

# Reversible AC Synchronous Motors

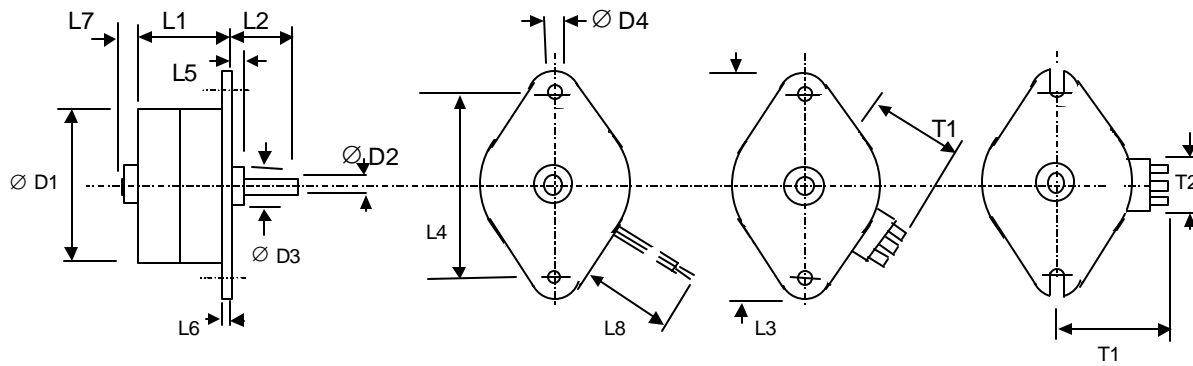
The 9904 111 series reversible ac synchronous motors provide fixed speed operation and are ideally suited to a wide range of control & instrumentation applications. The units low speed, either 250 or 500 rpm, ensure low mechanical noise and smooth operation when used with additional gearing in low speed drives.



The motors may be specified with a wide range of factory fitted gearheads where increased torque and reduced operating speed is required. Gearheads for the 35 & 51 mm options provide a choice of standard ratios with output speed options from 1 rev/second down to 1 rev/hour. while the high torque 56 mm model may be fitted with gearheads providing speeds down to 30 revs/hour.

## Reversible ac synchronous motor dimensions

The motors are either provided with leads ( Form 1 A ) or solder terminals ( Forms 1B & 1C ) as shown below:



Form 1

Form 1A

Form 1B

Form 1C

motor type 9904-111-	form	dimensions mm													
		D1	D2	D3	D4	L1	L2	L3	L4	L5	L6	L7	L8	T1	T2
<b>32 series</b>	1 A	35	2	10	3.2	21.5	8.8	50	42	1.2	0.8	2.2	175	N/A	N/A
<b>31- x11</b>	1 A	51	1.8	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	175	N/A	N/A
<b>31- x01</b>	1 A	51	3	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	175	N/A	N/A
<b>31- x14</b>	1 B	51	1.8	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	N/A	38.5	18.3
<b>31- x04</b>	1 B	51	3	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	N/A	38.5	18.3
<b>35 series</b>	1 C	56.3	3	12	4.4	33.5	8.2	76.5	66	1.5	1.5	3.8	N/A	37.1	20
<b>36 series</b>	1 C	56.3	3	12	4.4	33.5	8.2	76.5	66	1.5	1.5	3.8	N/A	37.1	20

## Reversible AC Synchronous Motor Performance

motor type	Supply Voltage coils connected in		Speed @50Hz rpm	Working Torque coils connected in		Current m A	Phasing Capacitor coils connected in		Mass grams
	Parallel Vac	Series Vac		Parallel Ncm	Series Ncm		Parallel µF	Series µF	
9904 111 32 311	110	220	250	0.4	0.7	8	0.1	0.22	80
9904 111 32 511	48	24				35	2.2	4.7	
9904 111 31 111	110	220	250	2.0	3.0	16	0.1	160	
9904 111 31 104						30	0.39		
9904 111 31 311						150	8		
9904 111 31 304						150	8		
9904 111 31 511	220	24	250	3.3	3.0	15	0.12	300	
9904 111 31 504						140	10		
9904 111 35 104	220	24	500	3.3	3.0	30	0.22	300	
9904 111 35 504						280	18		
9904 111 36 104	220	24	500	3.3	3.0	30	0.22	300	
9904 111 36 504						280	18		

