		1	110	60		0.4	1600	0.90	90	1.20	120	6.0 (250V)			
		1	115	60		0.4	1600	0.90	90	1.20	120				
SG7R15GB-E	4	1	200	50	S2(30min)	0.21	1300	1.10	110	1.20	120	1.8 (450V)	IP23	B(130)	T.P.
SG7R15DB-E				60		0.25	1550	0.90	90	1.10	110				
SG7R15SB-E		1	220	50		0.12	1300	1.10	110	1.20	120	1.5 (450V)			
				60		0.22	1600	0.90	90	1.20	120				
		1	230	50		0.21	1300	1.10	110	1.30	130				
				60		0.22	1600	0.90	90	1.30	130				

❖ 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	4.1
SG7KA□ SG7DA□ SG7SA□	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
	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

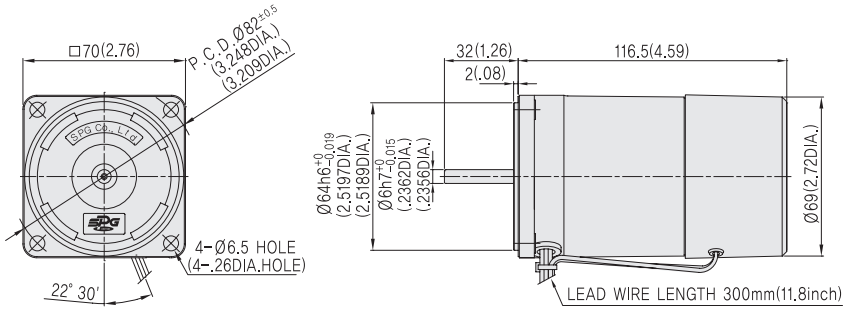
■ GEARED MOTOR – 60Hz

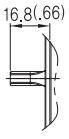
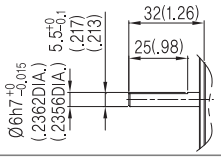
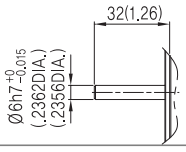
Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0	5.0
SG7KA□ SG7DA□ SG7SA□	kgf·cm	4.20	5.02	6.30	7.53	8.40	10.5	12.6	15.1	16.7	20.9	24.0	28.8	32.0	40.0	48.0	60.0	72.0	80.0	96.0	100	100	100	100	100	100
	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

❖ 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

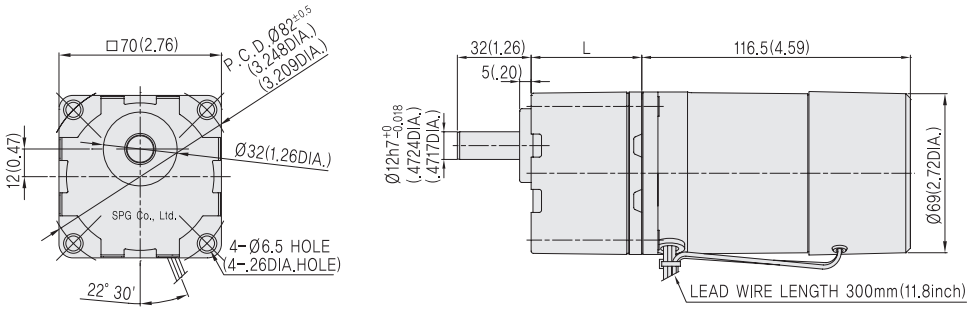
Unit : mm(inch)

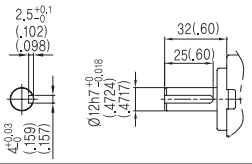
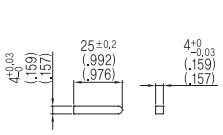
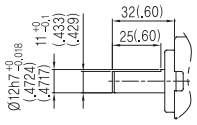
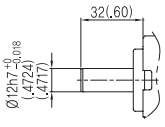


	GEAR TYPE	D-CUT TYPE	STRAIGHT TYPE
	SG7R15G□-E	SG7R15D□-E	SG7R15S□-E
MOTOR OUTPUT SHAFT			

GEARED MOTOR

Unit : mm(inch)



