

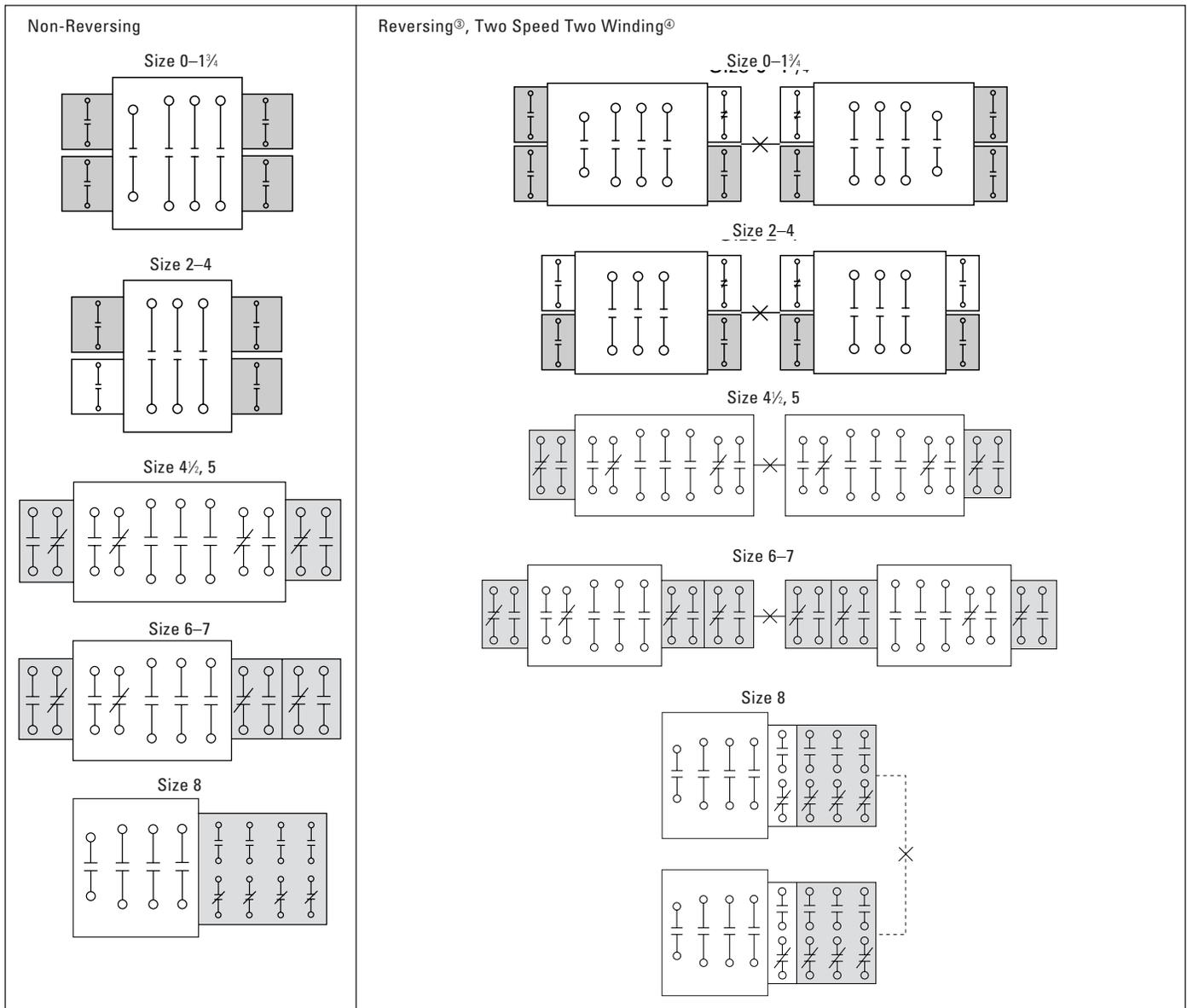
## Auxiliary Contact Configurations

**Heavy Duty Non-Reversing Contactor And Starter Auxiliary Contact Configurations**

Size	Standard Contacts at No Additional Price	Extra Contacts in Addition To Standard Contacts for an Additional Price <sup>①②</sup>	
		Left Hand Side	Right Hand Side
0-1¼	1-NO	2-NO or NC	2-NO or NC
2-4	1-NO	1-NO or NC	2-NO or NC
4½, 5	2-NO and 2-NC	1-NO and 1-NC	1-NO and 1-NC
6, 7	1-NO and 1-NC	1-NO and 1-NC	2-NO and 2-NC
8	1-NO	—	4-NO and 4-NC

