

BCcomponents, Inc.

Electrolytic Capacitors

**SERIES 3500****A.C. Motor Start Capacitor****DESCRIPTION**

BCcomponents Series 3500 AC motor start Capacitor is an electrochemical device consisting of compactly wound aluminum foil separated by layers of paper impregnated with a conducting electrolyte. Etching of the foil prior to formation and winding increases the effective foil surface area and the capacitance per unit volume. The entire assembly is housed in a molded plastic container.

Eight case sizes are available along with a choice of terminals and mounting methods. Four types of terminals are available. All have a special metal to metal under cover connection for positive terminal contact with the capacitor roll tabs. Units may be special ordered with bleeder resistors soldered across the terminals.

Capacitors may be ordered with leads and end cap & bracket assembly for mounting.

**FEATURES**

- ◆ Operation temperature from - 40°C to +65°C
- ◆ Storage temperature from - 55°C to +95°C
- ◆ 50-60 Hz operating frequency
- ◆ Plastic case requires no insulation
- ◆ Stable electrical characteristics after 75,000 start cycles (110VAC and 125VAC)
- ◆ Type 3535 meets EIA Type I specifications
- ◆ Type 3534 meets EIA Type II specifications
- ◆ Longer life due to cooler operation
- ◆ Four styles of terminals available

**AGENCIES**

EIA Standard EIA-463



UL & CSA Recognized component  
(File E207040)



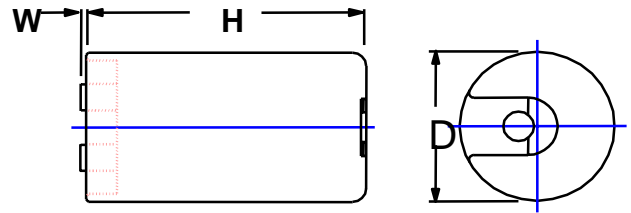
VDE Approved (series 3535)

# SERIES 3500

# A.C. Motor Start Capacitor

## Case Dimensions and Styles

Case Size	Dimensions in Inches		Case Style B W (Max)
	D +/- 0.020	H +/- 0.020	
1	1 7/16	2 3/4	0.032
2	1 7/16	3 3/8	0.032
3	1 7/16	4 3/8	0.032
4	1 13/16	3 3/8	0.032
5	1 13/16	4 3/8	0.032
6	2 1/16	3 3/8	0.032
7	2 1/16	4 3/8	0.032
8	2 9/16	4 3/8	0.032



## End Caps

Bottom Lead Hole		Top Lead Hole	
Case Size	Catalog #	Case Size	Catalog #
1,2,3	614A766AAP1	1,2,3	614A766ABP1
4,5	614A766AAP2	4,5	614A766ABP2
6,7	614A766AAP3	6,7	614A766ABP3
8	614A766AAP4	8	614A766ABP4

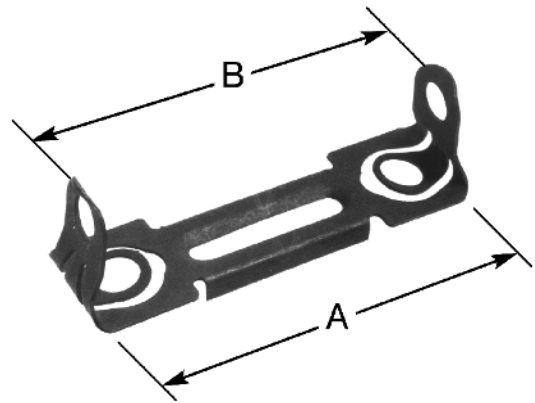
Top Lead Hole

Bottom Lead Hole



## Brackets

Case Size	Catalog #	A	B
3,5,7,8	614A765ABP1	5.015	4.656
2,4,6	614A765ABP2	4.015	3.650
1	614A765ABP3	3.374	3.015



## Leads and Terminals

Stripped leads, or leads terminated with eyelet or female quick connect terminals are available as an option.

Four capacitor terminals are available for capacitors supplied without leads.