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

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG7□A□	5~25	43	0.42
		150~360	48	0.52
MOTOR	SG7R15□□-E			1.30

25W ELECTROMAGNETIC BRAKE MOTOR

□80㎜ LEAD WIRE TYPE

■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type
						Current	Speed	Torque							
		Phase	(V)	(Hz)		(A)	(r/min)	(kgf · cm)	(mN · m)	(kgf · cm)	(mN · m)	(μF)			
SG8R25GA-E	4	1	100	50	S2(30min)	0.58	1300	1.80	0.18	2.10	0.21	10.0 (250V)	IP23	B(130)	T.P.
SG8R25KA-E				60		0.65	1600	1.50	0.15	2.20	0.22				
SG8R25DA-E		1	110	60		0.55	1600	1.50	0.15	2.10	0.21	8.0 (250V)			
SG8R25SA-E		1	115	60		0.55	1600	1.50	0.15	2.30	0.23				
SG8R25GB-E	4	1	200	50	S2(30min)	0.29	1300	1.80	0.18	2.10	0.21	2.5 (450V)	IP23	B(130)	T.P.
				60		0.32	1550	1.50	0.15	2.20	0.22				
SG8R25KB-E		1	220	50		0.29	1300	1.80	0.18	2.00	0.20	2.0 (450V)			
SG8R25DB-E				60		0.28	1600	1.50	0.15	2.10	0.21				
SG8R25SB-E		1	230	50		0.3	1300	1.80	0.18	2.30	0.23				
				60		0.28	1600	1.50	0.15	2.20	0.22				
SG8I25GT-E	4	3	200	50	Cont. S1	0.26	1300	1.80	0.18	7.30	0.73	–	IP23	B(130)	T.P.
				60		0.21	1550	1.50	0.15	5.60	0.56				
SG8I25KT-E		3	220	50		0.29	1300	1.80	0.18	8.40	0.84				
SG8I25DT-E				60		0.23	1600	1.50	0.15	6.80	0.68				
SG8I25ST-E		3	230	50		0.31	1350	1.80	0.18	9.00	0.90				
				60		0.24	1600	1.50	0.15	7.30	0.73				
SG8I25GS-E	4	3	380	50	Cont. S1	0.14	1300	1.80	0.18	6.60	0.66	–	IP23	B(130)	T.P.
				60		0.13	1550	1.50	0.15	5.20	0.52				
SG8I25KS-E		3	400	50		0.15	1300	1.80	0.18	7.20	0.72				
SG8I25DS-E				60		0.13	1550	1.50	0.15	5.80	0.58				
SG8I25SS-E		3	415	70		0.15	1350	1.80	0.18	7.60	0.76				
				80		0.13	1600	1.50	0.15	6.10	0.61				
		3	440	50		0.15	1350	1.80	0.18	8.50	0.85				
				60		0.14	1600	1.50	0.15	6.90	0.69				

❖ 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	4.1
SG8KA□ SG8DA□ SG8SA□	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
	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

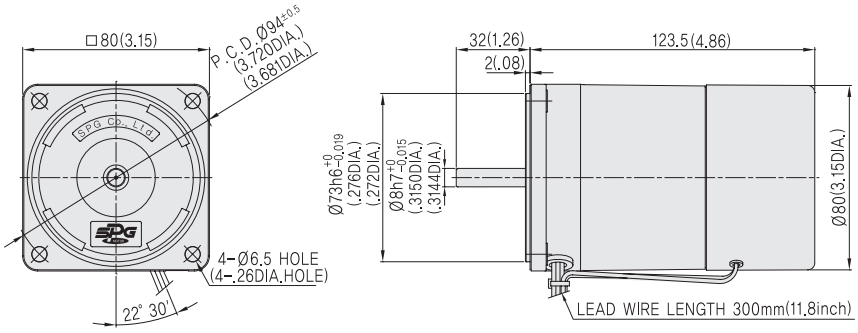
■ GEARED MOTOR – 60Hz

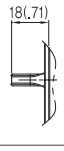
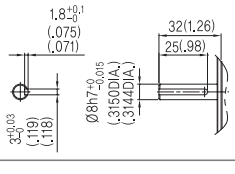
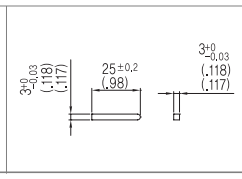
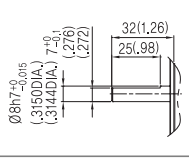
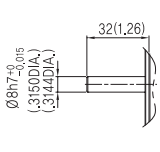
Model \ Ratio		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300	360
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0	5.0
SG8KA□ SG8DA□ SG8SA□	kgf·cm	7.30	8.80	10.9	13.1	14.6	18.2	21.9	26.2	29.2	36.5	41.8	50.2	55.7	69.7	83.6	105	125	139	160	160	160	160	160	160	160
	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

