

General

Protection of Motor Circuits

Molded case circuit breakers are used in motor circuits as a disconnecting means and for short-circuit protection. They should be used in conjunction with motor-running, over-current-protection devices, and should permit the motor to start without nuisance tripping from motor-inrush current. The circuit breaker should have a continuous-current rating of not less than 115% of the motor full-load current.

The recommended ETI instantaneous only circuit breakers listed in Table 1 have continuous-current ratings of at

least 115% of motor full-load currents. The trip-setting positions are approximately 11 times motor full-load currents. The suggested trip settings may have to be adjusted upward to no higher than 1300% of full-load current for non-design E type motors, and no greater than 1700% of full load current for design E motors, to allow for motor start-up due to inrush currents.

Breaker Mounted Immediately Ahead of Motor Starter

ETI instantaneous-trip circuit breakers are recommended for use in combination motor starters to provide selective short-circuit protection for the

motor branch circuit. The adjustable instantaneous-trip feature of the ETI circuit breaker provides for a trip setting slightly above the peak motor-inrush current. With this setting, no delay is introduced in opening the circuit when a fault occurs. This circuit breaker has no time-delay trip element. Therefore it must be used in conjunction with, and immediately ahead of, the motor-running overcurrent protective device.

Important: The information below does not apply to all motor applications: it is recommended that the user refer to the National Electrical Code (NEC) for specific needs.

Table 1 (When Breaker Is Mounted Immediately Ahead of Motor Starter)

3 Phase Induction Type Motors (ETI circuit breakers for branch circuit use with alternating-current combination, full voltage motor starters).

Motor Full Load Amperes	Catalog No	ETI Trip Setting	
		Adjustment	Amperes
.20–.33	ED63A001 CED63A001	Low	2.6
.34–.45		2	4.5
.46–.56		3	6
.57–.68		4	7.5
.69–.81		High	9
.53–.83	ED63A002 CED63A002	Low	7
.84–1.14		2	11
1.15–1.45		3	15
1.46–1.68		4	19
1.69–2.00		High	22
.76–1.29	ED63A003 CED63A003	Low	10
1.30–1.75		2	17
1.76–2.29		3	23
2.30–2.68		4	30
2.69–3.18		High	35
1.23–1.99	ED63A005 CED63A005	Low	16
2.00–2.75		2	26
2.76–3.52		3	36
3.53–4.14		4	46
4.15–4.90		High	54
2.30–3.80	ED63A010 CED63A010	Low	30
3.84–5.37		2	50
5.38–6.52		3	70
6.53–7.68		4	85
7.69–9.10		High	100
4.23–6.91	ED63A025 CED63A025	Low	55
6.92–9.61		2	90
9.62–11.91		3	125
11.92–13.83		4	155
13.84–16.40		High	180
6.15–10.37	ED63A030 CED63A030	Low	80
10.38–14.22		2	135
14.23–18.06		3	185
18.07–20.75		4	235
20.76–24.50		High	270
8.84–14.22	ED63A040 CED63A040	Low	115
14.23–19.60		2	185
19.61–24.99		3	255
25.00–28.83		4	325
28.84–34.00		High	375
13.84–23.06	ED63A050 CED63A050	Low	180
23.07–31.52		2	300
31.53–39.99		3	410
40.00–46.14		4	520
46.15–54.50		High	600
24.23–41.52	ED63A100 CED63A100	Low	315
41.53–56.91		2	540
56.92–68.45		3	740
68.46–76.91		4	890
76.92–90.90		High	1000