**Heavy Duty Reversing Contactor And Auxiliary Contact Configurations**

Size	Standard Contacts <sup>③</sup> Per Contactor at No Additional Price	Extra Contacts Per Contactor in Addition to Standard Contacts for an Additional Price <sup>①②</sup>	
		Left Hand Side	Right Hand Side
0-1¼ (Left Cont.) 0-1¼ (Right Cont.)	1-NO and 1-NC 1-NO and 1-NC	2-NO or NC 1-NO or NC	1-NO or NC 2-NO or NC
2-4	1-NO and 1-NC 2-NO and 2-NC	1-NO or NC 1-NO and 1-NC	1-NO or NC —
4½, 5 (Left Cont.) 4½, 5 (Right Cont.)	2-NO and 2-NC 2-NO and 2-NC	1-NO and 1-NC —	1-NO and 1-NC —
6, 7 (Left Cont.) 6, 7 (Right Cont.)	1-NO and 1-NC 1-NO and 1-NC	1-NO and 1-NC 2-NO and 2-NC	2-NO and 2-NC 1-NO and 1-NC
8	2-NO and 1-NC	—	3-NO and 3-NC



① If extra auxiliary contacts are required in addition to the maximum available, add a control relay to the enclosed starter from the factory modifications.

② See page 459 for price on additional auxiliary contacts. Extra contacts shown above are shaded.  
③ For each contactor, 1-NC contact used for standard electrical interlocking scheme and 1-NO for seal in contact.

④ Two Speed One Winding Controls require extra power poles or third contactor. Configurations will vary.

## Control Ratings

### Max HP Plugging and Jogging

Ratings shown are for applications requiring repeated interruptions of stalled motor current or repeated closing of high transient currents encountered in rapid motor reversal, involving more than five openings or closings per minute and more than ten in a ten minute period, such as plug stop, plug reverse or jogging duty. Ratings apply to single speed and multi speed controllers.

### Continuous Amp Rating, Service Limit

The service limit current represents the maximum RMS current, in amperes, which the controller may be expected to carry for protracted periods in normal service. At service limit current ratings, temperature rises may exceed those obtained by testing the controller at its continuous current rating. The trip current of overload relays or other motor protective devices shall not exceed the service limit current ratings of the controller.

### Ballast Type, Tungsten and Other Discharge Type Lighting Loads

The characteristics of ballast type lamps are such that it is not necessary to derate Class 40 contactors below their normal continuous current rating. Class

40 contactors may also be used for controlling tungsten and other discharge type lighting loads, Class 40 contactors are specifically designed for such loads and are applied at their full rating as listed in the Class 40 section.

### Resistance Heating Loads

Ratings apply to Class 40 contactors which are employed to switch the load at the utilization voltage of the resistance heating or light producing element with a duty which requires continuous operation of not more than five openings per minute.

### Capacitor Switching KVA Rating

When discharged, a capacitor has essentially zero impedance. For repetitive switching by a contactor, sufficient impedance should be connected in series to limit inrush current to not more than 6 times the contactor rated continuous current. In many installations, the impedance of connecting conductors may be sufficient for the purpose. When switching to connect additional banks, the banks already on the line may be charged and can supply additional available short circuit current which should be considered when selecting impedance to limit the current.

The ratings for capacitor switching above assume the following maximum available fault currents:

Size 2–3: 5,000 Amp  
RMS Sym

Size 3½–5: 10,000 Amp  
RMS Sym

Size 6: 18,000 Amp  
RMS Sym

If available fault current is greater than these values, connect sufficient impedance in series as noted in the previous paragraph.

The motor ratings in the table below are NEMA standard ratings and apply only when the code letter of the motor is the same as or occurs earlier in the alphabet than is shown in the table below.

Motors having code letters occurring later in the alphabet may require a larger controller.

