

Motor Load Tables



Motor Capacitor Selection

When capacitors are located at the load, maximum operational benefits are obtained. Overcorrection is also avoided since the capacitor is usually switched on and off with the load.

Capacitors must be carefully sized when switched with the motor as a unit, as dangerous overvoltages and transient torques may occur if the capacitor kVAR exceeds the motor magnetizing current. These tables are provided as an aid for proper selection. However, all conditions of these tables must be met to assure that overcorrection does not occur. If any condition is in doubt, then the motor manufacturer should be consulted.

Note: The capacitor sizes specified in these tables will increase the full load power factor to approximately .95. Larger sizes should not be used without consulting with Staco Energy Products beforehand.

Installation Locations

Motor Side of Overload Relay

- New motor installations where overloads can be sized in reference to reduced current draw.
- Existing motors where no overload change is needed.

Motor Side of Starter

- For existing motors when the overload rating exceeds code.

Line Side of Starter

- Multi-speed motors.
- Motors that are jogged or reversed.
- Motors that start frequently.
- Starters that disconnect/reconnect capacitors during cycle and starters with open transition.
- High inertia loads, when disconnecting the motor with the capacitor turns the motor into a self-excited generator.

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U-Frame NEMA Class B Motors & High Efficiency Motors

NEMA Motor Design A or B												
Normal Starting Torque — Normal Running Current												
HP Rating	3600 RPM		1800 RPM		1200 RPM		900 RPM		720 RPM		600 RPM	
	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R
3	1.5	14	1.5	15	1.5	20	2	27	2.5	35	3.5	41
5	2	12	2	13	2	17	3	25	4	32	4.5	37
7.5	2.5	11	2.5	13	2	15	4	22	5.5	30	6	34
10	3	10	3	11	3.5	14	5	21	6.5	27	7.5	31
15	4	9	4	10	5	13	6.5	18	8	23	9.5	27
20	5	9	5	10	5	11	7.5	18	10	20	10	25
25	5	6	5	8	7.5	11	7.5	13	10	20	10	21
30	5	5	5	8	7.5	11	10	15	15	22	15	25
40	7.5	8	10	8	10	10	15	16	15	18	15	20
50	10	7	10	8	10	9	15	12	20	15	25	22
60	10	6	10	8	15	10	15	11	20	15	25	20
75	15	7	15	8	15	9	20	11	30	15	40	20
100	20	8	20	8	25	9	30	11	40	14	45	18
125	20	6	25	7	30	9	30	10	45	14	50	17
150	30	6	30	7	35	9	40	10	50	17	60	17
200	40	6	40	7	45	8	55	11	60	12	75	17
250	45	5	45	6	60	9	70	10	75	12	100	17
300	50	5	50	6	75	9	75	9	80	12	105	17

Applies to three-phase, 60 Hz motors when switched with capacitors as a single unit.
%R is the percent of full load line current reduction.

T-Frame NEMA Class B Motors

NEMA Class B T-Frame Motors												
Normal Starting Torque — Normal Running Current												
HP Rating	3600 RPM		1800 RPM		1200 RPM		900 RPM		720 RPM		600 RPM	
	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R
3	1.5	14	1.5	23	2.5	28	3	38	3	40	4	40
5	2	14	2.5	22	3	26	4	31	4	40	5	40
7.5	2.5	14	3	20	4	21	5	28	5	38	6	45
10	4	14	4	18	5	21	6	27	7.5	36	8	38
15	5	12	5	18	6	20	7.5	24	8	32	10	34
20	6	12	6	17	7.5	19	9	23	10	29	12	30
25	7.5	12	7.5	17	8	19	10	23	12	25	18	30
30	8	11	8	16	10	19	14	22	15	24	22.5	30
40	12	12	13	15	16	19	18	21	22.5	24	25	30
50	15	12	18	15	20	19	22.5	21	24	24	30	30
60	18	12	21	14	22.5	17	26	20	30	22	35	28
75	20	12	23	14	25	15	28	17	33	14	40	19
100	22.5	11	30	14	30	12	35	16	40	15	45	17
125	25	10	36	12	35	12	42	14	45	15	50	17
150	30	10	42	12	40	12	52.5	14	52.5	14	60	17
200	35	10	50	11	50	10	65	13	68	13	90	17
250	40	11	60	10	62.5	10	82	13	87.5	13	100	17
300	45	11	68	10	75	12	100	14	100	13	120	17
350	50	12	75	8	90	12	120	13	120	13	135	15
400	75	10	80	8	100	12	130	13	140	13	150	15
450	80	8	90	8	120	10	140	12	160	14	160	15
500	100	8	120	9	150	12	160	12	180	13	180	15

Applies to three-phase, 60 Hz motors when switched with capacitors as a single unit.
%R is the percent of full load line current reduction.