❖ 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

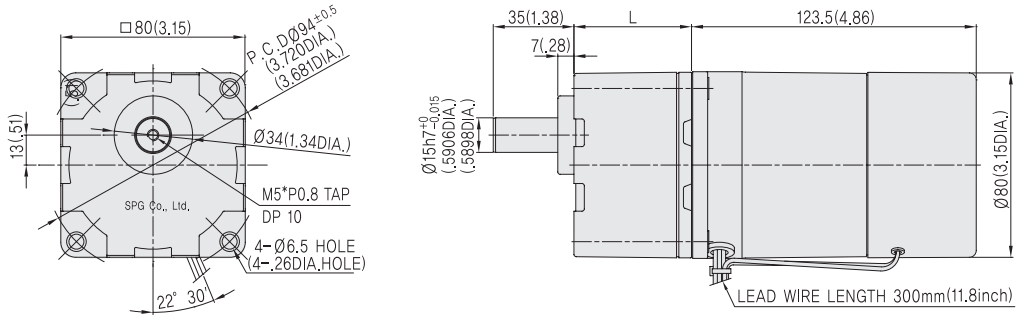
Unit : mm(inch)

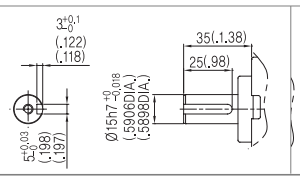
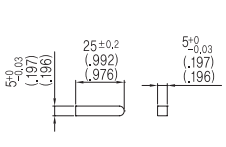
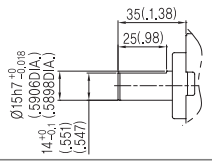
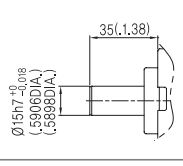


	GEAR TYPE	KEY TYPE		D-CUT TYPE	STRAIGHT TYPE
	SG8R25G□-E	SG8R25K□-E		SG8R25D□-E	SG8R25S□-E
MOTOR OUTPUT SHAFT					

GEARED MOTOR

Unit : mm(inch)



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

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□□-E			1.86

40W ELECTROMAGNETIC BRAKE MOTOR

□90㎜ LEAD WIRE TYPE

■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type
						Current	Speed	Torque							
		Phase	(V)	(Hz)		(A)	(r/min)	(kgf · cm)	(mN · m)	(kgf · cm)	(mN · m)	(μF)			
SG9R40GA-E SG9R40KA-E	4	1	100	50	S2(30min)	0.81	1350	2.80	0.28	3.70	0.37	16.0 (250V)	IP23	B(130)	T.P.
				60		1.02	1600	2.40	0.24	3.80	0.38				
SG9R40DA-E SG9R40SA-E		1	110	60		0.78	1650	2.30	0.23	3.20	0.32	12.0 (250V)			
		1	115	60		0.78	1650	2.30	0.23	3.70	0.37				
SG9R40GB-E SG9R40KB-E SG9R40DB-E SG9R40SB-E	4	1	200	50	S2(30min)	0.242	1300	2.90	0.29	3.60	0.36	4.0 (450V)	IP23	B(130)	T.P.
				60		0.51	1600	2.40	0.24	3.60	0.36				
		1	220	50		0.4	1350	2.80	0.28	3.60	0.36	3.5 (450V)			
				60		0.45	1600	2.30	0.23	3.60	0.36				
		1	230	50		0.42	1350	2.80	0.28	4.20	0.42				
				60		0.45	1650	2.30	0.23	4.00	0.40				
SG9I40GT-E SG9I40KT-E SG9I40DT-E SG9I40ST-E	4	3	200	50	Cont. S1	0.29	1300	2.90	0.29	10.0	1.00	–	IP23	B(130)	T.P.
				60		0.27	1550	2.40	0.24	7.90	0.97				
		3	220	50		0.3	1350	2.80	0.28	12.2	1.22				
				60		0.27	1600	2.40	0.24	9.20	0.92				
		3	230	50		0.31	1350	2.80	0.28	13.3	1.33				
				60		0.28	1600	2.40	0.24	10.3	1.03				
SG9I40GS-E SG9I40KS-E SG9I40DS-E SG9I40SS-E	4	3	380	50	Cont. S1	0.18	1350	2.80	0.28	12.7	1.27	–	IP23	B(130)	T.P.
				60		0.16	1600	2.30	0.23	9.60	0.96				
		3	400	50		0.19	1350	2.80	0.28	14.0	1.40				
				60		0.16	1650	2.30	0.23	10.5	1.05				
		3	415	70		0.2	1350	2.80	0.28	15.0	1.50				
				80		0.16	1650	2.30	0.23	11.6	1.16				
		3	440	50		0.21	1350	2.80	0.28	16.5	1.65				
				60		0.17	1650	2.30	0.23	12.8	1.28				