Motor HP Rating	Maximum Allowable Motor Code Letter
1½, 2	L
3–5	K
7½ & above	H

Heavy Duty Control

CONTROL PRODUCTS

### NEMA Electrical/Mechanical Ratings

Size	Load Volts	Max HP				Cont Amps	Service Limit Amps	Tungsten & Ballast Type Lamp Amps 480 Volts Max	Resistance Heating kW		Transformer Switching 50–60Hz KVA Rating Inrush Peak Time Continuous Amps				Capacitor Switching Rating 3 Ph KVAR	Mechanical Life
		Normal Duty		Plugging & Jogging Duty					1 Ph	3 Ph	20 Times		20–40 Times			
		1 Ph	3 Ph	1 Ph	3 Ph						1 Ph	3 Ph	1 Ph	3 Ph		
00	115	½	—	—	—	9	11	—	1.15	2.0	—	—	—	—	10 million operations	
	200	—	1½	—	—	9	11	—	2.0	3.46	—	—	—	—		
	230	1	1½	—	—	9	11	—	2.3	4.0	—	—	—	—		
	380	—	1½	—	—	9	11	—	—	6.5	—	—	—	—		
	460	—	2	—	—	9	11	—	4.6	8.0	—	—	—	—		
575	—	2	—	—	9	11	—	5.8	10.0	—	—	—	—	—		
0	115	1	—	½	—	18	21	20	2.3	4.0	0.6	—	0.3	—	10 million operations	
	200	—	3	—	1½	18	21	20	4.0	6.92	—	1.8	—	0.9		
	230	2	3	1	1½	18	21	20	4.6	8.0	1.2	2.1	0.6	1.0		
	380	—	5	—	1½	18	21	20	—	13.1	—	—	—	—		
	460	—	5	—	2	18	21	20	9.2	15.9	2.4	4.2	1.2	2.1		
575	—	5	—	2	18	21	—	11.5	19.9	3.0	5.2	1.5	2.6	—		
1	115	2	—	1	—	27	32	30	3.5	6.0	1.2	—	0.6	—	10 million operations	
	200	—	7½	—	3	27	32	30	6	10.4	—	3.6	—	1.8		
	230	3	7½	2	3	27	32	30	6.9	11.9	2.4	4.3	1.2	2.1		
	380	—	10	—	5	27	32	30	—	19.7	—	—	—	—		
	460	—	10	—	5	27	32	30	13.8	23.9	4.9	8.5	2.5	4.3		
575	—	10	—	5	27	32	—	17.3	29.8	6.2	11.0	3.1	5.3	—		
1P	115	3	—	1½	—	35	42	45	5.8	—	—	—	—	—	10 million operations	
	230	5	—	3	—	35	42	45	11.5	—	—	—	—	—		
1¼	115	—	—	—	—	40	40	45	5.8	9.9	1.6	—	0.8	—	10 million operations	
	200	—	10	—	5	40	40	45	10	17.3	—	4.9	—	2.4		
	230	—	10	—	5	40	40	45	11.5	19.9	3.2	5.75	1.6	2.8		
	380	—	15	—	7½	40	40	45	—	32.9	—	—	—	—		
	460	—	15	—	7½	40	40	45	23	39.8	6.6	11.2	3.3	5.7		
575	—	15	—	7½	40	40	—	28.8	49.7	8.1	14.5	4.1	7.1	—		