Type A  
Double QC



Type B  
Single QC

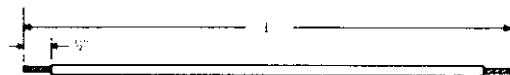


Type C  
Double QC  
with solder lug



Type D  
Solder lug

(Quick-connect terminals are also suitable for soldered connections.)



Eyelet  
terminal

Female  
quick-connect  
terminal



## PERFORMANCE SPECIFICATIONS

### 1. TEMPERATURE

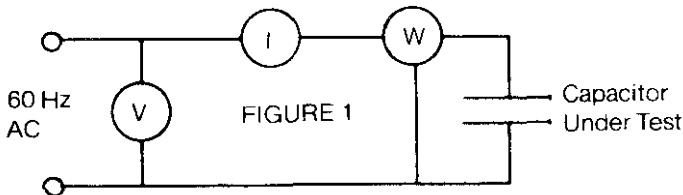
1.1 Operating. These capacitors are designed to operate within the ambient temperature range of -40°C to 65°C.

1.2 Storage. These capacitors may be subjected without permanent damage, to conditions in transit where temperatures range from -55°C to +95°C.

1.3 Tolerance. Unless otherwise specified, temperature tolerance shall be ±3°C.

2. **FREQUENCY**. Unless otherwise specified frequency shall be 50-60 Hz.

3. **VOLTAGE RATING**. The rated voltage is the r-m-s value of AC voltage at which the capacitor may be operated at its normal duty cycle and maximum ambient temperature.



### 4. CAPACITANCE AND POWER FACTOR.

4.1 Measurement. Using the circuit shown in Fig.1, apply rated r-m-s voltage from a 60 Hz source to the capacitor and record the reading from the amp meter and wattmeter. Current shall be measured within 3 seconds and power within 4 seconds after application of rated voltage.

**ATTENTION: Measurement of capacitance and power factor at conditions other than specified may result in error.**

4.2 Temperature. Measurement shall be made at a temperature of 25°C.

4.3 Calculation. Capacitance and Power Factor

$$c = \frac{i \times 10^6}{2\pi f v} \qquad \% pf = \frac{w}{vi} \times 100$$

Where:

- c = capacitance in MFD
- f = frequency (Hz)
- i = current in amperes
- π = constant 3.14
- v = applied r-m-s voltage
- pf = power factor
- w = power in watts

4.4 Requirements. Capacitance shall be within specified limits and the power factor shall not exceed 10%.

### 5. LIFETEST. \*

5.1 Capacitors shall be placed in a circulating air oven at an ambient temperature of 65°C.

Spacing between capacitors must be at least 1" and capacitors must not be subjected to direct radiation from heating elements. Circulation of air shall be sufficient to keep the temperature, within six (6) inches of the capacitor, below 68°C.

#### \* **Caution-**

*Confine capacitor(s) under test to isolate all electrical connections for the safety of personnel.*

5.1.1 A resistance equivalent to approximately 10% of the capacitor impedance shall be connected in series with each capacitor. A resistor of approximately 1000 ohms shall be connected in parallel with each capacitor.

5.1.2 Rated voltage shall be applied to the capacitor resistor combination for Type 3535, EIA Type I capacitors as specified below.

Rated Voltage (r-m-s)	Voltage Cycle	Duty Cycle	Minimum Number of Starts
110,115 and 125	2 times per minute 3/4 sec. on; 29 1/4 sec. off	0.0250	75,000
165,220 250 and 330	1 time per minute 1 sec. On; 59 sec. Off	0.0167	40,000

(Table per EIA-463 Standard for Type I capacitors)

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5.1.3 Rated voltage shall be applied to the capacitor resistor combination for Type 3534, EIA Type II, capacitors as specified below.

