

Type PSU AC Motor Start Capacitors

Non-polarized, Aluminum Electrolytic AC Motor Start Capacitors



The Type PSU is a compact non-polar, AC motor start capacitor constructed in a round rugged bakelite case. To extend the life of relay contact switches, the PSU can be purchased with optional bleeder resistors assembled with 1/4" quick-connect terminals. An optional mounting system consisting of a bracket that is attached to the capacitor case with one end cap is available. The PL end caps are for use with wiring through the bracket to the motor and the PLA end caps are for off motor mounting.

Optional Enhancements



Highlights

- Dual quick-connect terminals
- Rugged bakelite case
- Compact Size
- Resistor options
- Mounting options
- Non-polar
- Meets EIA RS-463 Type 2 (Normal Performance)

Specifications

Capacitance Range:	21 μ F to 1280 μ F
Voltage Range	110 Vac to 330 Vac
Capacitance Tolerance:	See ratings table
Operating Temperature Range:	-40 °C to 65 °C
Storage Temperature Range:	-55 °C to 85 °C
Operating Frequency:	50 Hz to 60 Hz
Power Factor:	10% max (12% \leq 30 μ F)

Ratings

Cap (μ F)	Vac	Case Code	Diameter (Inches) ± 0.015	Length (Inches) ± 0.06	Catalog Part Number
21-25	110/125	1	1 7/16	2 3/4	PSU2115
25-30	110/125	1	1 7/16	2 3/4	PSU2515
30-36	110/125	1	1 7/16	2 3/4	PSU3015
36-43	110/125	1	1 7/16	2 3/4	PSU3615
43-52	110/125	1	1 7/16	2 3/4	PSU4315
47-56	110/125	1	1 7/16	2 3/4	PSU4715
53-64	110/125	1	1 7/16	2 3/4	PSU5315
64-77	110/125	1	1 7/16	2 3/4	PSU6415
72-86	110/125	1	1 7/16	2 3/4	PSU7215
88-106	110/125	1	1 7/16	2 3/4	PSU8815
108-130	110/125	1	1 7/16	2 3/4	PSU10815
124-149	110/125	1	1 7/16	2 3/4	PSU12415
130-156	110/125	1	1 7/16	2 3/4	PSU13015
145-174	110/125	1	1 7/16	2 3/4	PSU14515
161-193	110/125	1	1 7/16	2 3/4	PSU16115
189-227	110/125	1	1 7/16	2 3/4	PSU18915A
200-240	110/125	2	1 7/16	3 3/8	PSU20015
216-259	110/125	2	1 7/16	3 3/8	PSU21615
216-259	110/125	1	1 7/16	2 3/4	PSU21615A
233-280	110/125	2	1 7/16	3 3/8	PSU23315A

Cap (μ F)	Vac	Case Code	Diameter (Inches) ± 0.015	Length (Inches) ± 0.06	Catalog Part Number
233-280	110/125	1	1 7/16	2 3/4	PSU23315B
243-292	110/125	2	1 7/16	3 3/8	PSU24315A
243-292	110/125	1	1 7/16	2 3/4	PSU24315B
270-324	110/125	2	1 7/16	3 3/8	PSU27015A
270-324	110/125	1	1 7/16	2 3/4	PSU27015B
300-360	110/125	4	1 13/16	3 3/8	PSU30015
324-389	110/125	3	1 7/16	4 3/8	PSU32415A
324-389	110/125	1	1 7/16	2 3/4	PSU32415B
340-408	110/125	4	1 13/16	3 3/8	PSU34015
340-408	110/125	2	1 7/16	3 3/8	PSU34015A
378-454	110/125	4	1 13/16	3 3/8	PSU37815
378-454	110/125	2	1 7/16	3 3/8	PSU37815A
400-480	110/125	4	1 13/16	3 3/8	PSU40015
400-480	110/125	2	1 7/16	3 3/8	PSU40015A
430-516	110/125	4	1 13/16	3 3/8	PSU43015A
430-516	110/125	2	1 7/16	3 3/8	PSU43015B
460-552	110/125	4	1 13/16	3 3/8	PSU46015A
460-552	110/125	2	1 7/16	3 3/8	PSU46015B
540-648	110/125	4	1 13/16	3 3/8	PSU54015A
540-648	110/125	5	1 13/16	4 3/8	PSU54015B

See page 5.000 for capacitor hardware and resistor options.