Motor Full Load Amperes	Catalog No	ETI Trip Setting	
		Adjustment	Amperes
38.46–55.37	ED63A125 CED63A125	Low	500
55.38–70.75		2	720
70.76–84.60		3	920
84.61–96.14		4	1100
96.15–113.60		High	1250
30.76–35.37	FXD62L150 FXD63L150 CFD62L150 CFD63L150	Low	400
35.38–39.99		2	460
40.00–44.60		3	520
44.61–49.23		4	580
49.23–53.83		5	640
53.84–58.45	FXD62A150 FXD63A150 CFD62A150 CFD63A150	6	700
58.46–63.06		7	760
63.07–74.50		High	820
61.53–69.22		Low	800
69.23–76.91		2	900
76.92–84.60	FXD62A250 FXD63A250 CFD62A250 CFD63A250	3	1000
84.61–92.29		4	1100
92.30–99.99		5	1200
100.00–108.00		6	1300
108.00–115.00		7	1400
115.00–136.00	High	1500	
85.00–100.00	FXD62A250 FXD63A250 CFD62A250 CFD63A250	Low	1100
100.00–115.00		2	1300
115.00–131.00		3	1500
131.00–146.00		4	1700
146.00–162.00		5	1900
162.00–177.00	JXD62L400 JXD63L400 CJD62L400 CJD63L400	6	2100
177.00–192.00		7	2300
192.00–227.00		High	2500
95.00–110.00		Low	1250
110.00–124.00		2	1430
124.00–138.00	JXD62H400 JXD63H400 CJD62H400 CJD63H400	3	1610
138.00–151.00		4	1790
151.00–165.00		5	1960
165.00–178.00		6	2140
178.00–192.00		7	2320
192.00–227.00	High	2500	
154.00–176.00	JXD62H400 JXD63H400 CJD62H400 CJD63H400	Low	2000
176.00–198.00		2	2290
198.00–220.00		3	2570
220.00–242.00		4	2860
242.00–264.00		5	3140
264.00–285.00	LXD62L600 LXD63L600 CLD62L600 CLD63L600	6	3430
285.00–308.00		7	3710
308.00–326.00		High	4000
155.00–176.00		Low	2000
176.00–198.00		2	2290
198.00–220.00	LXD62L600 LXD63L600 CLD62L600 CLD63L600	3	2570
220.00–242.00		4	2860
242.00–264.00		5	3140
264.00–285.00		6	3430
285.00–308.00		7	3710
308.00–326.00	High	4000	

Motor Full Load Amperes	Catalog No	ETI Trip Setting	
		Adjustment	Amperes
231.00–264.00	LXD62H600 LXD63H600 CLD62H600 CLD63H600	Low	3000
264.00–292.00		2	3430
292.00–330.00		3	3800
330.00–362.00		4	4290
362.00–395.00		5	4710
395.00–428.00		6	5140
428.99–462.00		High	5570
462.00–490.00	LXMD62L800 LXMD63L800	7	5570
215.00–238.00		Low	2800
238.00–261.00		2	3100
261.00–284.00		3	3400
284.00–308.00		4	3700
308.00–369.00		5	4000
369.00–423.00		6	4800
423.00–462.00	High	7	5500
462.00–490.00		High	6000
246.00–269.00	LXMD62A800 LXMD63A800	Low	3200
269.00–284.00		2	3500
284.00–323.00		3	3700
323.00–362.00		4	4200
362.00–492.00		5	4700
492.00–562.00		6	6400
562.00–616.00		7	7300
616.00–660.00	High	8000	
231.00–264.00	MXD62L800 MXD63L800 CMD62L800 CMD63L800	Low	3000
264.00–292.00		2	3430
292.00–330.00		3	3800
330.00–362.00		4	4290
362.00–395.00		5	4710
395.00–428.00		6	5140
428.00–462.00		7	5570
462.00–490.00	High	6000	
308.00–352.00	MXD62A800 MXD63A800 CMD62A800 CMD63A800	Low	4000
352.00–442.00		2	4570
442.00–447.00		3	5740
447.00–483.00		4	5810
483.00–527.00		5	6280
527.00–571.00		6	6850
571.00–616.00		7	7240
616.00–660.00	High	8000	
385.00–440.00	MXD62H800 MXD63H800 CMD62H800 CMD63H800	Low	5000
440.00–495.00		2	5715
495.00–550.00		3	6430
550.00–605.00		4	7145
605.00–660.00		5	7860
660.00–695.00		6	8575



Motor Circuits

Breaker Mounted at a Distance From Motor Starter

ET thermal-magnetic circuit breakers conform to the National Electrical Code table 430-152 requirements for motor branch and feeder circuit protection when properly applied in conjunction with motor-running overcurrent protective devices. The recommended

circuit-breaker ratings in Table 2 provide adequate time delay for starting the majority of three-phase induction motors.

To determine the ampere ratings of the ET breaker to protect a motor feeder, add the rating of the ET breaker used to protect the largest motor branch circuit

in the group to the full-load currents of the remaining motors in the group.

Interrupt Ratings

For normal commercial purposes, available fault current can conveniently be obtained in the Interrupting Selector Tables.

