

# AC Motor Run Capacitors -Oil Filled

## Features-

- Self-healing, metallized polypropylene film
- Oil filled
- Metal Case, Moisture and Oil Resistant
- Voltages from 240 - 660 VAC
- Single (800P) & Dual (810P) Capacitance Values
- Meets EIA 456 Specifications
- UL Recognized Capacitors
- RoHS Compliant

## General Specifications-

### Operating Temperature:

-40 to +70°C (std.)

Higher temps available upon request.

### Voltage Range:

240 - 660 VAC

### Capacitance Range:

3 - 120 $\mu$ F

### Capacitance Tolerance:

$\pm$ 6% (std.) – others available

### Operating Frequency:

50/60Hz

### Case Sizes:

Round & Oval Sizes

### Termination:

1/4" Quick Disconnect Terminals (Std.)

### Performance Specifications:

Meets Requirements of EIA-456

UL310 & UL 810, C22.2 No. 190

RoHS Compliant



## Product Description:

BMI's type 800P and 810P AC Motor Run units are non-polarized oil-filled metallized polypropylene film capacitors designed for continuous AC applications. These capacitors are used in split phase motor, compressor, filter and other AC applications. The capacitors are housed aluminum cases with steel covers. Different terminal configurations are available for various wiring options. Mounting hardware and brackets are available to facilitate mounting. Units can be supplied with bleeder resistors if required.

## 800P SINGLE - PART NUMBER BREAK-DOWN:

**800P 505 H 44 M 25 A 4 X BM**

CUSTOMER CODE

**ACCESSORIES:**

G = GROUND LUG  
 R = RESISTOR  
 S = STUD CAN  
 W = BRACKET  
 X = NO ACCESSORIES (STD.)

**TERMINAL TYPE:**

3 = 1/4" TRIPLE QUICK-CONNECT  
 4 = 1/4" QUADRUPLE QUICK-CONNECT (STD.)  
 5 = 1/4" COMBINATIONS (DOUBLE/TRIPLE/QUADRUPLE)  
 7 = 1/4" SOLDER LUG QUICK-CONNECT

**CASE MATERIAL:**

A = ALUMINUM (STD.)  
 N = TIN PLATED STEEL  
 P = PAINTED STEEL

**CASE HEIGHT:**

EXPRESSED WITH THE FIRST DIGIT IN WHOLE INCHES  
 AND THE SECOND DIGIT IN 1/8"s  
 FOR EXAMPLE, 30 = 3.00", 46 = 4.75"

**BASE CASE CODE:**

A = 2.156" x 1.312" OVAL  
 C = 2.906" x 1.906" OVAL  
 D = 3.656" x 1.968" OVAL  
 M = 1.75" ROUND  
 N = 2.00" ROUND  
 P = 2.50" ROUND

**AC VOLTAGE RATING:**

EXPRESSED IN TENS OF VOLTS.  
 FOR EXAMPLE, 37 = 370VAC.