Type PSU AC Motor Start Capacitors

Cap (µF)	Vac	Case Code	Diameter (Inches) ±.015	Length (Inches) ±.06	Catalog Part Number	Cap (µF)	Vac	Case Code	Diameter (Inches) ±.015	Length (Inches) ±.06	Catalog Part Number
590-708	110/125	5	1 13/16	4 3/8	PSU59015A	21-25	220/250	1	1 7/16	2 3/4	PSU2135
590-708	110/125	4	1 13/16	3 3/8	PSU59015B	25-30	220/250	1	1 7/16	2 3/4	PSU2535
645-774	110/125	5	1 13/16	4 3/8	PSU64515	30-36	220/250	1	1 7/16	2 3/4	PSU3035
645-774	110/125	4	1 13/16	3 3/8	PSU64515A	36-43	220/250	1	1 7/16	2 3/4	PSU3635
708-850	110/125	5	1 13/16	4 3/8	PSU70815	43-52	220/250	2	1 7/16	3 3/8	PSU4335B
708-850	110/125	4	1 13/16	3 3/8	PSU70815A	43-52	220/250	1	1 7/16	2 3/4	PSU4335C
720-864	110/125	5	1 13/16	4 3/8	PSU72015	47-56	220/250	2	1 7/16	3 3/8	PSU4735
720-864	110/125	4	1 13/16	3 3/8	PSU72015A	47-56	220/250	1	1 7/16	2 3/4	PSU4735A
800-960	110/125	5	1 13/16	4 3/8	PSU80015	53-64	220/250	2	1 7/16	3 3/8	PSU5335
800-960	110/125	4	1 13/16	3 3/8	PSU80015A	53-64	220/250	1	1 7/16	2 3/4	PSU5335A
815-978	110/125	5	1 13/16	4 3/8	PSU81515	64-77	220/250	2	1 7/16	3 3/8	PSU6435
815-978	110/125	4	1 13/16	3 3/8	PSU81515A	64-77	220/250	1	1 7/16	2 3/4	PSU6435A
829-995	110/125	5	1 13/16	4 3/8	PSU82915A	72-86	220/250	4	1 13/16	3 3/8	PSU7235
829-995	110/125	4	1 13/16	3 3/8	PSU82915B	88-106	220/250	4	1 13/16	3 3/8	PSU8835
850-1020	110/125	5	1 13/16	4 3/8	PSU85015	108-130	220/250	4	1 13/16	3 3/8	PSU10835A
850-1020	110/125	4	1 13/16	3 3/8	PSU85015A	124-149	220/250	5	1 13/16	4 3/8	PSU12435
1000-1200	110/125	7	2 1/16	4 3/8	PSU100015A	124-149	220/250	4	1 13/16	3 3/8	PSU12435A
1020-1224	110/125	7	2 1/16	4 3/8	PSU102015	130-156	220/250	5	1 13/16	4 3/8	PSU13035
1175-1410	110/125	7	2 1/16	4 3/8	PSU117515	130-156	220/250	4	1 13/16	3 3/8	PSU13035A
1280-1536	110/125	7	2 1/16	4 3/8	PSU128015	145-174	220/250	5	1 13/16	4 3/8	PSU14535
21-25	165	1	1 7/16	2 3/4	PSU2165A	145-174	220/250	4	1 13/16	3 3/8	PSU14535A
25-30	165	1	1 7/16	2 3/4	PSU2565A	161-193	220/250	7	2 1/16	4 3/8	PSU16135A
30-36	165	1	1 7/16	2 3/4	PSU3065A	189-227	220/250	7	2 1/16	4 3/8	PSU18935A
36-43	165	1	1 7/16	2 3/4	PSU3665A	189-227	220/250	6	2 1/16	3 3/8	PSU18935B
43-52	165	1	1 7/16	2 3/4	PSU4365A	216-259	220/250	7	2 1/16	4 3/8	PSU21635A
47-56	165	1	1 7/16	2 3/4	PSU4765A	216-259	220/250	6	2 1/16	3 3/8	PSU21635B
53-64	165	1	1 7/16	2 3/4	PSU5365A	233-280	220/250	7	2 1/16	4 3/8	PSU23335A
64-77	165	1	1 7/16	2 3/4	PSU6465A	233-280	220/250	6	2 1/16	3 3/8	PSU23335B
72-86	165	1	1 7/16	2 3/4	PSU7265A	243-292	220/250	7	2 1/16	4 3/8	PSU24335