Rated Voltage (r-m-s)	Capacitance Rating (uF)		Duty Cycle		Duration of Test* (Number of Starts)
	From	To	Seconds On	Seconds Off	
110	21-25	124-149	3/4	29 ¼	50,000
	130-156	243-292	1	59	50,000
	270-324	378-454	1	89	33,500
	400-480	540-648	1	119	25,000
	590-708	850-1020	1	179	16,500
	1000-1200	1280-1546	1	239	12,500
115	21-25	108-130	3/4	29 ¼	50,000
	124-149	189-227	1	59	50,000
	216-259	340-408	1	89	33,500
	378-454	460-552	1	119	25,000
	540-648	815-978	1	179	16,500
	829-995	1020-1224	1	239	12,500
125	21-25	88-106	3/4	29 ¼	50,000
	108-130	145-174	1	59	50,000
	161-193	233-280	1	89	33,500
	243-292	378-454	1	119	25,000
	400-480	590-708	1	179	16,500
	645-774	800-960	1	239	12,500
165	21-25	88-106	1	59	33,500
	108-130	124-149	1	89	33,500
	130-156	216-259	1	119	25,000
	233-280	340-408	1	179	16,500
	378-454	590-708	1	239	12,500
220	21-25	43-52	1	59	33,500
	37-56	72-86	1	89	33,500
	68-106	145-174	1	119	25,000
	161-193	243-292	1	179	16,500
	270-324	430-516	1	239	12,500
250	21-25	30-36	1	59	33,500
	36-43	64-77	1	89	33,500
	72-86	88-106	1	119	25,000
	108-130	189-227	1	179	16,500
	216-259	324-389	1	239	12,500
330	21-25	21-25	1	59	33,500
	25-30	30-36	1	89	33,500
	36-43	64-77	1	119	25,000
	72-86	88-106	1	179	16,500
	108-130	130-156	1	239	12,500

(Table per EIA-463 Standard for Type II capacitors)

\* The number of starts shown in this column are reduced starts for accelerated testing so that test time does not exceed 35 days. Type 2 capacitors should be capable of 50,000 starts for ratings to 125 volts and 40,000 starts for higher voltages.

5.2 Upon completion of the life test, the capacitors shall be returned to room ambient for a minimum of 24 hours. The capacitors shall then meet the following requirements:

5.2.1 Capacitance, when measured per paragraph 4, shall not differ from the initial measured value by more than 25%.

5.2.2 The power factor, when measured per paragraph 4, shall not exceed 20%.

6. **OVERVOLTAGE TEST.** Capacitors shall withstand, without breakdown or visible mechanical damage, 140% of rated voltage for one second at room temperature (EIA Type I capacitors only).

7. **TERMINAL STRENGTH.** The capacitor terminals shall be capable of withstanding a steady pull of 10 pounds applied in any direction for a period of 10 seconds. There shall be no loosening of the terminals or damage to the terminals or seal. A torque of 4 pounds applied to the terminals shall not cause them to rotate.

8. **CASE INSULATION.** Capacitors are designed to withstand a 1500-volt 60 hertz r-m-s voltage applied for 5 seconds between terminals and case without breakdown or flashover.

9. **VIBRATION.** Capacitors shall be clamped rigidly to a vibration platform and subjected to a simple harmonic motion having a maximum peak-to-peak amplitude of .06 inches and a maximum acceleration of 10g. The frequency of vibration shall be varied linearly between 10 and 55 cycles per second. The entire frequency range, 10 to 55 to 10 cycle per second, shall be traversed in one minute. Capacitors shall be vibrated for 1½ hours with the direction of motion being parallel to the axis of the capacitor. The capacitors shall then be placed so that the direction of motion is perpendicular to the axis and the vibration continued for 1½ hours. During the last ½ hour of the test, the capacitor shall be connected to a bridge and observed for a 3 minute period. The capacitor under test shall meet the requirements of paragraph 9.1.

9.1 There shall be no evidence of loosening of the capacitor element within the container, when shaken by hand following the test. There shall be no indication of intermittent contact during the 3 minute observation period. Capacitors shall not be open or shorted.

10. **MARKING.** Capacitors will have the following minimum marking:

Manufacturer's Name And / Or Symbol  
 Manufacturer's Part Number  
 Capacitance (Min-Max value in MFD)  
 Rated Voltage  
 Rated Frequency  
 EIA Source and Date Code

## Application Guidelines

The BCcomponents AC Motor Start capacitors are non-polar aluminum electrolytic capacitors designed for intermittent AC duty; more specifically, the starting of small AC motors. They are not suitable for most DC or continuous AC applications.