Open Squirrel Cage NEMA Class 2B Motors

NEMA Class 2B Open Squirrel Cage Motors												
Normal Starting Torque — Normal Running Current												
HP Rating	3600 RPM		1800 RPM		1200 RPM		900 RPM		720 RPM		600 RPM	
	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R	kVAR	%R
3	1.5	14	1.5	15	1.5	20	2	27	2.5	35	3.5	41
5	2	12	2	13	2	17	3	25	4	32	4.5	37
7.5	2.5	11	2.5	12	3	15	4	22	5.5	30	6	34
10	3	10	3	11	3.5	14	5	21	6.5	27	7.5	31
15	4	9	4	10	5	13	6.5	18	8	23	9.5	27
20	5	9	5	10	6.5	12	7.5	16	9	21	12	25
25	6	9	6	10	7.5	11	9	15	11	20	14	23
30	7	8	7	9	9	11	10	14	12	18	16	22
40	9	8	9	9	11	9	12	13	15	16	20	20
50	12	8	11	9	13	10	15	12	19	15	24	19
60	14	8	14	8	15	10	18	11	22	15	27	19
75	17	8	16	8	18	10	21	10	26	14	32.5	18
100	22	8	21	8	25	9	27	10	32.5	13	40	17
125	27	8	26	8	30	9	32.5	10	40	13	47.5	16
150	32.5	8	30	8	35	9	37.5	10	47.5	12	52.5	15
200	40	8	37.5	8	42.5	9	47.5	10	60	12	65	14
250	50	8	45	7	52.5	8	57.5	9	70	11	77.5	13
300	57.5	8	52.5	7	60	8	65	9	80	11	87.5	12
350	65	8	60	7	67.5	8	75	9	87.5	10	95	11
400	70	8	65	6	75	8	85	9	95	10	105	11
450	75	8	67.5	6	80	8	92.5	9	100	9	110	11
500	77.5	8	72.5	6	82.5	8	97.5	9	107.5	9	115	10

Applies to three-phase, 60 Hz motors when switched with capacitors as a single unit.
%R is the percent of full load line current reduction.

Suggested Capacitor Ratings In Kilovar for NEMA Class C, D, and Wound-Rotor Motors

Induction Motor Rating (HP)	Design C Motor		Design D Motor	
	1800 & 1200 RPM	900 RPM	1200 RPM	Wound-Rotor Motor
15	5	5	5	5.5
20	5	6	6	7
25	6	6	6	7
30	7.5	9	10	11
40	10	12	12	13
50	12	15	15	17.5
60	17.5	18	18	20
75	19	22.5	22.5	25
100	27	27	30	33
125	35	37.5	37.5	40
150	37.5	45	45	50
200	45	60	60	65
250	54	70	70	75
300	65	90	75	85

Applies to 3 phase 60 Hz motors when switched with capacitors as a single unit.

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

240 Vac					480 Vac					600 Vac				
kVAR	CURRENT (Amps)	WIRE SIZE	FUSE (Amps)	SWITCH (Amps)	kVAR	CURRENT (Amps)	WIRE SIZE	FUSE (Amps)	SWITCH (Amps)	kVAR	CURRENT (Amps)	WIRE SIZE	FUSE (Amps)	SWITCH (Amps)
2	4.8	14	10	30	2	2.4	14	5	30	2	1.9	14	3	30
2.5	6	14	10	30	2.5	3	14	6	30	2.5	2.4	14	4	30
3	7.2	14	15	30	3	3.6	14	7	30	3	2.9	14	4	30
4	9.6	14	15	30	4	4.8	14	10	30	4	3.8	14	5	30
5	12	14	20	30	5	6	14	10	30	5	4.8	14	7	30
6	14	14	25	30	6	7.2	14	15	30	6	5.8	14	9	30
7.5	18	12	30	30	7.5	9	14	17.5	30	7.5	7.2	14	12	30
8	19	10	30	60	8	9.6	14	20	30	8	7.7	14	12	30
10	24	10	40	60	10	12	14	25	60	10	9.6	14	15	60
12.5	30	8	50	60	12.5	15	11	30	30	12.5	12	14	20	30
15	36	8	60	60	15	18	12	35	30	15	14	14	20	30
17.5	42	6	70	100	17.5	21	10	40	60	17.5	17	12	25	30
20	48	6	80	100	20	24	10	50	60	20	19	10	30	60
22.5	54	4	90	100	22.5	27	10	50	60	22.5	22	10	35	60
25	60	4	100	100	25	30	8	60	60	25	24	10	35	60
30	72	3	125	200	30	36	8	80	200	30	29	8	45	60
35	84	2	125	200	35	42	6	80	100	35	34	8	50	60
40	96	1	175	200	40	48	6	100	100	40	38	6	60	100
45	108	1/0	175	200	45	54	4	100	100	45	43	6	70	100
50	120	2/0	200	200	50	60	4	125	100	50	48	6	80	100
60	144	3/0	250	400	60	72	2	150	200	60	58	4	90	100
75	180	250M	300	400	75	90	1/0	175	200	75	72	3	100	200
80	192	300M	300	400	80	96	1/0	175	200	80	77	3	125	200
90	216	350M	350	400	90	108	1/0	200	200	90	86	1	125	200
100	241	400M	400	400	100	120	2/0	250	200	100	96	1	150	200
120	289	(2) 3/0	500	600	120	144	3/0	300	200	120	115	2/0	175	200
125	300	(2) 3/0	500	600	125	150	3/0	300	400	125	120	2/0	200	200
150	361	(2) 250M	600	600	150	180	250M	350	400	150	144	3/0	225	400
					175	210	350M	400	400	175	168	250M	250	400
					200	241	400M	500	400	200	192	300M	300	400
					225	270	(2) 3/0	600	600	225	216	400M	350	400
					250	300	(2) 3/0	600	600	250	241	400M	350	400
					300	361	(2) 250M	600	600	300	289	(2) 3/0	450	600

Wire sizes based on NEC at 135% rated current using 90°C rated wire.

Note: Review published kVAR recommendations from motor manufacturers for other motor types such as severe duty, TEFC, etc.



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