

Motor capacitors

V1.2 (3/4/21)

Two types

1. Run Capacitors
2. Start Capacitors

Run Capacitors for Sale

Voltage rating. These capacitors are rated for 240V AC motors and similar applications. The rating may be stated as 450VAC OR 400V~ 10000h /cl.B etc The caps fail due to overheating due to too much electrical current, see service notes/best life above.

Brand of capacitor may vary

Dimensions: Approximate and may vary, if size is critical, confirm dimensions before buying, bolt may or may not be present.

Round Capacitors

Plus 15mm for spade connectors, Plus 20mm for mounting bolt (may be gently cut off if required)

Size	Diameter	Length	Weight.	
1uF	25mm	58mm	40g	
2.5uF	20mm	55mm	45g	Also see square capacitors below.
4uF	30mm	60mm	60g	Smaller dishwasher wash pumps
5uF	30mm	60mm	60g	
6uF	30mm	60mm	60g	
7uF	30mm	60mm	60g	F/P dryer motors
8uF	30mm	60mm	60g	Dryer motors, old dishwasher wash pumps
10uF	35mm	60mm	70g	washing machine motors
12uF	35mm	70mm	85g	Large washing machine motors
14uF	35mm	75mm	90g	Large washing machine motors
16uF	35mm	70mm	105g	Large washing machine motors
20uF	40mm	70mm	110g	Large Motor

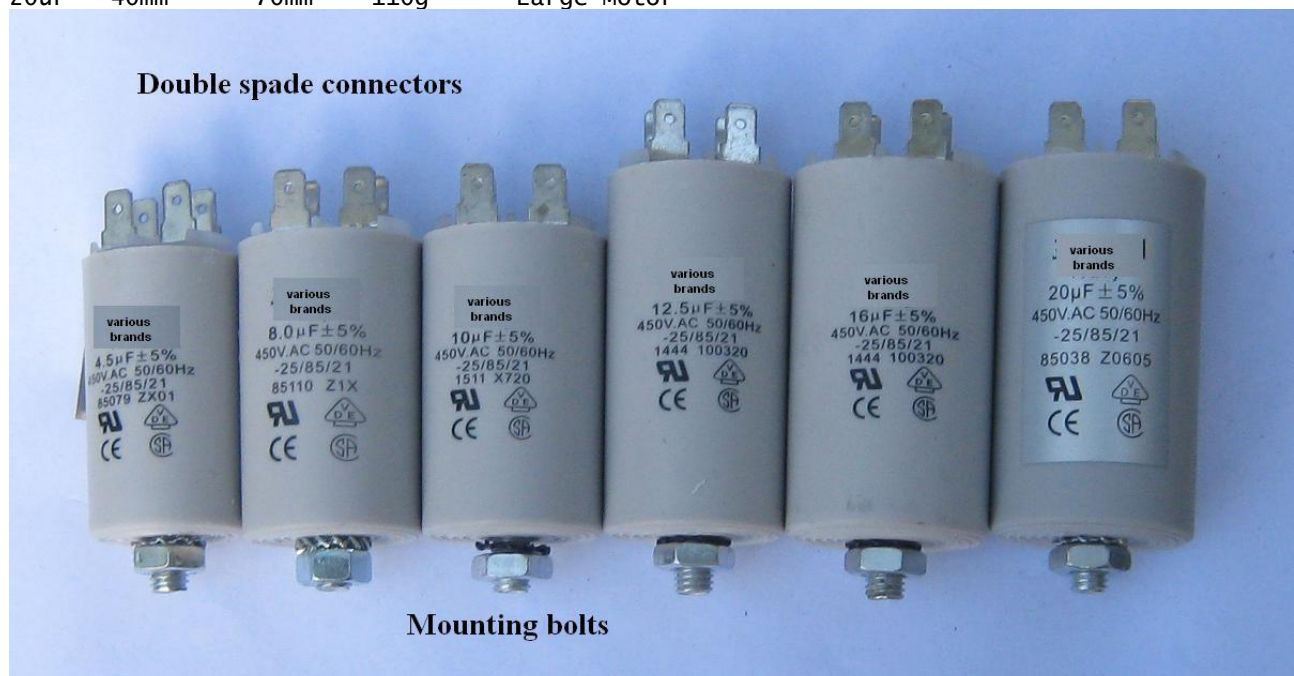


Illustration 1: Some Run Capacitors 1uF to 20uF

Rectangle Capacitors (Square Capacitors)

Size	Dimensions	Weight
1uF	37 x 13 x 24mm	30g (not available)
1.5uF	37 x 14 x 25mm	30g
2uF	37 x 15 x 27mm	30g
3uF	37 x 15 x 27mm	30g

Capacitors have a double spade connectors at each end the are 4.7mm (mostly 1uF caps) and 6.4mm (others) but this can vary and is

not part of specifications.
Add 15mm height for spade connectors, moulded lug for mounting bolting bolt (may be gently cut off if required)



Illustration 2: Some rectangle Run Capacitors

Large Capacitors

Size	Diameter	Length	weight.
25uF	45mm	92mm	160g
30uF	45mm	70mm	110g
40uF	51mm	106mm	200g
45uF	51mm	106mm	200g
50uF	50mm	120mm	230g
60uF	55mm	130mm	270g
80uF	50mm	115mm	245g
80uF	55mm	120mm	300g
100uF	55mm	120mm	315g/270g

Some with plastic case, some with aluminium case some with or without mounting bolt.