**1. DUTY CYCLE.** The duty cycle of an AC Motor Start capacitor may be determined by dividing the capacitor's on-time (energized time) by the sum of its on-time (energized time) and its off-time (de-energized time). For a given AC Motor Start capacitor, operating at a given voltage and ambient temperature, the time-averaged power dissipated by the capacitor, the internal operating temperature of the capacitor and therefore the life expectancy of the capacitor are all directly proportional to the capacitor's duty cycle.

1.1 Normal capacitor life may be realized (assuming voltage and temperature limits are not exceeded) when the on-time of a capacitor does not exceed 3 seconds and its duty cycle does not exceed 0.0167. Example: Twenty (20) three (3) second starts per hour yield a duty cycle of 0.0167 and does not exceed the three (3) second on-time limit.

1.2 Longer than 3 second on-times are not recommended as they will cause the capacitor's life to be shortened. Should they be unavoidable, there are certain precautions that can be taken to minimize the degradation of the capacitor's life expectancy. For on-times up to 6 seconds:

- Reduce the duty cycle by increasing the off-time
- Reduce the ambient temperature
- Provide forced air cooling
- Use a capacitor with a higher voltage rating
- Use two capacitors connected in Series, with each having twice the capacitance value of the original.

**2. FREQUENCY.** These capacitors are designed and are tested at 60 Hz. However, they are suitable for use from 50 to 60 Hz.

**3. VOLTAGE.** (Rated voltage and over voltage are covered in the PERFORMANCE SPECIFICATIONS section). However, there is a third voltage that should be considered in the application of AC Motor Start capacitors. During the start cycle of a normal capacitor start motor the voltage impressed across the AC motor start

capacitor does not remain constant. It should start close to the rated voltage, dip slightly and then begin to increase as the motor's RPM increases. Should the start switch fail to open, it is possible for the capacitor's voltage to increase to as much as 2 to 3 times the capacitor's rated voltage.

3.1 Normal capacitor life may be realized (assuming temperature and duty cycle limits are not exceeded) when, during the start cycle the voltage impressed across the capacitor does not exceed 125% of its rated voltage.

**4. TEMPERATURE.** (Storage and operating temperatures are covered in the PERFORMANCE SPECIFICATIONS section). There has been some misunderstanding about the -40°C lower limit. As the temperature decreases from room temperature, capacitance starts to fall and power factor (measurement of losses) starts to rise. Either one of these effects will cause a decrease in a motor's starting torque. The effects are such that below -40°C a stalled rotor condition could occur. However, because the losses are so high, the internal capacitor temperature will rise rather quickly, thus restoring normal start torque. The total effect may just be a delay in the motor reaching switch out speed.

**5. SHELF LIFE.** The normal shelf life expectancy for these capacitors is typically in excess of 5 years when stored in ambient temperatures not exceeding 40°C.

**6. RESISTORS.** Some specialized applications require that the motor start capacitor be discharged prior to the closing of the start switch. This minimizes shock hazard, switch bounce noise, and peak contact currents. The resistor used to discharge the capacitor should be sufficiently large so as not to significantly increase the power factor and small enough to ensure the capacitor is discharged within the required time. Normally, a 15K ohm  $\pm 20\%$  2-Watt resistor is used. Consult factory for this option.

**7. MOUNTING.** Vertical mounting of the capacitor with the terminals up is recommended; however horizontal mounting with the pressure relief vent up is acceptable. **Vertical mounting with terminals down or horizontal mounting with a relief vent down is not recommended as this may reduce capacitor life and could impair the operation of the pressure relief vent.**

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8. **CLEANING SOLVENTS.** Recommended cleaning solvents are those free of halogens or halogen groups such as ethyl alcohol, butyl alcohol, methyl alcohol, propyl alcohol and deionized or distilled water. Solvents that are **NOT recommended** are **halogenated hydrocarbon** solvents such as Freon TF®, Freon TMC®; carbon tetrachloride, chloroform trichloroethylene, trichloroethane, and methylene chloride.