88-106	165	2	1 7/16	3 3/8	PSU8865	243-292	220/250	6	2 1/16	3 3/8	PSU24335A
88-106	165	1	1 7/16	2 3/4	PSU8865A	270-324	220/250	7	2 1/16	4 3/8	PSU27035A
108-130	165	2	1 7/16	3 3/8	PSU10865	270-324	220/250	6	2 1/16	3 3/8	PSU27035B
108-130	165	1	1 7/16	2 3/4	PSU10865A	16-20	330	2	1 7/16	3 3/8	PSU1630
124-149	165	2	1 7/16	3 3/8	PSU12465	18-22	330	4	1 13/16	3 3/8	PSU1830
124-149	165	1	1 7/16	2 3/4	PSU12465A	21-25	330	1	1 7/16	2 3/4	PSU2130
130-156	165	2	1 7/16	3 3/8	PSU13065	21-25	330	2	1 7/16	3 3/8	PSU2130A
130-156	165	1	1 7/16	2 3/4	PSU13065A	25-30	330	2	1 7/16	3 3/8	PSU2530
145-174	165	2	1 7/16	3 3/8	PSU14565	30-36	330	2	1 7/16	3 3/8	PSU3030
145-174	165	1	1 7/16	2 3/4	PSU14565A	36-43	330	2	1 7/16	3 3/8	PSU3630
161-193	165	2	1 7/16	3 3/8	PSU16165	43-52	330	2	1 7/16	3 3/8	PSU4330
161-193	165	1	1 7/16	2 3/4	PSU16165A	43-52	330	4	1 13/16	3 3/8	PSU4330A
189-227	165	2	1 7/16	3 3/8	PSU18965B	47-56	330	4	1 13/16	3 3/8	PSU4730
189-227	165	1	1 7/16	2 3/4	PSU18965C	53-64	330	4	1 13/16	3 3/8	PSU5330B
216-259	165	4	1 13/16	3 3/8	PSU21665A	64-77	330	4	1 13/16	3 3/8	PSU6430
233-280	165	3	1 7/16	4 3/8	PSU23365	72-86	330	5	1 13/16	3 3/8	PSU7230B
233-280	165	4	1 13/16	3 3/8	PSU23365A	72-86	330	4	1 13/16	3 3/8	PSU7230C
243-292	165	3	1 7/16	4 3/8	PSU24365	88-106	330	5	1 13/16	4 3/8	PSU8830A
243-292	165	4	1 13/16	3 3/8	PSU24365A	88-106	330	4	1 13/16	3 3/8	PSU8830B
270-324	165	3	1 7/16	4 3/8	PSU27065A	108-130	330	7	2 1/16	4 3/8	PSU10830B
270-324	165	4	1 13/16	3 3/8	PSU27065B	124-149	330	8	2 9/16	4 3/8	PSU12430
324-389	165	5	1 13/16	4 3/8	PSU32465	124-149	330	7	2 1/16	4 3/8	PSU12430A
324-389	165	4	1 13/16	3 3/8	PSU32465A	130-156	330	7	2 1/16	4 3/8	PSU13030A
340-408	165	5	1 13/16	4 3/8	PSU34065	145-174	330	7	2 1/16	4 3/8	PSU14530A
340-408	165	4	1 13/16	3 3/8	PSU34065A	161-193	330	8	2 9/16	4 3/8	PSU16130
378-454	165	5	1 13/16	4 3/8	PSU37865	161-193	330	7	2 1/16	4 3/8	PSU16130A
378-454	165	4	1 13/16	3 3/8	PSU37865A	189-227	330	8	2 9/16	4 3/8	PSU18930
400-480	165	5	1 13/16	4 3/8	PSU40065	189-227	330	7	2 1/16	4 3/8	PSU18930A
400-480	165	4	1 13/16	3 3/8	PSU40065A	216-259	330	8	2 9/16	4 3/8	PSU21630
430-516	165	5	1 13/16	4 3/8	PSU43065	216-259	330	7	2 1/16	4 3/8	PSU21630A
430-516	165	4	1 13/16	3 3/8	PSU43065A	270-324	330	8	2 9/16	4 3/8	PSU27030
460-552	165	5	1 13/16	4 3/8	PSU46065	270-324	330	7	2 1/16	4 3/8	PSU27030A
460-552	165	4	1 13/16	3 3/8	PSU46065A	378-454	330	8	2 9/16	4 3/8	PSU37830
540-648	165	7	2 1/16	4 3/8	PSU54065	460-552	330	8	2 9/16	4 3/8	PSU46030
540-648	165	4	1 13/16	3 3/8	PSU54065A						

See page 5.000 for capacitor hardware and resistor options.