**CAPACITANCE TOLERANCE:**

H = ±6% (STD.)  
 K = ±10%  
 L = ±5%  
 W = ±3%

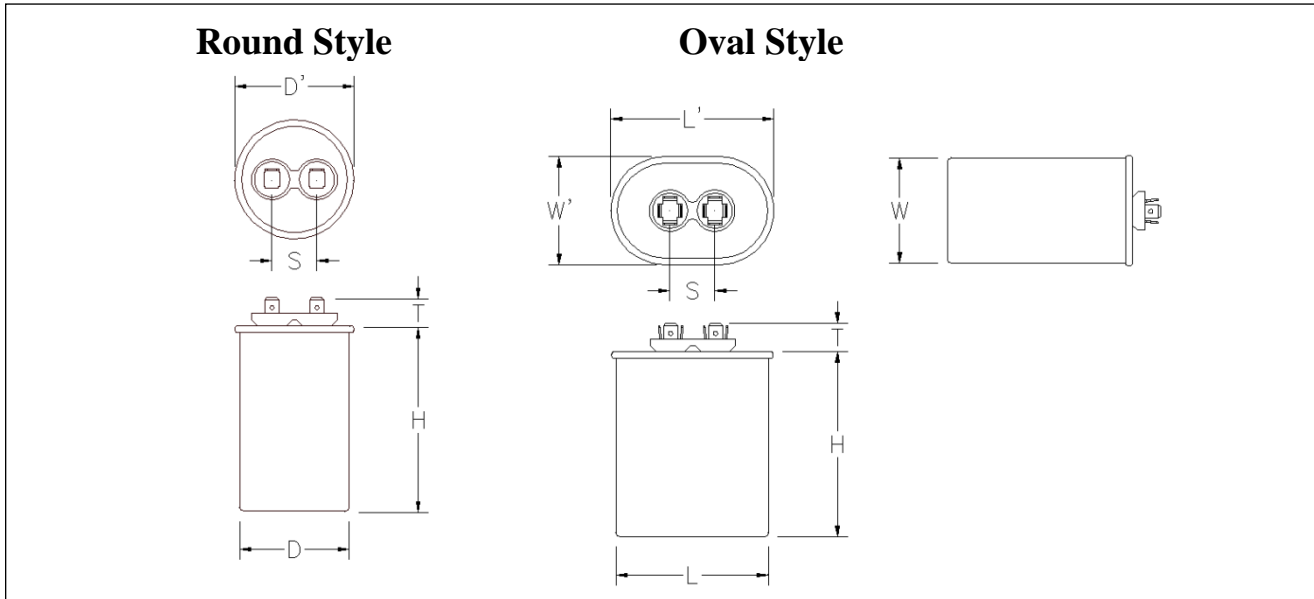
**CAPACITANCE:**

EXPRESSED IN PICO FARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS. THE LETTER "D" INDICATES 0.5µF FOR CAPACITORS 10.5µF AND ABOVE. FOR EXAMPLE, 7.5µF = 755, 12.5µF = 12D AND 30µF = 306

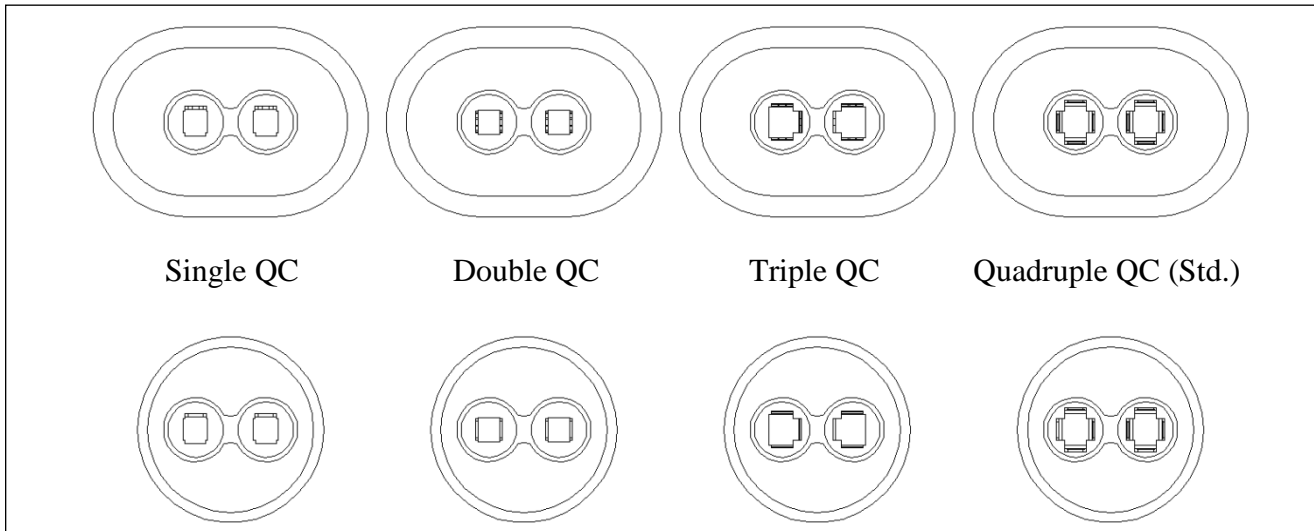
**BMI TYPE #:**

IDENTIFIES THE BASIC CAPACITOR DESIGN.