9. **SAFETY.** The watt-second capability of these capacitors is high enough that precautions should be taken during the testing and application of these devices. Normally, the DC series resistance of the main and auxiliary windings are such that the capacitor is completely discharged prior to the motor coming to a complete stop. However if this is not the case, or if this is deemed inadequate, discharge resistors are available from the factory.

9.1 **Misapplication, such as exceeding design limits or applying continuous AC voltage, may result in destruction or explosion of the capacitors.**

9.2 **Care should be exercised in the mounting of these capacitors to insure minimal damage in the event of an explosion.**

10. **GENERAL.** Consult factory if the application requirements do not match the parameters as specified for the capacitor.

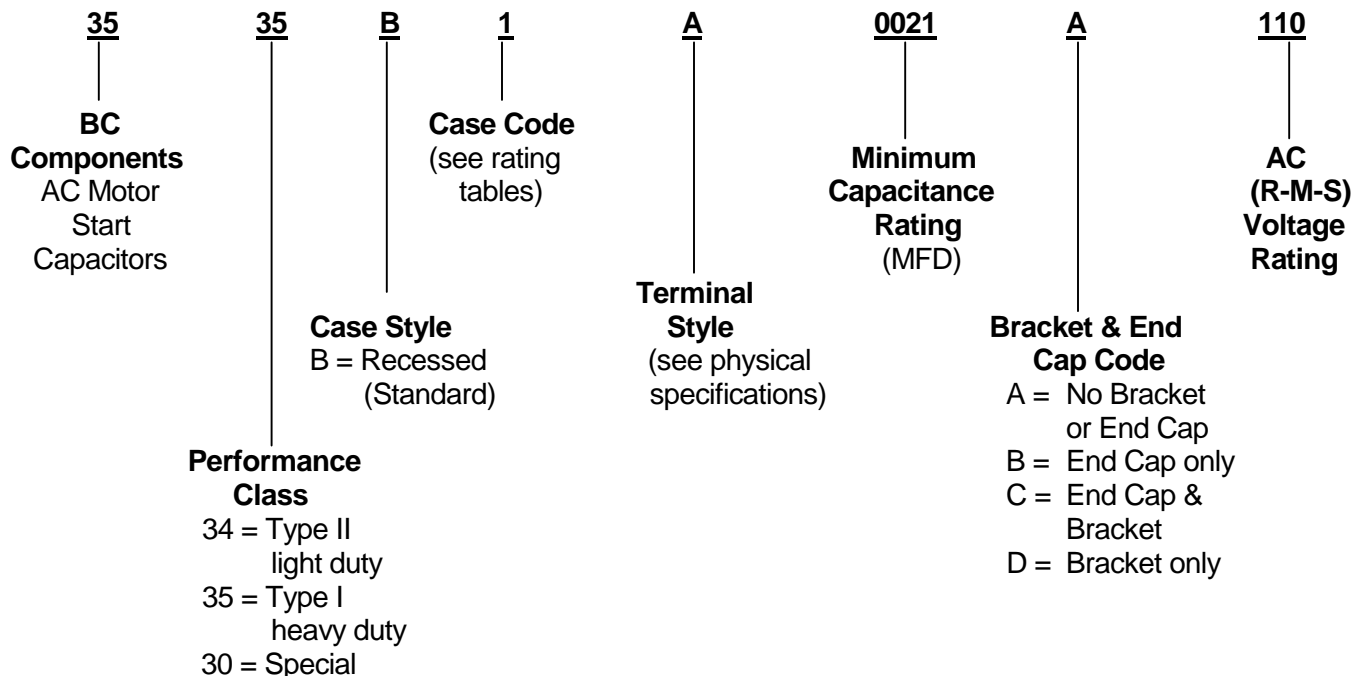
11. **INQUIRIES.** When consulting about a special application or an application problem, the following minimum information should be made available:

- Capacitor nameplate information; capacitance value (in MFD), AC voltage rating, etc.
- Case size (diameter & length)
- Application duty cycle (on time, off time)
- Maximum switch out voltage
- Maximum ambient temperature
- Any special or unusual application characteristic.