❖ 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□ SG9DB□ SG9SB□	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
	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

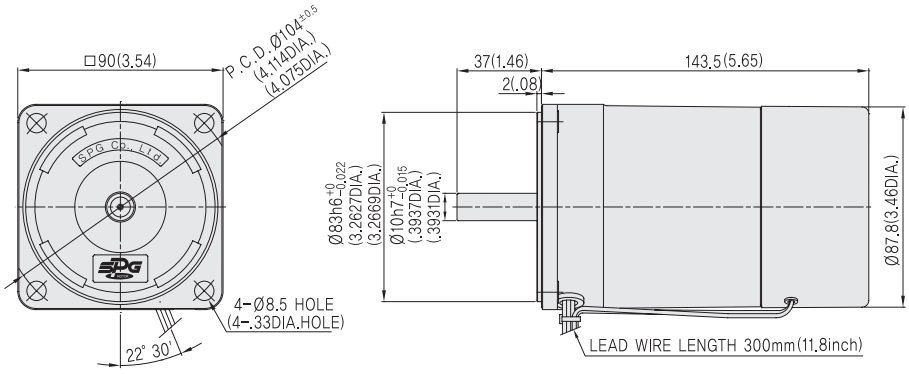
■ GEARED MOTOR – 60Hz

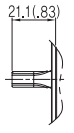
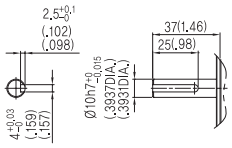
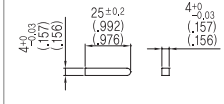
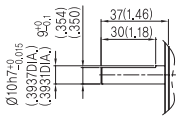
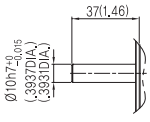
Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0
SG9KB□ SG9DB□ SG9SB□	kgf·cm	10.9	13.1	16.3	19.6	21.8	27.2	32.7	39.2	41.6	52.0	62.4	74.9	83.2	104	125	156	187	208	235	294	300	300	300	300
	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

❖ 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

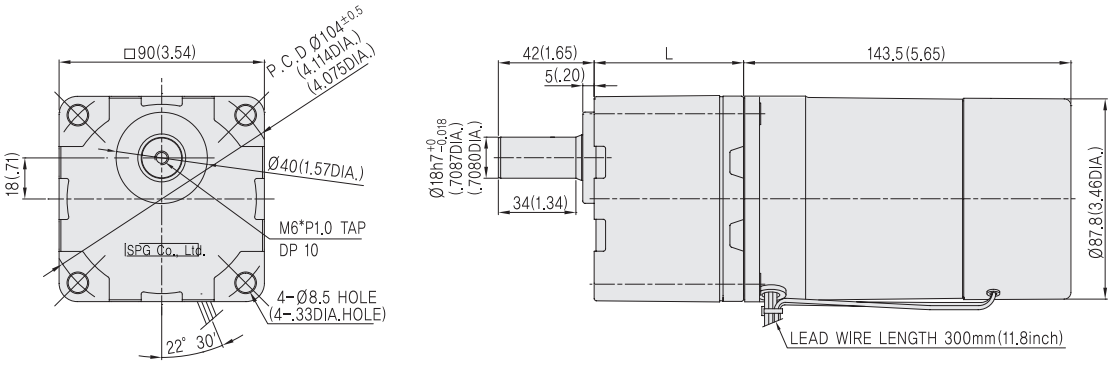
Unit : mm(inch)