## Motor Run Capacitor Dimensions (Single)



## Motor Run Terminal Configurations



OVAL CANS					
BASE CODE	L x W $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	L' x W' $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	H $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	T $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	S $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )
A	2.056'' x 1.223'' (52.2 x 31.1mm)	2.156'' x 1.312'' (54.8 x 33.3mm)	See Max Capacitance Table	0.468'' (11.9mm)	0.812'' (20.62mm)
C	2.777'' x 1.782'' (70.5 x 45.3mm)	2.906'' x 1.906'' (73.8 x 48.4mm)		0.468'' (11.9mm)	0.812'' (20.62mm)
D	3.535'' x 1.844'' (89.8 x 46.8mm)	3.656'' x 1.968'' (92.9 x 50.0mm)		0.468'' (11.9mm)	0.812'' (20.62mm)

ROUND CANS					
BASE CODE	D $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	D' $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	H $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	T $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	S $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )
M	1.750'' (44.5mm)	1.875'' (47.6mm)	See Max Capacitance Table	0.468'' (11.9mm)	0.812'' (20.62mm)
N	2.000'' (50.8mm)	2.125'' (54.0mm)		0.468'' (11.9mm)	0.812'' (20.62mm)
P	2.500'' (63.5mm)	2.625'' (66.7mm)		0.468'' (11.9mm)	0.812'' (20.62mm)

## 800P Maximum Capacitance by Case Size (µF)

### OVAL

Base Code: "A" - 2.056" x 1.223" (52.2 x 31.1mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240	8.0	12	15									
330	7.0	12	13	15	17	18	22	26	28	32	35	
370	6.0	6.0	8.5	10	12	13	15	17	19	22	23	
440	4.0	4.5	6.5	7.0	8.0	9.0	11	13	14	16	18	
480	3.0	3.5	5.0	5.5	6.0	7.0	8.5	10	10	12	13	

Base Code: "C" - 2.777" x 1.782" (70.5 x 45.3mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240												
330				42	45	52	62	72	76	86	99	
370				28	30	36	44	50	52	58	68	
440				20	22	26	32	36	40	44	50	
480				16	18	20	24	28	30	34	38	

Base Code: "D" - 3.535" x 1.844" (89.8 x 46.8mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240												
330				76	80	94	99					
370				50	55	60	74	88	92	99		
440				34	40	46	54	62	68	76	86	96
480				28	32	36	42	48	52	60	66	72

