

# CAPACITALK™

MYRON ZUCKER 

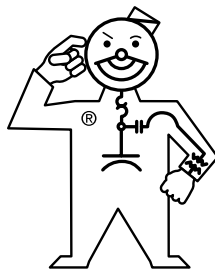
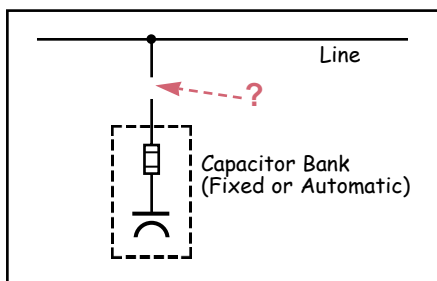
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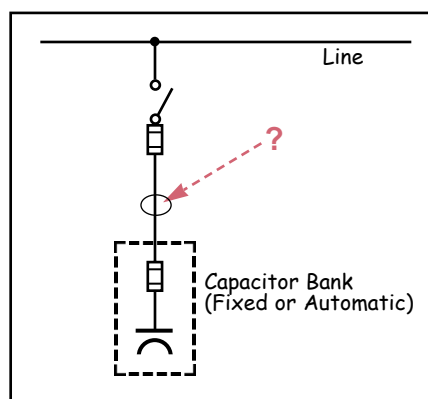
## Wires, Fuses and Disconnects — What Size Do I Use?

**W**iring power factor capacitors in your electrical system involves determining the proper size wire, fuse and disconnecting means when the power factor capacitor is not part of a motor circuit. The following are some requirements from the 1999 National Electrical Code, Article 460:

### How Do I Determine Fusing and Disconnect Size?



### How Do I Determine Wire Size?



### NEC Article 460-8-a

The ampacity of capacitor circuit conductors shall not be less than 135 percent of the rated current of the capacitor.

### NEC Article 460-8-b

- (1) An overcurrent device shall be provided in each ungrounded conductor for each capacitor bank.
- (2) The rating or setting of the overcurrent device shall be as low as practicable.

### NEC Article 460-8-c

- (1) A disconnecting means shall be provided in each ungrounded conductor for each capacitor bank.
- (4) The rating of the disconnecting means shall not be less than 135 percent of the rated current of the capacitor.

### Example:

Following the requirements set forth in NEC Article 460, the wire, fuse and disconnect sizes for a 400 KVAR capacitor bank at 480 volt, 60 Hz would be as follows:

$$400 \text{ KVAR} \times 1.2 \text{ amps per KVAR} = 480 \text{ amps}$$

$$480 \text{ amps} \times 135\% = 648 \text{ amps}$$

$$\text{Disconnect or circuit breaker size} = 800 \text{ amps}$$

$$\text{Fuse size} = 800 \text{ amps}$$

$$\text{Wire size} = (2) 500 \text{ mcm per phase}$$

On the back of this issue, you will find a convenient chart of recommended wire, fuse and switch sizes for 3-phase 60 Hz capacitors—240, 480 and 600 volts.



# Recommended Wire Sizes, Switches and Fuses for 3-phase, 60 Hz Capacitors

(These wire sizes are based on 135% of rated current in accordance with the 1999 National Electrical Code, Article 460.)