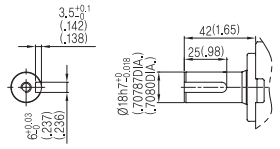
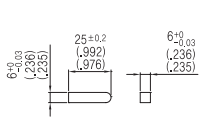
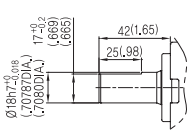
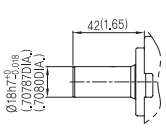


	GEAR TYPE	KEY TYPE		D-CUT TYPE	STRAIGHT TYPE
	SG9R40G□-E	SG9R40K□-E		SG9R40D□-E	SG9R40S□-E
MOTOR OUTPUT SHAFT					

GEARED MOTOR

Unit : mm(inch)



	KEY TYPE		D-CUT TYPE	STRAIGHT TYPE
	SG9KA□		SG9DA□	SG9SA□
GEAR HEAD OUTPUT SHAFT				

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG9□B□	5~25	45	0.85
		30~120	58	1.15
		150~360	64	1.30
MOTOR	SG9R40□□-E			2.74

60W ELECTROMAGNETIC BRAKE MOTOR

□90㎜ LEAD WIRE TYPE

■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type
						Current	Speed	Torque							
		Phase	(V)	(Hz)		(A)	(r/min)	(kgf · cm)	(mN · m)	(kgf · cm)	(mN · m)	(μF)			
SG9R60GA-E SG9R60KA-E	4	1	100	50	S2(30min)	1.26	1300	4.30	0.43	5.10	0.51	25.0 (250V)	IP23	B(130)	T.P.
				60		1.53	1600	3.50	0.35	5.60	0.56				
SG9R60DA-E SG9R60SA-E		1	110	60		1.21	1650	3.50	0.35	4.80	0.48	20.0 (250V)			
		1	115	60		1.23	1650	3.50	0.35	5.80	0.58				
SG9R60GB-E SG9R60KB-E SG9R60DB-E SG9R60SB-E	4	1	200	50	S2(30min)	0.61	1300	4.30	0.43	5.80	0.58	6.0 (450V)	IP23	B(130)	T.P.
				60		0.78	1600	3.60	0.36	5.90	0.59				
		1	220	50		0.6	1350	4.30	0.43	5.70	0.57	5.0 (450V)			
				60		0.62	1600	3.50	0.35	6.00	0.60				
		1	230	50		0.65	1350	4.30	0.43	6.40	0.64				
				60		0.62	1650	3.50	0.35	6.20	0.62				
SG9I60GT-E SG9I60KT-E SG9I60DT-E SG9I60ST-E	4	3	200	50	Cont. S1	0.44	1300	4.40	0.44	15.4	1.54	–	IP23	B(130)	T.P.
				60		0.39	1550	3.70	0.37	11.4	1.14				
		3	220	50		0.47	1350	4.30	0.43	18.2	1.82				
				60		0.4	1600	3.60	0.36	13.5	1.35				
		3	230	50		0.5	1350	4.20	0.42	19.5	1.95				
				60		0.4	1600	3.50	0.35	14.7	1.47				
SG9I60GS-E SG9I60KS-E SG9I60DS-E SG9I60SS-E	4	3	380	50	Cont. S1	0.25	1350	4.30	0.43	17.0	1.70	–	IP23	B(130)	T.P.
				60		0.22	1600	3.60	0.36	12.7	1.27				
		3	400	50		0.27	1350	4.20	0.42	18.4	1.84				
				60		0.22	1600	3.50	0.35	14.3	1.43				
		3	415	70		0.29	1350	4.20	0.42	19.8	1.98				
				80		0.23	1600	3.50	0.35	15.3	1.53				
		3	440	50		0.33	1350	4.20	0.42	21.5	2.15				
				60		0.24	1650	3.50	0.35	16.8	1.68				