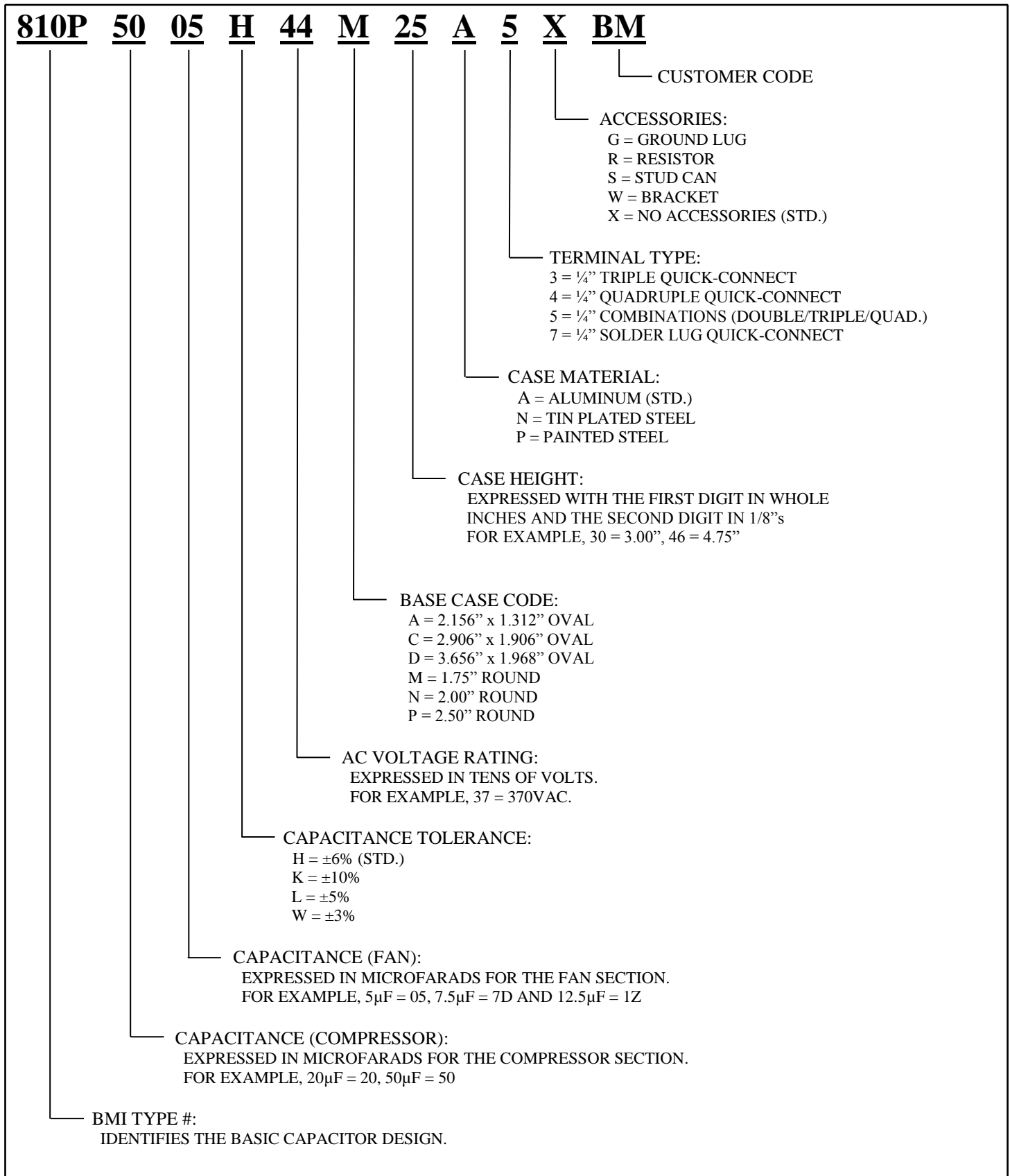
### ROUND

Base Code: "M" - 1.750" (44.5mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240		31	43	50	56	62	75	87	94			
330		20	28	32	36	40	48	56	60	68	78	
370		13	19	22	25	27	33	39	41	47	52	
440		9.5	14	16	18	20	24	28	30	35	38	
480		7.5	10	12	14	15	18	22	24	26	29	