Type PSU Motor Start Capacitors Application Guide

VOLTAGE RATING

The capacitors's rated voltage must be greater than or equal to the average voltage across the capacitor's terminals during the motor starting cycle. This is not the same voltage as the motor line voltage. In addition, the cutoff voltage rating of the capacitor must be greater than or equal to the maximum voltage attained across the terminals of the capacitor in actual service.

The maximum recommended cut-of voltages for the four standard voltage ratings are as follows:

<u>Rated Voltage (rms)</u>	<u>Maximum Cut-Off Voltage (rms)</u>
125	160
165	210
250	300
330	400

These ratings are based on the maximum capacitor temperature of 65 °C.

CAPACITANCE RATING

The capacitance is chosen to give the necessary starting torque to the motor. The minimum capacitance value is the minimum designed capacitance. The maximum capacitance is 20% more than the minimum value.

DUTY CYCLE

The duty cycle should be calculated for each application. It is the ratio of the time the capacitor is on voltage to the total time of one cycle. The duty cycles for the normal performance of standard Type II capacitors are listed in Table A. CDE type PSU capacitors may be used in any intermittent application within their temperature and voltage range where the duty cycle does not exceed that listed in Table A. This is in accordance with the standards in EIA Specification RS-463 for Type II capacitors. If a particular application exceeds the normal duty cycle, but does not exceed the values listed in Table B, an extra performance or Type I capacitor is required.

FREQUENCY

These capacitors are designed for 60 Hz application but may be operated in the range of 47 Hz - 60 Hz without damage provided voltage limitations stated above are observed. For other variations in frequency, contact CDE.

Duty Cycles of Type II

Table A

<u>Rated Voltage VAC (rms)</u>	<u>Capacitance Rating (µF)</u>		<u>Duty Cycle</u>		<u>% Duty Cycle</u>	<u># of Starts</u>
	<u>From</u>	<u>To</u>	<u>Secs. (On)</u>	<u>Secs. (Off)</u>		
125	21-25	81-106	0.75	29.25	2.500	50,000
	108-130	145-174	1	59	1.670	50,000
	161-193	233-280	1	89	1.110	33,500
	243-292	378-454	1	119	0.833	25,000
	400-480	590-708	1	179	0.556	16,500
	645-774	800-960	1	239	0.417	12,500
165	21-25	88-106	1	59	1.670	33,500
	108-130	124-149	1	89	1.110	33,500
	130-156	216-259	1	119	0.833	25,000
	233-280	340-408	1	179	0.556	16,500
	378-454	590-708	1	239	0.417	12,500
	250	21-25	30-36	1	59	1.670
36-43		64-77	1	89	1.110	33,500
72-86		88-106	1	119	0.833	25,000
108-130		189-227	1	179	0.556	16,500
216-259		324-389	1	239	0.417	12,500
330		21-25	21-25	1	59	1.670
	25-36	30-36	1	89	1.110	33,500
	36-43	64-77	1	119	0.833	25,000
	72-86	88-106	1	179	0.556	16,500
	108-130	130-156	1	239	0.417	12,500

Typical life expectancy is 50,000 cycles for 125V ratings, and 40,000 total cycles for 165, 250 and 330V ratings. The number of cycles shown in the table above are for the convenient test time of 35 days total for all ratings.

Duty Cycles of Type I

Table B

<u>Rated Voltage VAC (rms)</u>	<u>Capacitance Rating (µF)</u>	<u>Duty Cycle</u>		<u>% Duty Cycle</u>	<u># of Starts</u>
		<u>Secs. (On)</u>	<u>Secs. (Off)</u>		
125	all	0.75	29.25	2.500	75,000
165	all	1	59	1.670	40,000
250	all	1	59	1.670	40,000
330	all	1	59	1.670	40,000

If an application exceeds the duty cycles of Type I, other methods of capacitor selection must be used. Contact CDE, for Engineering assistance.

MOUNTING

Vertical mounting of the capacitor with the terminals up is recommended. However, horizontal mounting is acceptable providing the vent is in the upward position. Vertical mounting with the terminals down is not recommended because the capacitor life may be reduced.