Sigma synchronous motors

Sigma line-synchronous motors deliver accurate bidirectional speed control for low-speed applications (72 and 100 rpm at 60 Hz). Motor drive is accomplished economically by employing standard line supply frequencies (50 or 60 Hz) as the primary timing medium for motor speed. Input is analog, and consists of two sine waves 90° out of phase. Motor "steps" occur as each sine reaches a positive or negative maximum, thus the primary stepping rate per second is 4X line frequency. Like Sigma's standard stepping motors, these synchronous motors contain permanent-magnet rotors and run at 200 steps per revolution. Operation from the ac line through a simple R-C phase-shift network. Torque output from 70 to 1000 oz-in. Motor sizes of 2.2", 3.4" and 4.2" OD; lengths from 2.0" to 8.8". Dielectric strength between winding and frame, 100 Vrms at 60 Hz; between windings, 500 Vrms (all models). Rear-shaft extensions and splashproof features optional. General specifications (page 8) also applicable.

Synchronous motor ratings and characteristics

Line No.	Motor	T_{max} oz-in./N-m	Current (amps)	Phase resistance (ohms)	Stator inductance (H)	Rotor inertia oz-in.^{2}/10^3kg-m^2	Detent torque oz-in./N-m	HOLDING TORQUE				R-C PHASE-SHIFT NETWORK*		
								One winding energized		Two windings energized				
								Amperes per winding	Torque oz-in./N-m	Amperes per winding	Torque oz-in./N-m	Resistor descriptions (ohms)	Capacitor descriptions (ufd)	Kit number
1	20-2220S72-A120	70/0.049	0.13	600	2.00	0.035/0.006	1.00/0.01	0.13	73/0.52	0.09	78/0.55	300, 12 W	1.5, 330 Vac	AT1354-1
2	20-2235S72-A120	130/0.92	0.20	265	1.20	1.4/.026	5.00/0.04	0.24	170/1.20	0.17	175/1.24	400, 25 W	2.25, 330 Vac	AT1354-3
3	20-2235S72-A240	"	0.12	1040	4.40	"	"	0.12	"	0.05	"	1500, 24 W	0.6, 660 Vac	AT1354-4
4	20-3424S72-A120	120/0.85	0.18	270	1.30	2.9/.053	"	0.24	"	0.17	180/1.27	500, 24 W	2.0, 330 Vac	AT1354-5
5	20-3424S72-A240	"	0.90	1070	4.90	"	"	0.12	"	0.09	"	1500, 25 W	0.5, 660 Vac	AT1354-6
6	20-3437S72-A120	250/1.77	0.36	100	0.54	6.2/.113	7.00/0.05	0.47	280/1.48	0.33	350/2.47	200, 25 W	4.0, 330 Vac	AT1354-7
7	20-3437S72-A240	"	0.18	415	2.20	"	"	0.23	"	0.16	"	800, 25 W	1.0, 660 Vac	AT1354-8
8	20-3450S72-A120	340/2.40	0.44	62	0.42	9.6/.176	11.0/0.08	0.70	500/3.53	0.50	620/4.38	200, 50 W	5.0, 330 Vac	AT1354-9
9	20-3450S72-A240	"	0.22	255	1.70	"	"	0.35	"	0.25	"	850, 50 W	1.25, 660 Vac	AT1354-10
10	20-4247S72-A120	370/2.61	0.46	48	0.30	16.6/.304	20.0/0.14	0.88	550/3.88	0.62	700/4.94	150, 50 W	5.0, 330 Vac	AT1354-11
11	20-4247S72-A240	"	0.24	230	1.10	"	"	0.40	"	0.28	"	500, 50 W	1.25, 660 Vac	AT1354-12
12	20-4266S72-A120	580/4.10	0.66	25	0.20	36.3/.664	35.0/0.25	1.35	1100/7.77	0.95	1400/9.89	150, 50 W	7.5, 330 Vac	AT1354-13
13	20-4266S72-A240	"	0.33	100	0.80	"	"	0.68	"	0.48	"	600, 50 W	2.0, 660 Vac	AT1354-14
14	20-4266TS72-A120	760/5.37	1.10	16.5	0.14	"	"	1.35	"	0.95	"	100, 100 W	12.0, 330 Vac	AT1354-15
15	20-4266TS72-A240	"	0.55	66	0.56	"	"	0.68	"	0.48	"	400, 100 W	3.0, 660 Vac	AT1354-16
16	20-4270S72-A120	580/4.10	0.66	25	0.20	"	"	1.35	"	0.95	"	150, 50 W	7.5, 330 Vac	AT1354-13
17	20-4270S72-A240	"	0.33	100	0.80	"	"	0.68	"	0.48	"	600, 50 W	2.0, 660 Vac	AT1354-14
18	20-4270TS72-A120	760/5.37	1.10	16.5	0.14	"	"	1.35	"	0.95	"	100, 100 W	12.0, 330 Vac	AT1354-15
19	20-4270TS72-A240	"	0.55	66	0.56	"	"	0.68	"	0.48	"	400, 100 W	3.0, 660 Vac	AT1354-16
20	20-4288S72-A120	1000/7.06	1.20	14.5	0.13	56.2/1.02	50.0/0.35	2.16	1600/11.30	1.53	2050/14.48	50, 75 W	12.0, 330 Vac	AT1354-17
21	20-4288S72-A240	"	0.60	60	0.52	"	"	1.08	"	0.77	"	200, 75 W	3.0, 660 Vac	AT1354-18

OPTIONS — Many optional items are available on special order from the factory; e.g. rear shaft extensions, 4 leads and splashproof models. For further information on these and other options, please consult the factory.

***NOTE** — Required phase-shift network must be ordered separately. Please consult factory.

For synchronous motor connection diagrams, see page 22; for dimensions see page 24.