❖ 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□ SG9DB□ SG9SB□	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
	N·m	1.97	2.37	2.96	3.55	3.94	4.93	5.91	7.10	7.53	9.42	11.3	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

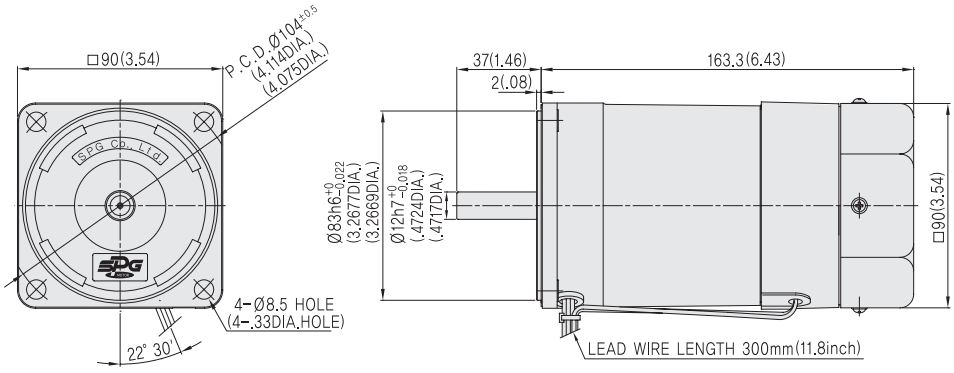
■ GEARED MOTOR – 60Hz

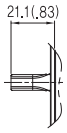
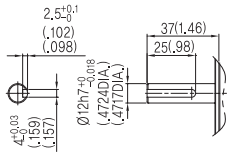
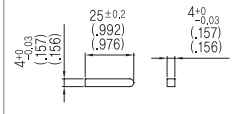
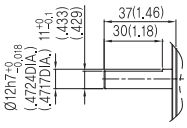
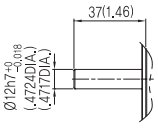
Model	Ratio	5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200	250	300
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0	7.2	6.0
SG9KB□ SG9DB□ SG9SB□	kgf·cm	16.5	19.8	24.8	29.7	33.0	41.3	49.6	59.5	63.1	78.9	94.7	114	126	158	189	237	284	300	300	300	300	300	300	300
	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

❖ 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

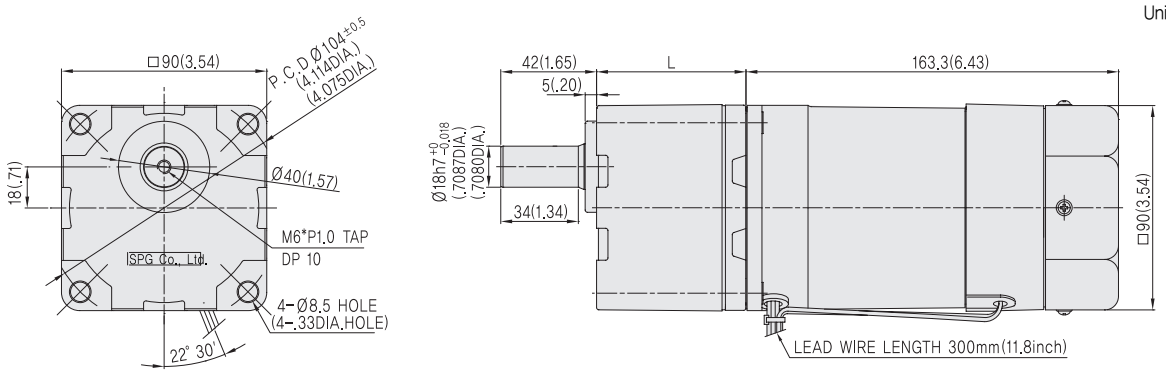
Unit : mm(inch)

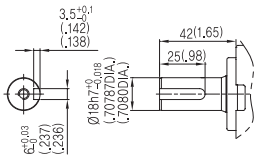
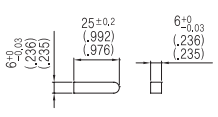
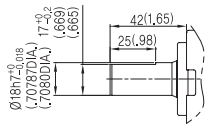
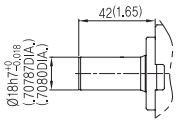