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## HOW TO SPECIFY a *BCCOMPONENTS*

### AC MOTOR START CAPACITOR



# SERIES 3500

# A.C. Motor Start Capacitor

Standard Capacitance values **EIA Type I**

uF Min-Max	Case Size	Part Number
<b>110 Volts AC</b>		
21-25	1	3535B1A0021A110 **
25-30	1	3535B1A0025A110 **
30-36	1	3535B1A0030A110 **
36-43	1	3535B1A0036A110 **
43-53	1	3535B1A0043A110 **
47-56	1	3535B1A0047A110 **
53-64	1	3535B1A0053A110 **
64-77	1	3535B1A0064A110 **
72-88	1	3535B1A0072A110 **
88-108	1	3535B1A0088A110 **
108-130	1	3535B1A0108A110 **
124-149	1	3535B1A0124A110 **
130-156	1	3535B1A0130A110 **
145-175	1	3535B1A0145A110 **
161-193	1	3535B1A0161A110 **
189-227	2	3535B2A0189A110 **
216-259	2	3535B2A0216A110 **
233-280	2	3535B2A0233A110 **
243-292	4	3535B4A0243A110 **
270-324	4	3535B4A0270A110 **
340-408	4	3535B4A0340A110 **
378-440	4	3535B4A0378A110 **
400-480	4	3535B4A0400A110 **
430-516	4	3535B4A0430A110 **
460-552	4	3535B4A0460A110 **
540-648	7	3535B7A0540A110 **
590-708	7	3535B7A0590A110 **
710-850	8	3535B8A0710A110 **

uF Min-Max	Case Size	Part Number
<b>125 Volts AC</b>		
21-25	1	3535B1A0021A125 **
25-30	1	3535B1A0025A125 **
30-36	1	3535B1A0030A125 **
36-43	1	3535B1A0036A125 **
43-53	1	3535B1A0043A125 **
47-56	1	3535B1A0047A125 **
53-64	1	3535B1A0053A125 **
64-77	1	3535B1A0064A125 **
72-88	1	3535B1A0072A125 **
88-108	1	3535B1A0088A125 **
108-130	1	3535B1A0108A125 **
124-149	1	3535B1A0124A125 **
130-156	1	3535B1A0130A125 **
145-175	2	3535B2A0145A125 **
161-193	2	3535B2A0161A125 **
189-227	2	3535B2A0189A125 **
216-259	4	3535B4A0216A125 **
233-280	4	3535B4A0233A125 **
243-292	4	3535B4A0243A125 **
270-324	4	3535B4A0270A125 **
340-408	5	3535B5A0340A125 **
378-440	5	3535B5A0378A125 **
400-480	5	3535B5A0400A125 **
430-516	7	3535B7A0430A125 **
460-552	7	3535B7A0460A125 **
540-648	8	3535B8A0540A125 **

uF Min-Max	Case Size	Part Number
<b>165 Volts AC</b>		
21-25	1	3535B1A0021A165 **
25-30	1	3535B1A0025A165 **
30-36	1	3535B1A0030A165 **
36-43	1	3535B1A0036A165 **
43-53	1	3535B1A0043A165 **
47-56	1	3535B1A0047A165 **
53-64	1	3535B1A0053A165 **
64-77	1	3535B1A0064A165 **

72-88	1	3535B1A0072A165 **
88-108	2	3535B2A0088A165 **
108-130	2	3535B2A0108A165 **
124-149	4	3535B4A0124A165 **
130-156	4	3535B4A0130A165 **
145-175	4	3535B4A0145A165 **
161-193	4	3535B4A0161A165 **
189-227	4	3535B4A0189A165 **
216-259	5	3535B5A0216A165 **
233-280	5	3535B5A0233A165 **
243-292	5	3535B5A0243A165 **
270-324	5	3535B5A0270A165 **
340-408	7	3535B7A0340A165 **
378-440	8	3535B8A0378A165 **
400-480	8	3535B8A0400A165 **