KVAR	240 VOLTS				480 VOLTS				600 VOLTS			
	Current* (Amps)	Wire Size 90° C-Type THHN XHHW* or Equiv.†	Fuse (Amps)	C.B. or Switch (Amps)	Current* (Amps)	Wire Size 90° C-Type THHN XHHW* or Equiv.†	Fuse (Amps)	C.B. or Switch (Amps)	Current* (Amps)	Wire Size 90° C-Type THHN XHHW* or Equiv.†	Fuse (Amps)	C.B. or Switch (Amps)
1	2.4	14	5	30	1.2	14	3	30	1.0	14	3	30
1.5	3.6	14	6	30	1.8	14	3	30	1.4	14	3	30
2	4.8	14	10	30	2.4	14	5	30	1.9	14	3	30
2.5	6.0	14	10	30	3.0	14	6	30	2.4	14	5	30
3	7.2	14	15	30	3.6	14	6	30	2.9	14	5	30
4	9.6	12	20	30	4.8	14	10	30	3.8	14	6	30
5	12	12	20	30	6.0	14	10	30	4.8	14	10	30
6	14	10	25	30	7.2	14	15	30	5.8	14	10	30
7.5	18	10	30	30	9.0	14	15	30	7.2	14	15	30
10	24	8	40	60	12	12	20	30	9.6	12	20	30
12.5	30	8	50	60	15	10	25	30	12	12	20	30
15	36	6	60	60	18	10	30	30	14	10	25	30
17.5	42	6	70	100	21	8	35	60	16	10	30	30
20	48	4	80	100	24	8	40	60	19	8	35	60
22.5	54	4	90	100	27	8	50	60	22	8	35	60
25	60	2	100	100	30	8	50	60	24	8	40	60
27.5	66	2	125	200	33	6	60	60	26	8	45	60
30	72	2	125	200	36	6	60	60	29	8	50	60
32.5	78	1/0	150	200	39	6	65	100	31	8	50	60
35	84	1/0	150	200	42	6	70	100	34	6	60	60
37.5	90	1/0	150	200	45	6	75	100	36	6	60	60
40	96	2/0	175	200	48	4	80	100	38	6	65	100
42.5	102	2/0	175	200	51	4	90	100	41	6	70	100
45	108	3/0	200	200	54	4	90	100	43	6	75	100
50	120	3/0	200	200	60	2	100	100	48	4	80	100
52.5	126	3/0	200	200	63	2	110	200	50	4	80	100
55	132	4/0	250	400	66	2	125	200	53	4	90	100
60	144	4/0	250	400	72	2	125	200	58	2	100	100
65	156	4/0	250	400	78	1/0	150	200	62	2	110	200
70	168	300MCM	300	400	84	1/0	150	200	67	2	125	200
75	180	300MCM	300	400	90	1/0	150	200	72	2	125	200
80	192	350MCM	350	400	96	2/0	175	200	77	1/0	150	200
90	216	500MCM	400	400	108	3/0	200	200	86	1/0	150	200
100	240	500MCM	400	400	120	3/0	200	200	96	2/0	175	200
125	300	(2)4/0	500	600	150	4/0	250	400	120	3/0	200	200
150	360	(2)300MCM	600	600	180	300MCM	300	400	144	4/0	250	400
175	420	(2)350MCM	700	800	210	500MCM	400	400	168	300MCM	300	400
200	480	(2)500MCM	800	800	240	500MCM	400	400	192	350MCM	350	400
225	540	(3)300MCM	900	1200	270	(2)4/0	500	600	216	500MCM	400	400
250	600	(3)350MCM	1000	1200	300	(2)4/0	500	600	240	500MCM	400	400
275	660	(3)500MCM	1100	1200	330	(2)300MCM	600	600	264	(2)4/0	500	600
300	720	(3)500MCM	1200	1200	360	(2)300MCM	600	600	288	(2)4/0	500	600
350					420	(2)350MCM	700	800	336	(2)300MCM	600	600
400					480	(2)500MCM	800	800	384	(2)350MCM	700	800
450					540	(3)300MCM	900	1200	432	(2)400MCM	750	800
500					600	(3)350MCM	1000	1200	480	(2)500MCM	800	800
550					660	(3)500MCM	1100	1200	528	(3)300MCM	900	1200
600					720	(3)500MCM	1200	1200	576	(3)350MCM	1000	1200

\* Rated current based on operation at rated voltage, frequency, and KVAR.

† Consult National Electrical Code for other wire types. Above size based on 35°C Ambient Operation. (Refer to NEC table 310-16.)

**Note:** Fuses furnished within Capacitor Assembly may be rated at higher value than shown in this table. The table is correct for field installations and reflects the manufacturer's suggested rating for overcurrent protection and disconnect means in compliance with the National Electrical Code.

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