## Control Ratings

### NEMA Electrical/Mechanical Ratings

Size	Load Volts	Max HP				Cont Amps	Service Limit Amps	Tungsten & Ballast Type Lamp Amps 480 Volts Max	Resistance Heating kW		Transformer Switching 50-60Hz KVA Rating Inrush Peak Time Continuous Amps				Capacitor KVA Switching Rating 3 Ph KVAR	Mechanical Life		
		Normal Duty		Plugging & Jogging Duty					1 Ph	3 Ph	1 Ph	3 Ph	20 Times				20-40 Times	
		1 Ph	3 Ph	1 Ph	3 Ph								1 Ph	3 Ph			1 Ph	3 Ph
2	115	3	—	2	—	45	52	60	8.1	13.9	2.1	—	1.0	—	—	10 million operations		
	200	—	10	—	7½	45	52	60	14	24.2	—	6.3	—	3.1	—			
	230	7½	15	5	10	45	52	60	16.1	27.8	4.1	7.2	2.1	3.6	8			
	380	—	25	—	15	45	52	60	—	46.0	—	—	—	—	—			
	460	—	25	—	15	45	52	60	32.2	55.7	8.3	14	4.2	7.2	16			
575	—	25	—	15	45	52	60	40.3	69.6	10.0	18	5.2	8.9	20	—			
2½	115	5	—	—	—	60	65	75	10.4	17.9	3.1	—	1.5	—	—	10 million operations		
	200	—	15	—	10	60	65	75	18	31.1	—	9.1	—	4.6	—			
	230	10	20	—	15	60	65	75	20.7	35.8	6.1	10.6	3.1	5.3	17.5			
	380	—	30	—	20	60	65	75	—	59.2	—	—	—	—	—			
	460	—	30	—	20	60	65	75	41.4	71.6	12	21	6.1	10.6	34.5			
575	—	30	—	20	60	65	75	51.8	89.5	15	26.5	7.6	13.4	43.5	—			
3	115	7½	—	—	—	90	104	100	14.4	24.8	4.1	—	2.0	—	—	5 million operations		
	200	—	25	—	15	90	104	100	25	43.3	—	12	—	6.1	—			
	230	15	30	—	20	90	104	100	28.8	50.0	8.1	14	4.1	7.0	27			
	380	—	50	—	30	90	104	100	—	82.2	—	—	—	—	—			
	460	—	50	—	30	90	104	100	57.5	99.4	16	28	8.1	14	53			
575	—	50	—	30	90	104	100	71.9	124	20	35	10	18	67	—			
3½	115	—	—	—	—	115	125	150	18.4	31.8	—	—	—	—	—	5 million operations		
	200	—	30	—	20	115	125	150	32	55.4	—	16	—	8	—			
	230	—	60	—	25	115	125	150	36.8	63.7	11	18.5	5.4	9.5	33.5			
	380	—	60	—	30	115	125	150	—	105	—	—	—	—	—			
	460	—	75	—	40	115	125	150	73.6	127	21.5	37.5	11.0	18.5	66.5			
575	—	75	—	40	115	125	150	92	159	37	47	13.5	23.5	83.5	—			
4	200	—	40	—	25	135	156	200	39	67.5	—	20	—	10	—	5 million operations		
	230	—	50	—	30	135	156	200	44.9	77.6	14	23	6.8	12	40			
	380	—	75	—	50	135	156	200	—	128	—	—	—	—	—			
	460	—	100	—	60	135	156	200	89.7	155	27	47	14	23	80			
	575	—	100	—	60	135	156	—	112	194	34	59	17	29	100		—	
4½	200	—	50	—	30	210	225	—	53	91.7	—	30.5	—	15	—	10 million operations		
	230	—	75	—	40	210	225	—	60.9	105	20.5	35	10.4	18	60			
	380	—	100	—	75	210	225	—	—	174	—	—	—	—	—			
	460	—	150	—	100	210	225	—	122	211	40.5	70.5	20.5	35	120			
	575	—	150	—	100	210	225	—	152	264	51	88	25.5	44	150		—	
5	200	—	75	—	60	270	311	—	70	121	—	41	—	20	—	10 million operations		
	230	—	100	—	75	270	311	—	80.5	139	27	47	14	24	80			
	380	—	150	—	125	270	311	—	—	230	—	—	—	—	—			
	460	—	200	—	150	270	311	—	161	278	54	94	27	47	160			
	575	—	200	—	150	270	311	—	201	348	68	117	34	59	200		—	
6	200	—	150	—	125	540	621	—	—	162	—	81	—	41	—	5 million operations		
	230	—	200	—	150	540	621	—	120	210	54	94	27	47	160			
	380	—	300	—	250	540	621	—	—	342	—	—	—	—	—			
	460	—	400	—	300	540	621	—	240	415	108	188	54	94	320			
	575	—	400	—	300	540	621	—	300	515	135	234	68	117	400		—	
7	200	—	—	—	—	810	932	—	—	—	—	—	—	—	—	5 million operations		
	230	—	300	—	—	810	932	—	180	315	—	—	—	—	240			
	380	—	—	—	—	810	932	—	—	—	—	—	—	—	—			
	460	—	600	—	—	810	932	—	360	625	—	—	—	—	480			
	575	—	600	—	—	810	932	—	450	775	—	—	—	—	600		—	
8	200	—	—	—	—	1215	1398	—	—	—	—	—	—	—	—	5 million operations		
	230	—	450	—	—	1215	1398	—	—	—	—	—	—	—	360			
	380	—	—	—	—	1215	1398	—	—	—	—	—	—	—	—			
	460	—	900	—	—	1215	1398	—	—	—	—	—	—	—	720			
	575	—	900	—	—	1215	1398	—	—	—	—	—	—	—	900		—	

Heavy Duty Control

CONTROL PRODUCTS

### Max HP 380V 50Hz Ratings

Class	Description	Control Size 3 Phase												
		0	1	1¼	2	2½	3	3½	4	4½	5	6	7	8
14, 40	Across The Line	5	10	15	25	30	50	60	75	100	150	300	500	700
30, 32	Var & Const Torq Const HP	5	10	15	25	30	50	60	75	100	150	300	500	700
		3	7½	10	20	25	40	50	60	75	100	200	300	400
36, 37	Auto Tr Wye Delta	—	10	15	25	30	50	60	75	100	150	300	500	700
		—	15	25	40	50	75	100	150	200	250	500	800	1000