uF Min-Max	Case Size	Part Number
<b>220 Volts AC</b>		
21-25	1	3535B1A0021A220 **
25-30	1	3535B1A0025A220 **
30-36	1	3535B1A0030A220 **
36-43	2	3535B2A0036A220 **
43-53	2	3535B2A0043A220 **
47-56	2	3535B2A0047A220 **
53-64	4	3535B4A0053A220 **
64-77	4	3535B4A0064A220 **
72-88	4	3535B4A0072A220 **
88-108	4	3535B4A0088A220 **
108-130	5	3535B5A0108A220 **
124-149	5	3535B5A0124A220 **
130-156	5	3535B5A0130A220 **
145-175	7	3535B7A0145A220 **
161-193	8	3535B8A0161A220 **
189-227	8	3535B8A0189A220 **

uF Min-Max	Case Size	Part Number
<b>250 Volts AC</b>		
21-25	1	3535B1A0021A250 **
25-30	1	3535B1A0025A250 **
30-36	2	3535B2A0030A250 **
36-43	2	3535B2A0036A250 **
43-53	4	3535B4A0043A250 **
47-56	4	3535B4A0047A250 **
53-64	4	3535B4A0053A250 **
64-77	4	3535B4A0064A250 **
72-88	4	3535B4A0072A250 **
88-108	5	3535B5A0088A250 **
108-130	5	3535B5A0108A250 **
124-149	7	3535B7A0124A250 **
130-156	8	3535B8A0130A250 **
145-175	8	3535B8A0145A250 **
161-193	8	3535B8A0161A250 **

uF Min-Max	Case Size	Part Number
<b>330 Volts AC</b>		
21-25	2	3535B2A0021A330 **
25-30	2	3535B2A0025A330 **
30-36	4	3535B4A0030A330 **
36-43	4	3535B4A0036A330 **
43-53	4	3535B4A0043A330 **
47-56	4	3535B4A0047A330 **
53-64	5	3535B5A0053A330 **
64-77	5	3535B5A0064A330 **
72-88	5	3535B5A0072A330 **
88-108	7	3535B7A0088A330 **
108-130	8	3535B8A0108A330 **

**Note:** \*\* The last two digits are for internal use only. They are sequentially assigned and have NO predetermined meaning.

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# A.C. Motor Start Capacitor

## Standard Capacitance values EIA Type II

uF Min-Max	Case Size	Part Number
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### 110 Volts AC

21-25	1	3534B1A0021A110 **
25-30	1	3534B1A0025A110 **
30-36	1	3534B1A0030A110 **
36-43	1	3534B1A0036A110 **
43-53	1	3534B1A0043A110 **
47-56	1	3534B1A0047A110 **
53-64	1	3534B1A0053A110 **
64-77	1	3534B1A0064A110 **
72-88	1	3534B1A0072A110 **
88-108	1	3534B1A0088A110 **
108-130	1	3534B1A0108A110 **
124-149	1	3534B1A0124A110 **
130-156	1	3534B1A0130A110 **
145-175	1	3534B1A0145A110 **
161-193	1	3534B1A0161A110 **
189-227	1	3534B1A0189A110 **
216-259	2	3534B2A0216A110 **
233-280	2	3534B2A0233A110 **
243-292	2	3534B2A0243A110 **
270-324	2	3534B2A0270A110 **
340-408	4	3534B4A0340A110 **
378-440	4	3534B4A0378A110 **
400-480	4	3534B4A0400A110 **
430-516	4	3534B4A0430A110 **
460-552	4	3534B4A0460A110 **
540-648	5	3534B5A0540A110 **
590-708	5	3534B5A0590A110 **
710-850	7	3534B7A0710A110 **
829-995	7	3534B7A0829A110 **
1000-1200	8	3534B8A1000A110 **