Table 2 (When Breaker Is Mounted at a Distance From Motor Starter)

3 Phase Induction Type Motors (EQ and ET circuit breakers [thermal-magnetic trip] for branch breaker use with alternating-current combination motor starters).

Motor Horsepower Rating	200V and 208V Motors			230V Motors			460V Motors			575V Motors		
	240V Circuit Breaker Data ^①			240V Circuit Breaker Data ^①			480V Circuit Breaker Data ^①			600V Circuit Breaker Data ^①		
	Breaker Type	Catalog No	Ampere Rating	Breaker Type	Catalog No	Ampere Rating	Breaker Type	Catalog No	Ampere Rating	Breaker Type	Catalog No	Ampere Rating
1/2	BQ ^②	BQ3B015	15	BQ ^②	BQ3B015	15	ED4	ED43B015	15	ED6	ED63B015	15
3/4		BQ3B015	15		BQ3B015	15		ED43B015	15		ED63B015	15
1		BQ3B015	15		BQ3B015	15		ED43B015	15		ED63B015	15
1 1/2		BQ3B015	15		BQ3B015	15		ED43B015	15		ED63B015	15
2		BQ3B020	20		BQ3B015	15		ED43B015	15		ED63B015	15
3		BQ3B030	30		BQ3B020	20		ED43B015	15		ED63B015	15
5	BQ ^②	BQ3B040	40	BQ ^②	BQ3B030	30	ED4	ED43B015	15	ED6	ED63B015	15
7 1/2		BQ3B060	60		BQ3B050	50		ED43B030	30		ED63B020	20
10		BQ3B070	70		BQ3B070	70		ED43B030	30		ED63B030	30
15		BQ3B100	100		BQ3B090	90		ED43B040	40		ED63B035	35
20					BQ3B100	100		ED43B050	50		ED63B050	50
25	FXD6	FXD63B125	125	FXD6	FXD63B125	125	ED4	FXD63B090	90	FXD6	FXD63B060	60
30		FXD63B150	150		FXD63B150	150		FXD63B100	100		FXD63B070	70
40		FXD63B175	175		FXD63B175	175		FXD63B125	125		FXD63B090	90
50		FXD63B200	200		FXD63B200	200		FXD63B150	150		FXD63B100	100
60	JXD2	JXD23B300	300	—	—	—	FXD6, FD6	FXD63B150	150	FXD6	FXD63B100	100
75	JXD2	JXD23B400	400	JXD2	JXD23B350	350	FXD6, FD6	FXD63B200	200	FXD6, FD6	FXD63B125	125
100	JXD2	JXD23B400	400	JXD2	JXD23B400	400	FD6 ^③ JD6 ^③	FD63B250 JD63B250	250 250	FXD6, FD6	FD63B175	175
125	LD6 ^③ or LMD6	LD63B600 LMD63B600	600	LD6 ^③ or LMD6	LD63B500 or LMD63B500	500	JD6 ^③	JD63B300	300	FXD6, FD6 or JD6 ^③	FXD63B200 JD63B200	200 200
150	LD6 ^③ or LMD6	LD63B600 or LMD63B600	600	LMD6	LD63B600 or LMD63B600	600	JD6 ^③	JD63B300	300	FXD6 or JD6 ^③	FXD63B225 JD63B225	225 225
200	LMD6	LMD63B800	800	LMD6	LMD63B800	800	JD6 ^③	JD63B350	350	JD6 ^③	JD63B300	300
250	—	—	—	—	—	—	JD6 ^③	JD63B400	400	JD6 ^③	JD63B400	400
300	—	—	—	—	—	—	LD6 ^③ or LMD6	LD63B600 or LMD63B600	600	JD6 ^③	JD63B400	400
350	—	—	—	—	—	—	LMD6	LMD63B700	700	LD6 ^③ or LMD6	LD63B500 or LMD63B500	500
400	—	—	—	—	—	—	LMD6	LMD63B800	800	LD6 ^③ or LMD6	LD63B600 or LMD63B600	600
500	—	—	—	—	—	—	—	—	—	LMD6	LMD63B800	800

①The selection of breakers for this table is in accordance with Article 430, 1996 National Electric Code. Recommended circuit breakers are for full voltage starting, special consideration is necessary for reduced voltage starting.

②For panelboard applications, substitute the BL breaker for the BQ, ED2 circuit breakers may also be used.

③For non-interchangeable trip applications, substitute the FXD6 for the FD6, the JXD6 for the JD6, or the LXD6 for the LD6.