	GEAR TYPE	KEY TYPE		D-CUT TYPE	STRAIGHT TYPE
	SG9R60G□-E	SG9R60K□-E		SG9R60D□-E	SG9R60S□-E
MOTOR OUTPUT SHAFT					

GEARED MOTOR

Unit : mm(inch)



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

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG9□A□	5~25	45	0.85
		25~100	58	1.15
		120~300	64	1.30
MOTOR	SG9R06□□-E			2.90

90W ELECTROMAGNETIC BRAKE MOTOR

□90㎜ LEAD WIRE TYPE

■ MOTOR

Model	Poles	Voltage		Freq.	Duty	Rated Load				Starting Torque		Capacitor	Degree of Protection	Insulation Classification	Protected Type
						Current	Speed	Torque							
		Phase	(V)	(Hz)		(A)	(r/min)	(kgf · cm)	(mN · m)	(kgf · cm)	(mN · m)	(μF)			
SG9R90GA-E SG9R90KA-E SG9R90DA-E SG9R90SA-E	4	1	100	50	S2(30min)	1.80	1250	6.70	0.67	7.50	0.75	25.0 (250V)	IP23	B(130)	T.P.
				60		2.19	1550	5.50	0.55	7.70	0.77				
		1	110	60		1.87	1600	5.40	0.54	8.30	0.83	20.0 (250V)			
		1	115	60		1.86	1600	5.30	0.53	8.80	0.88				
SG9R90GB-E SG9R90KB-E SG9R90DB-E SG9R90SB-E	4	1	200	50	S2(30min)	0.90	1250	6.80	0.68	7.90	0.79	6.0 (450V)	IP23	B(130)	T.P.
				60		1.14	1500	5.70	0.57	7.90	0.79				
		1	220	50		0.80	1300	6.60	0.66	8.40	0.84	5.0 (450V)			
				60		0.98	1550	5.50	0.55	8.40	0.84				
		1	230	50		0.80	1300	6.50	0.65	8.50	0.85				
				60		0.98	1600	5.40	0.54	8.90	0.89				
SG9I90GT-E SG9I90KT-E SG9I90DT-E SG9I90ST-E	4	3	200	50	Cont. S1	0.61	1300	6.60	0.66	22.9	2.29	–	IP23	B(130)	T.P.
				60		0.55	1600	5.50	0.55	17.8	1.78				
		3	220	50		0.65	1300	6.40	0.64	26.2	2.62				
				60		0.55	1600	5.30	0.53	21.0	2.10				
		3	230	50		0.69	1350	6.40	0.64	23.8	2.38				
				60		0.56	1600	5.30	0.53	23.1	2.31				
SG9I90GS-E SG9I90KS-E SG9I90DS-E SG9I90SS-E	4	3	380	50	Cont. S1	0.31	1300	6.60	0.66	21.1	2.11	–	IP23	B(130)	T.P.
				60		0.29	1550	5.50	0.55	15.6	1.56				
		3	400	50		0.32	1300	6.50	0.65	22.5	2.25				
				60		0.28	1550	5.40	0.54	17.3	1.73				
		3	415	70		0.33	1300	6.40	0.64	24.3	2.43				
				80		0.28	1600	5.40	0.54	18.4	1.84				
		3	440	50		0.23	1350	6.30	0.63	26.8	2.68				
				60		0.29	1600	5.30	0.53	20.5	2.05				

❖ 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
	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
SG9KC□ SG9DC□ SG9SC□	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
	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