## AC/DC Coil and Operating Information

### AC Coils For NEMA Contactors

Controller Size	Seal Watts	Volts 60Hz	Inrush (Open Magnet)		Normal (Sealed Magnet)		Normal Coil Operating Limits	Typical Drop-Out Volts	Operating Times (msec)	
			Amps	VA	Amps	VA			Pick-Up	Drop-Out
00 thru 2 1/2	8.6	24 120 208 240 277 480 600	9.08 1.82 .105 .91 .79 .45 .36	218	1.04 .21 .12 .105 .090 .052 .042	25	85%–110% of Rated Voltage	50% of Rated Voltage	19–29	10–14
3, 3 1/2	14	24 120 208 240 277 480 600	12.9 2.58 1.49 1.29 1.12 .646 .516	310	1.08 .217 .125 .108 .094 .054 .043	26			26–41	14–19
4	22	120 208 240 277 480 600	4.25 2.45 2.14 1.77 1.08 .85	510	.425 .245 .215 .183 .112 .085	51			18–34	10–12
4 1/2, 5	—	120 240 480 600	— — — —	1590	— — — —	94			25–40	10–30
6	—	240 480 600	— — —	2900	— — —	105			30–50	10–20
7	—	120 240 480 600	— — — —	4000	— — — —	140			30–50	10–20
8	—	120 240 480 600	— — — —	4200	— — — —	100			40–80	140–240

Heavy Duty Control

CONTROL PRODUCTS

### DC Coils

Controller Size	00–2 1/2		3, 3 1/2		4	
	Inrush Amps	Normal Amps	Inrush Amps	Normal Amps	Inrush Amps	Normal Amps
12	14.0	0.5	20.0	1.0	26.0	1.30
24	7.3	0.25	10.0	0.50	12.0	0.64
32	6.0	0.19	7.8	0.43	9.3	0.48
48	3.6	0.12	5.2	0.284	6.2	0.32
125	1.4	0.05	2.0	0.136	2.7	0.130
250	0.7	0.025	1.0	0.052	1.3	0.064

### AC-DC Rectifier

Controller Size	AC Input Volts 50–120Hz	DC Output				
		Volts	Amps			.016 Sec
			25°C	50°C	75°C	
00–6	120	125	2	1	.7	15
00–5	240	250	2	1	.7	15

## Circuit Breaker Data

### Breaker Kits—Breaker Type with Solid State Overload

### Breaker Type with Ambient Compensated Bimetal Overload Relay

Class	Size	Max Hp				Breaker Amps	Catalog No	List Price \$ <sup>③</sup>	Size	Max Hp				Breaker Amps	Catalog No	List Price \$ <sup>③</sup>
		200 Volts	230 Volts	460 Volts	575 Volts					200 Volts	230 Volts	460 Volts	575 Volts			
18, 26 32, 37	0	1/2	1/2	1	1	3	ED63A003	*	0	1/2	1/2	1	1	3	ED63A003	*
		1	1	3	3	10	ED63A010	*		1	1	3	3	10	ED63A010	*
		2	2	5	5	10	ED63A010	*		3	3	5	5	25	ED63A025	*
		3	3	—	—	25	ED63A025	*		1/2	1/2	1	1	3	ED63A003	*
	1	1/2	1/2	1	1	3	ED63A003	*	1	1	1	3	3	10	ED63A010	*
		1	1	3	3	10	ED63A010	*		3	3	7 1/2	7 1/2	25	ED63A025	*
		2	2	5	5	10	ED63A010	*		7 1/2	7 1/2	10	10	30	ED63A030	*
		3	3	7 1/2	10	25	ED63A025	*		5	5	15	15	30	ED63A030	*
		7 1/2	7 1/2	10	—	30	ED63A030	*		10	10	—	—	50	ED63A050	*
		—	—	15	15	30	ED63A030	*		7 1/2	7 1/2	20	20	40	ED63A040	*
	1 1/4	—	—	15	15	30	ED63A030	*	2	10	15	25	25	50	ED63A050	*
		10	10	—	—	50	ED63A050	*		10	15	30	30	50	ED63A050	*
	2	—	—	15	20	30	ED63A030	*	2 1/2	10	15	30	30	50	ED63A050	*
		10	15	25	25	50	ED63A050	*		15	20	—	—	100	ED63A100	*
	2 1/2	—	—	30	30	50	ED63A050	*	3	—	—	30	30	50	ED63A050	*
		15	20	—	—	100	ED63A100	*		25	30	50	50	100	ED63A100	*
	3	—	—	30	30	50	ED63A050	*	3 1/2	30	40	75	75	125	ED63A125	*
		25	30	50	50	100	ED63A100	*		40	50	100	100	150	FXD63A150L	*
	3 1/2	30	40	75	75	125	ED63A125	*								
	4	40	50	100	100	150	FXD63A150L	*								