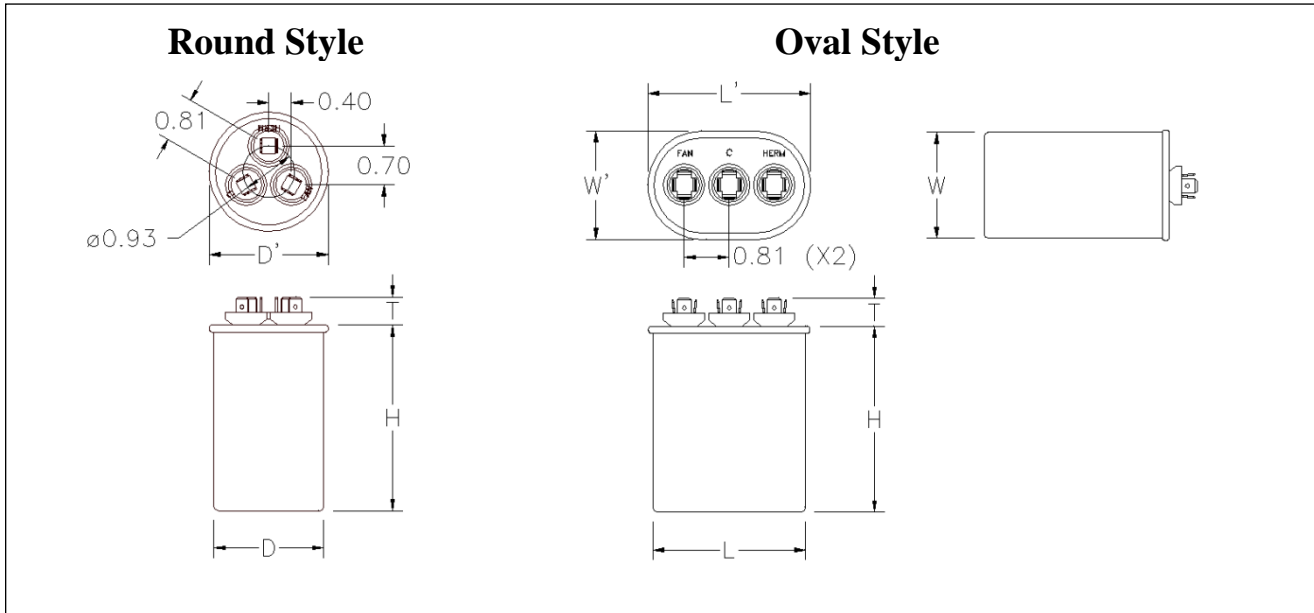
Base Code: "N" - 2.000" (50.8mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240			61	70	75	87	99					
330			39	45	50	56	67	78	84	95	99	
370			26	30	32	38	46	55	58	65	73	
440			20	22	25	28	33	39	42	48	54	
480			15	17	20	22	26	30	32	37	41	

Base Code: "P" - 2.500" (63.5mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240				99								
330				69	75	87	99					
370				50	55	63	75	88	95	99		
440				36	40	46	55	61	70	79	89	99
480				28	30	35	42	50	53	60	68	75

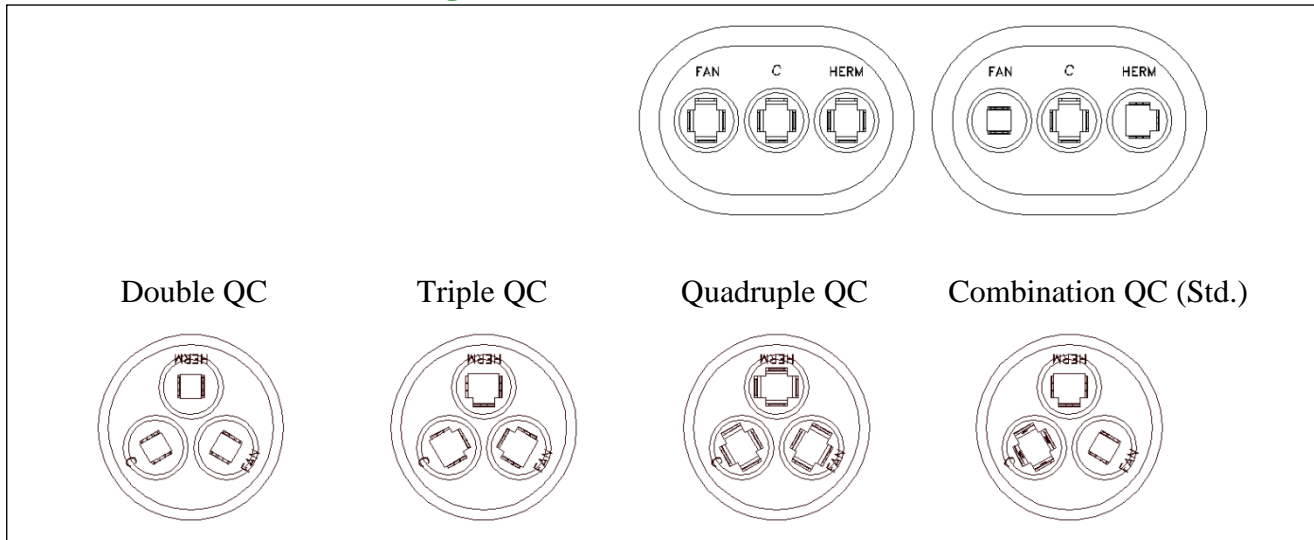
# 810P DUAL - PART NUMBER BREAK-DOWN:



## Motor Run Capacitor Dimensions (Dual)



## Motor Run Terminal Configurations



OVAL CANS					
BASE CODE	L x W $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	L' x W' $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	H $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	T $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	Terminal Spacing $\pm 0.060''$ (Center-to-Center) ( $\pm 1.52\text{mm}$ )
A	2.056" x 1.223" (52.2 x 31.1mm)	2.156" x 1.312" (54.8 x 33.3mm)	See Max Capacitance Table	0.468" (11.9mm)	0.812" (20.62mm)
C	2.777" x 1.782" (70.5 x 45.3mm)	2.906" x 1.906" (73.8 x 48.4mm)		0.468" (11.9mm)	0.812" (20.62mm)
D	3.535" x 1.844" (89.8 x 46.8mm)	3.656" x 1.968" (92.9 x 50.0mm)		0.468" (11.9mm)	0.812" (20.62mm)

ROUND CANS					
BASE CODE	D $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	D' $\pm 0.031''$ ( $\pm 0.79\text{mm}$ )	H $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	T $\pm 0.060''$ ( $\pm 1.52\text{mm}$ )	Terminal Spacing $\pm 0.060''$ (Center-to-Center) ( $\pm 1.52\text{mm}$ )
M	1.750" (44.5mm)	1.875" (47.6mm)	See Max Capacitance Table	0.468" (11.9mm)	0.812" (20.62mm)
N	2.000" (50.8mm)	2.125" (54.0mm)		0.468" (11.9mm)	0.812" (20.62mm)
P	2.500" (63.5mm)	2.625" (66.7mm)		0.468" (11.9mm)	0.812" (20.62mm)

## 810P Maximum Combined Capacitance by Case Size (µF)

### OVAL

Base Code: "C" - 2.777" x 1.782" (70.5 x 45.3mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240												
330				42	45	52	62	72	76	86	99	
370				28	32	36	44	50	52	58	68	
440				20	22	26	32	36	40	44	50	
480				16	18	20	24	28	30	34	38	

Base Code: "D" - 3.535" x 1.844" (89.8 x 46.8mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240												
330				76	82	94	99					
370				50	55	60	74	88	92	99		
440				34	40	46	54	62	68	76	86	96
480				28	30	36	42	48	52	60	66	72

### ROUND

Base Code: "N" - 2.000" (50.8mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240			61	70	75	87	99					
330			39	45	50	56	67	78	84	95	99	
370			26	30	32	38	46	55	58	65	73	
440			20	22	25	28	33	39	42	48	54	
480			15	17	20	22	26	30	32	37	41	

Base Code: "P" - 2.500" (63.5mm)												
Rated Voltage	Case Height in. (mm)											
	1.625 (41.3)	2.000 (50.8)	2.375 (60.3)	2.625 (66.7)	2.750 (69.9)	3.000 (76.2)	3.375 (85.7)	3.750 (95.3)	4.000 (101.6)	4.250 (108.0)	4.750 (120.7)	5.125 (130.2)
240				99								
330				69	75	87	99					
370				50	55	63	75	88	95	99		
440				36	40	46	55	61	70	79	89	99
480				28	30	35	42	50	53	60	68	75