Illustration 3: Some Large Capacitors 25uF to 100uF

Start Capacitors

Voltage Rating 330V AC

Can use run capacitor if size allows, start capacitors are much smaller dimensions.

PartNo.	Size uF	Dia	Length	Weight	Applications
CAP053S	53-64uF	56mm	85mm	145g	whirlpool motor
CAP064S	64-77uF	45mm	85mm	145g	
CAP073S	72-83uF	56mm	85mm	145g	
CAP088S	88-106uF	45mm	85mm	145g	
CAP108S	108-136uF	50mm	110mm	230g	
CAP130S	130-156uF	52mm	110mm	145g	
CAP145S	145-174uF	50mm	110mm	230g	
CAP161S	161-193uF	50mm	110mm	230g	
CAP216S	216-260uF	50mm	110mm	230g	
CAP233S	233-280uF	52mm	112mm	230g	
CAP243S	243-292uF	50mm	110mm	230g	
CAP324S	324-388uF	50mm	110mm	230g	



Illustration 4: Some Start Capacitors

Service Notes

Use this information at own risk, Fair Warning..read

Run Capacitors

These capacitors are used in capacitor run motors in pressure pumps, washing machine, dryers, dishwashers etc. with capacitor run motors (3 power wires to motor A1, A2, C) plus an earth see Illustration 5) The larger the capacitor (μF) the more current flow through the winding and more power.

Start Capacitors

Not stated but start capacitors are generally have the following features. These caps are 'Electrolytic' and are suitable only for short time in use in starting motors, and are only rated for a small number of starts per hour. The start cap must be in series with the centrifugal switch. They are not suitable for cap run motors as they only rated for intermittent use. Electrolytic start caps are much smaller in physical size than run capacitors. Run capacitors can be used as start capacitor but are much bigger in size and may not fit into the capacitor box.

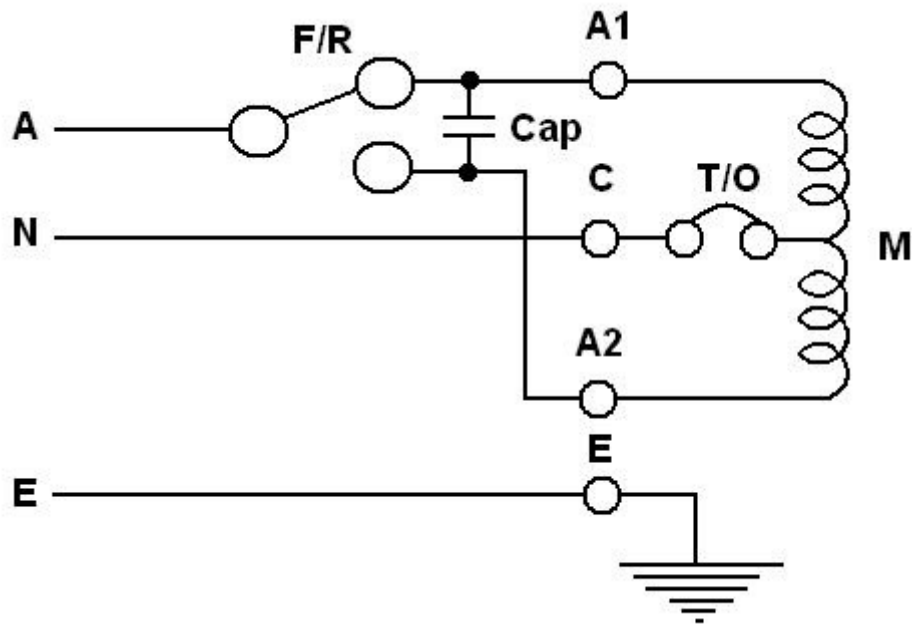


Illustration 5: Capacitor Run Motor Wiring

Illustration 2 show a motor with a start capacitor (C1) and a run capacitor (C2). A motor may not have any capacitors, may have only a start capacitor (C1) which improves the starting and protects the start winding. Some times on larger motors a run capacitor (C2) is added to get a little extra power out of the motor.

Capacitors have only two connections, each connection is a double spade connector, the pair of connectors are joined together, some can be seen on the top, other the join is under the plastic casing. (Pix4)

If the motor is not starting or starting slow then check the capacitor and the motor winding resistance. (Illustration1)

Some large electric motors (ie pumps) may have 2 capacitors, a start capacitor a run capacitor.