### ETI Motor Circuit Interrupter Instantaneous Trip Breakers: Recommended Settings<sup>①②</sup>

HP	230 Volts		460 Volts		575 Volts	
	A <sup>②</sup>	Set	A <sup>②</sup>	Set	A <sup>②</sup>	Set
1/4	2	2	1	3	1	2
1/2	2	3	1	3	1	3
3/4	3	3	2	2	2	2
1	5	3	3	2	2	2
1 1/2	5	4	3	3	2	3
2	10	2	3	4	3	3
3	10	4	5	3	5	2
5	25	3	10	2	5	4
7 1/2	30	3	10	4	10	3
10	40	3	25	3	25	2
15	40	4	30	3	25	3
20	50	4	30	4	30	3
25	100	3	40	4	40	3
30	100	4	50	3	40	4
40	100	4	50	4	50	3
50	150	4	100	3	50	4
60	250	2	100	4	100	3
75	250	4	100	4	100	3
100	250	6	150	4	100	4
125	400H	4	250	3	150	4
150	600L	6	250	4	250	3
200	800L	4	250	5	250	4
250	800L	7	400H	4	600L	3
300	800A	6	600L	6	600L	4
350	—	—	800L	3	600L	5
400	—	—	800L	5	800L	3
450	—	—	800L	6	800L	4
500	—	—	800A	4	800A	2
	—	—	800A	6	800A	4

For maximum protection the trip position should be set as low as possible. Turn the adjustment screw counterclockwise to successively lower positions until the breaker trips on motor starting. After this position is determined, turn the adjustment screw clockwise to the next higher setting for normal operation. The adjustment screw is infinitely adjustable for customer convenience. If the breaker does not trip at the lowest setting leave the indicator at this setting.

To set: determine motor full load current from the motor nameplate. Refer to the table and determine the recommended setting position. Use a screwdriver to set the indicator on the adjustment screw to the appropriate position.

The instantaneous trip circuit breaker is factory set at the LO position. In accordance with the National Electrical Code, "The setting on an instantaneous trip circuit breaker may be increased over 700 percent, but shall in no case exceed 1300 percent of motor full load current for non design E motors. Design E motors may not exceed 1700 percent."

### ETI Motor Circuit Setting Positions<sup>①</sup>

Cont Amps	Trip Setting Positions "Nominal Trip Amp"							
	LO	2	3	4	5	6	7	HI
1	2.6	4.5	6	7.5	—	—	—	9
2	7	11	15	19	—	—	—	22
3	10	17	23	30	—	—	—	35
5	16	26	36	46	—	—	—	54
10	30	50	70	85	—	—	—	100
25	55	90	120	150	—	—	—	180
30	80	135	180	230	—	—	—	270
40	115	185	250	320	—	—	—	375
50	180	300	400	510	—	—	—	600
100	300	500	640	850	—	—	—	1000
125	—	—	—	—	—	—	—	—
150 <sup>④</sup>	800	900	1000	1100	1200	1300	1400	1500
250	1100	1300	1500	1700	1900	2100	2300	2500
400H <sup>⑤</sup> /600HL <sup>⑥</sup>	2000	2290	2570	2860	3140	3430	3710	4000
600H <sup>⑤</sup> /800HL <sup>⑥</sup>	3000	3430	3860	4290	4710	5140	5570	6000
800A <sup>⑤</sup>	4000	4570	5140	5710	6280	7420	8000	—

① Contact a Sales Office for settings with current limiters.  
② A = Continuous amps.

③ Consult Sales Office for pricing.  
④ FXD63A150  
⑤ JXD63H400

⑥ LXD63H600  
⑦ LXD63L600  
⑧ MXD63L800

⑨ MXD63A800  
⑩ \*Recommended Initial Settings based upon 1100% typical motor FLA."

Heavy Duty Control

CONTROL PRODUCTS