## TYPICAL DATA AND PERFORMANCE CHARACTERISTICS FOR AC MOTOR RUN CAPACITORS

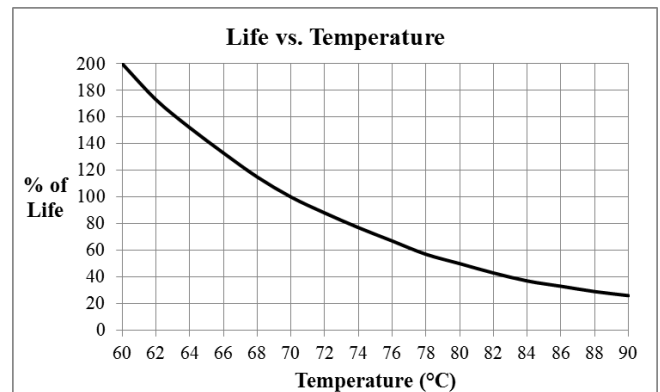
1. **Operating Temperature.** These capacitors are designed to operate within the ambient temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ .
2. **Frequency.** Standard operating frequency range is 50Hz to 60Hz.
3. **Voltage Rating.** The rated voltage is the rms value of AC voltage at which the capacitor may be operated at maximum ambient temperature.
4. **Capacitance.** The capacitance shall be measured on an AC bridge at a frequency of 60Hz at standard test conditions. When measured at the operational limits the capacitance will not change by more than  $-5\%$  to  $+2\%$  of the  $+25^{\circ}\text{C}$  capacitance value.
5. **Single & Dual Value Capacitors** – BMI manufactures both types. Single value capacitors are one capacitor value in one case with two quick connect terminals. Dual value capacitors are designed to house two separate valued capacitors in the same housing. The dual capacitor has three terminals labeled “C”, “Fan”, and “Herm” for the common, fan, and hermetic (pressure/compressor) electric lines to support two electric motors.
6. **Self-Healing** – The metallized capacitor element self-heals itself by automatically “clearing” any defects within microseconds, and the capacitor continues to function at full efficiency. The metallized electrode evaporates around the defect allowing full functionality of the element with negligible capacitance loss.
7. **Dissipation Factor.** The dissipation factor (DF) shall not exceed 0.1% when measured at a frequency of 60Hz &  $+25^{\circ}\text{C}$ ; 1% at 1kHz &  $+25^{\circ}\text{C}$ .
8. **Leakage Current** – When 115VAC (60Hz) is applied between the shorted capacitor terminals and the bare case, the leakage current will not exceed the values shown on the following table:

Capacitance ( $\mu\text{F}$ )	Leakage Current ( $\mu\text{A}$ )
0-14	60
14.1-20	70
20.1-35	100
35.1 - up	150

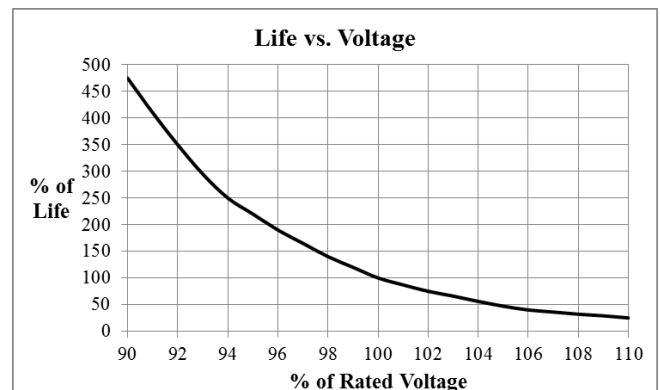
9. **Life Expectancy** – The Barker Microfarads manufactured AC electrolytic motor run capacitors are designed to have a life expectancy of 60,000 hours with an estimated survival of better than 94%. Their first year survival under rated operating conditions is designed to be greater than 99.5%.