The replacement capacitor should be replaced with one within 10% of the manufacturer specification. The size is printed on side.

Inspect original capacitor, for any with bulges or leakage, they need to be replaced

Some capacitors fail without any visual sign, measure the insulation resistance with a digital multimeter.

Measure the Capacitance with a digital meter (more expensive meters) on a capacitance range. Start capacitors do not give reliable results with the meter.

Substitute a suspect faulty one with good capacitor.

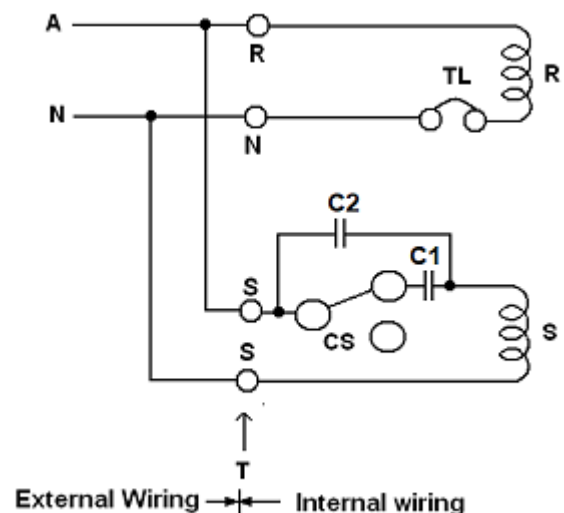


Illustration 6: Induction Motor with Start Capacitor and Run Capacitor

CS Centrifugal Switch C1 Start Cap. C2 Run Cap.

How to get best service life from the capacitor

Capacitor run motors are simple in construction but have low starting torque. The motor current increases with load, when the motor is running less than the rated speed due to heavy load or on starting with a load. This results in more current flowing through the windings and the capacitor. This generates heat.

1. Do not overload the motor.
2. Try and start the motor with no load.
3. Avoid repeated starts with heavy load.
4. Air Compressors: Start air compressor with the off/on switch on the compressor, not the power point. The compressor switch bleeds air out to reduce the starting load.
5. Water pumps: These start with no load but quickly get to full load. Avoid repeated stop starts. Fix leaking taps etc.

Some original capacitor that need replacing

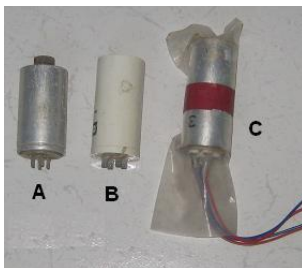


Illustration 7: Some Capacitor to Replace

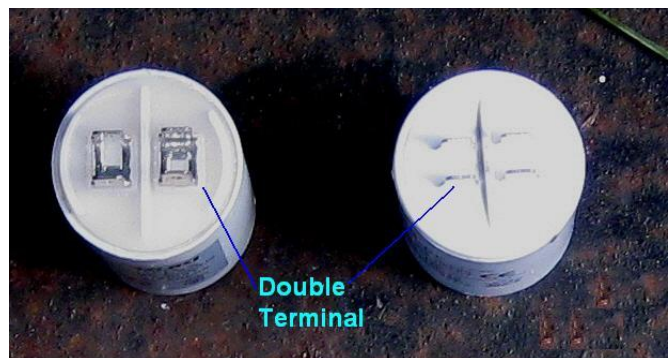


Illustration 8: Capacitor Double Terminals

Illustration 7 A: Aluminium case capacitor, B: Plastic case capacitor, C: Capacitor with leads instead of spade terminals.

Illustration 8: They some times have double terminals, sometimes exposed sometimes hidden below the plastic.

Cannot read the size of the capacitor?

The following was found from a web search.

Start Capacitor for 240V AC motor. Suggested size in table from the web. A Whirlpool washing machine motor is marked 1/2HP and uses a 64 μ F start capacitor. The table shows a larger capacitor. Use the table as a guide, I cannot guarantee this information. The start capacitor limits the amount of current flowing through the start winding, the larger the capacitor the more electrical current. If too much current flow the winding will overheat and fail. The start capacitor is only in the circuit for a very short time, so it is not as critical as the run capacitor. If the motor starts too hard use a smaller capacitor, if it is too slow starting use a bigger capacitor.

HP	HP	kW	μ F
1/8	0.125	0.093	20-30
1/6	0.166	0.125	30-40
1/4	0.250	0.185	40-70
1/3	0.330	0.249	60-80
1/2	0.500	0.373	80-100
3/4	0.750	0.560	108-140

HP	HP	kW	μF
1	1.000	0.746	138-182

Note 1HP = 0.746kW = 746W.

The same source as the start capacitors. The size for the run capacitor (illustration6: capacitor C2) The capacitor to get a little extra power out of the start winding when the motor is operating. Need to check if the motor is not getting too hot.

HP	μF
1/8	4-5
1/2	10
1 - 2	4 - 5
3	20
5	Max 40