### 125 Volts AC

21-25	1	3534B1A0021A125 **
25-30	1	3534B1A0025A125 **
30-36	1	3534B1A0030A125 **
36-43	1	3534B1A0036A125 **
43-53	1	3534B1A0043A125 **
47-56	1	3534B1A0047A125 **
53-64	1	3534B1A0053A125 **
64-77	1	3534B1A0064A125 **
72-88	1	3534B1A0072A125 **
88-108	1	3534B1A0088A125 **
108-130	1	3534B1A0108A125 **
124-149	1	3534B1A0124A125 **
130-156	1	3534B1A0130A125 **
145-175	1	3534B1A0145A125 **
161-193	1	3534B1A0161A125 **
189-227	2	3534B2A0189A125 **
216-259	2	3534B2A0216A125 **
233-280	2	3534B2A0233A125 **
243-292	3	3534B3A0243A125 **
270-324	3	3534B3A0270A125 **
340-408	4	3534B4A0340A125 **
378-440	4	3534B4A0378A125 **
400-480	4	3534B4A0400A125 **
430-516	4	3534B4A0430A125 **
460-552	4	3534B4A0460A125 **
540-648	5	3534B5A0540A125 **
645-774	7	3534B7A0645A125 **
829-995	8	3534B8A0829A125 **

### 165 Volts AC

21-25	1	3534B1A0021A165 **
25-30	1	3534B1A0025A165 **
30-36	1	3534B1A0030A165 **
36-43	1	3534B1A0036A165 **
43-53	1	3534B1A0043A165 **
47-56	1	3534B1A0047A165 **

53-64	1	3534B1A0053A165 **
64-77	1	3534B1A0064A165 **
72-88	1	3534B1A0072A165 **
88-108	1	3534B1A0088A165 **
108-130	2	3534B2A0108A165 **
124-149	2	3534B2A0124A165 **
130-156	4	3534B4A0130A165 **
145-175	4	3534B4A0145A165 **
161-193	4	3534B4A0161A165 **
189-227	4	3534B4A0189A165 **
216-259	4	3534B4A0216A165 **
233-280	5	3534B5A0233A165 **
243-292	5	3534B5A0243A165 **
270-324	5	3534B5A0270A165 **
340-408	7	3534B7A0340A165 **
400-480	7	3534B7A0400A165 **
460-552	8	3534B8A0460A165 **

### 220 Volts AC

21-25	1	3534B1A0021A220 **
25-30	1	3534B1A0025A220 **
30-36	1	3534B1A0030A220 **
36-43	1	3534B1A0036A220 **
43-53	2	3534B2A0043A220 **
47-56	2	3534B2A0047A220 **
53-64	2	3534B2A0053A220 **
64-77	4	3534B4A0064A220 **
72-88	4	3534B4A0072A220 **
88-108	4	3534B4A0088A220 **
108-130	4	3534B4A0108A220 **
124-149	5	3534B5A0124A220 **
130-156	5	3534B5A0130A220 **
145-175	7	3534B7A0145A220 **
161-193	7	3534B7A0161A220 **
189-227	7	3534B7A0189A220 **
233-280	8	3534B8A0233A220 **
270-324	8	3534B8A0270A220 **

### 250 Volts AC

21-25	1	3534B1A0021A250 **
25-30	1	3534B1A0025A250 **
30-36	2	3534B2A0030A250 **
36-43	2	3534B2A0036A250 **
43-53	2	3534B2A0043A250 **
47-56	2	3534B2A0047A250 **
53-64	4	3534B4A0053A250 **
64-77	4	3534B4A0064A250 **
72-88	4	3534B4A0072A250 **
88-108	5	3534B5A0088A250 **
108-130	5	3534B5A0108A250 **
124-149	5	3534B5A0124A250 **
130-156	5	3534B5A0130A250 **
145-175	7	3534B7A0145A250 **
161-193	7	3534B7A0161A250 **
189-227	8	3534B8A0189A250 **
233-280	8	3534B8A0233A250 **

### 330 Volts AC

21-25	2	3534B2A0021A330 **
25-30	2	3534B2A0025A330 **
30-36	4	3534B4A0030A330 **
36-43	4	3534B4A0036A330 **
43-53	4	3534B4A0043A330 **
47-56	4	3534B4A0047A330 **
53-64	5	3534B5A0053A330 **
64-77	5	3534B5A0064A330 **
72-88	5	3534B5A0072A330 **
88-108	7	3534B7A0088A330 **
108-130	8	3534B8A0108A330 **
124-149	8	3534B8A0124A330 **
145-175	8	3534B8A0145A330 **

**Note:** \*\* The last two digits are for internal use only. They are sequentially assigned and have NO predetermined meaning.