- 9.1. The useful life of a motor run capacitor is affected by operation temperature and voltage compared to the capacitor rating. For example:

Effects of Application Temperature vs. Rated Temperature



Effects of Application Voltage vs. Rated Voltage





**10. Accelerated Life Test (Elevated Temperature)** – To confirm life expectations the following accelerated test conditions may be applied:

- 10.1. Measure the capacitance and DF at standard conditions.
- 10.2. Apply a test voltage of 1.25X rated voltage at 60Hz for a period of 2,000 hours at 80°C in a chamber with capacitors separated by at least 1 inch of air. There shall be sufficient air circulation so that the ambient temperature does not vary by more than  $\pm 3^\circ\text{C}$ .
- 10.3. Upon completion of the test, the capacitance and DF will be measured at a temperature of +25°C. None of the following will have occurred to pass the test.
  - Permanent short circuit.
  - Continuous or intermittent open circuit.
  - Change of capacitance by more than  $\pm 3\%$ .
  - An increase in DF by more than 0.1%.

**11. Accelerated Life Test (Room Temperature)** – To confirm life expectations the following accelerated test conditions may also be applied:

- 11.1. Measure the capacitance and DF at standard conditions. Apply a test voltage of 1.35X rated voltage at 60Hz for a period of 120 hours at +25°C.
- 11.2. Upon completion of the test, the capacitance and DF will be measured at a temperature of +25°C.
- 11.3. The same pass conditions must be fulfilled as in the elevated temperature test.

**12. Surge Voltage.** Standard maximum peak transient surge voltage rating must not exceed 315% of rated voltage AC (rms).

**13. Overvoltage Test.** Standard maximum over-voltages are 140% of standard rated voltages AC (rms) for a duration of one second at the room temperature measurement condition. This is used for quality testing only.

**14. Voltage Tests –**

- 14.1. Terminal to Terminal – Capacitors are capable of withstanding the applications of 1.75X rated voltage for a period of 1 second at +25°C.

14.2. Terminal to Case – Capacitors are capable of withstanding the application of 2X rated voltage + 1000VAC for a period of 1 second at +25°C.

**15. Storage Life.** With no voltage applied, the capacitors shall be capable of being exposed to temperatures of  $-40^\circ\text{C}$  to  $+90^\circ\text{C}$  without permanent damage. The time of exposure in the  $-40^\circ\text{C}$  to  $+40^\circ\text{C}$  range without permanent damage is 10 years.

**16. Terminal Strength.** The capacitor terminals shall be capable of withstanding a steady push or pull of 220 N (50 lb<sub>f</sub>). There shall be no loosening of the terminals or damage to the terminals or seal. A torque of 0.34 N·m (3.00 lb<sub>f</sub>-in) applied to the terminals shall not cause them to rotate.

**17. Internal Pressure Interrupter.** The motor run capacitor is equipped with an internal protective mechanical device to prevent case rupture under capacitor fault conditions at specified levels of voltage and fault current causing an open circuit failure (P2).

Failure Modes:

P2 – The capacitor is designed to fail in Open circuit mode only and is protected against fire and shock hazard.

P1 – The capacitor is designed to fail in either open circuit or short-circuit mode and is protected against fire and shock hazard.

P0 – The capacitor has no specific failure protection.

**18. Fault Current** – BMI AC motor run capacitors are rated to a fault current up to 10,000 Amps (AFC).

**19. Marking.** Capacitors will have the following minimum marking:

**Manufacture's Name and/or LOGO**  
**Manufacture's Part Number**  
**Capacitance**  
**Capacitance Tolerance**  
**Rated Voltage**  
**Rated Frequency**  
**Rated Temperature**  
**Assembled in USA & Date Code**  
**Failure Mode Code**  
**10,000 AFC**  
**Catalog Parts include CUL recognition & CE marking**  
**"NO PCB's"**  
**Bar coding (optional)**

**20. Mechanical Options.** Additional hardware is available at customer request. The standard quadruple quick disconnect terminal is the basis for this product but other terminals may be available at the request of the customer drawing.

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**NOTES**

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