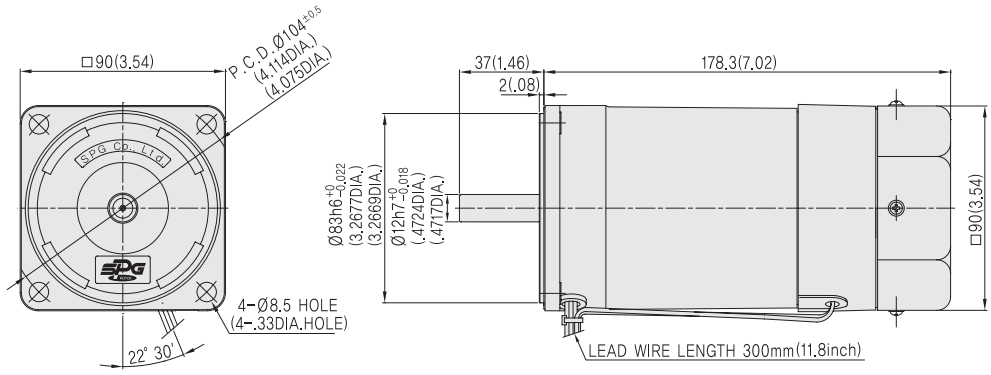
■ GEARED MOTOR – 60Hz

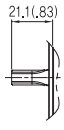
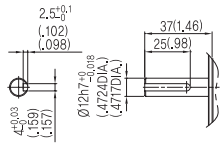
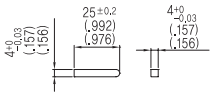
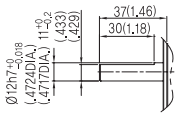
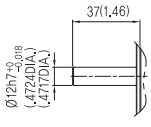
Model \ Ratio		5	6	7.5	9	10	12.5	15	18	20	25	30	36	40	50	60	75	90	100	120	150	180	200
	r/min	360	300	240	200	180	144	120	100	90.0	72.0	60.0	50.0	45.0	36.0	30.0	24.0	20.0	18.0	15.0	12.0	10.0	9.0
SG9KC□ SG9DC□ SG9SC□	kgf·cm	25.7	30.8	38.5	46.2	51.3	64.1	77.0	88.2	98.0	123	147	177	196	245	294	346	400	400	400	400	400	400
	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

❖ 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

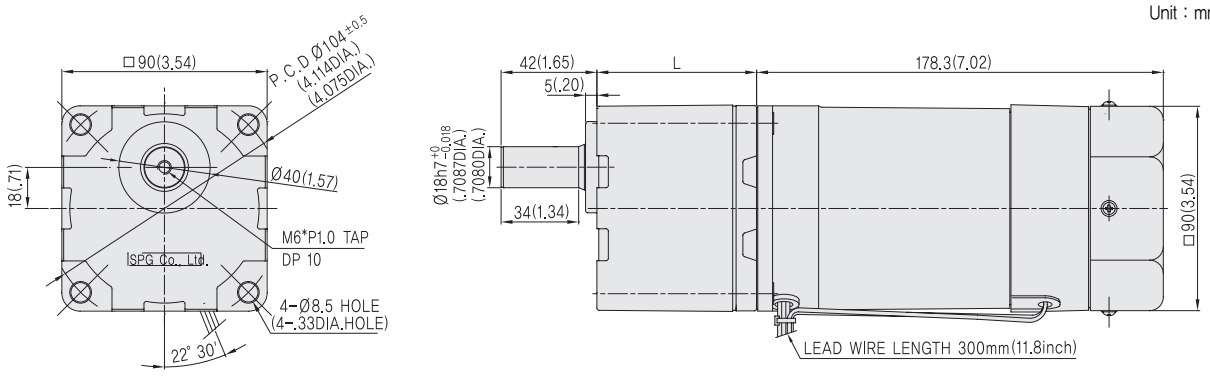
Unit : mm(inch)

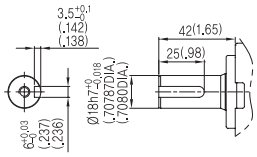
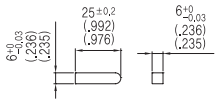
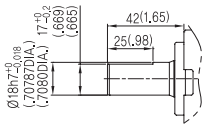
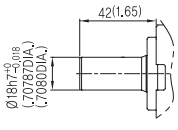


	GEAR TYPE	KEY TYPE		D-CUT TYPE	STRAIGHT TYPE
	SG9R90G□-E	SG9R90K□-E		SG9R90D□-E	SG9R90S□-E
MOTOR OUTPUT SHAFT					

GEARED MOTOR

Unit : mm(inch)



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

MODEL		GEAR RATIO	L	WEIGHT(kg)
GEAR HEAD	SG9□C□	5~15	45	0.85
		18~36	58	1.15
		50~180	70	1.42
MOTOR	SG9R90□□-E			3.41