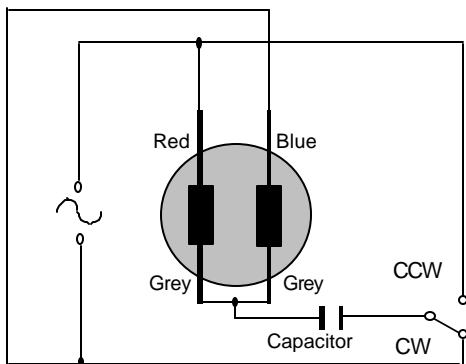
note\*\* The above motors are rated for continuous operation. except the 36 series which is rated for a 50% duty cycle  
The 250 rpm motors may be used on a 60Hz supply to provide 300 rpm using different phasing capacitors

# AC Synchronous Motor General Specification

	Units	32 series	31xx 1 series	31xx 4 series	35 series	36 series
Input Power:						
Coils in parallel	Watts	0.8	3.5		3.5	6
Coils in series		1.7				
Permissible voltage tolerance	%	-15 / +10		-15 / +10		
Maximum recommended load inertia	Kgcm <sup>2</sup>	0.005	0.02		0.09	0.05
Maximum Radial force on shaft	N	2.5	5.0		10	
Maximum Axial force on shaft	N	0.75	1.5		1.5	
Insulation according to CEE10		class 1	class 2	class 1	class 1	
Insulation test voltage	V	1500	2500	1500	1500	
Ambient temperature range	Deg. C	-20 to +60			-20 to +70	
operating		-40 to + 100			-40 to + 1000	
storage						
bearings		Sintered bronze				
Housing		Zinc plated				

## AC Synchronous Motor Connections for Operation on 50Hz Supplies:

### Series connected coils



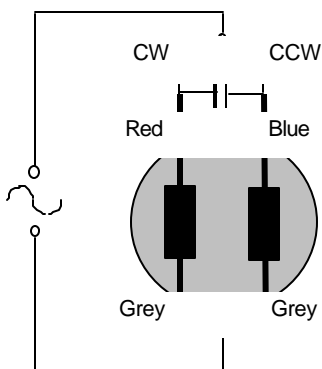
### Application notes

The direction of rotation of the ac synchronous motors can be determined by simply connecting a capacitor and a switch across the two windings as shown. The motors run at a fixed speed synchronous with mains frequency, at any torque up to the motor's operating limit. They are therefore ideal for high accuracy fixed speed drives.

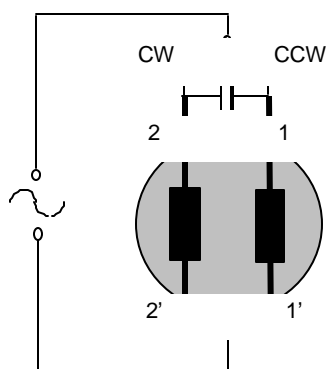
The motors will accelerate to operating speed in typically 100 msecs. and will stop within typically 60 degrees once power is removed, depending on the load inertia. They are therefore suitable for positioning applications where the high accuracy of a stepper motor, for example, is not required. If starting problems are experienced in applications featuring low friction torque it is usually because the load inertia is too high. In these cases a coupling with some compliance often helps to overcome this problem. When a gearhead is used for reduced speed operation the reflected load inertia at the motor is reduced by the square of the gear ratio.

## AC Synchronous Motor Connections: Parallel Connected Coils

motors with leads



motors with solder terminals



The motors may also be operated on 60Hz supplies. If this is required please contact us for connection details

## Geared AC Synchronous Motors

A wide range of gearheads providing reduced speed operation from 1 rev/second to 1 rev per hour may be specified, factory fitted to the ac synchronous motor range. For further details please see the section entitled 'Geared synchronous motors'

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