

# Evolution Series E9000 Motor Control Centers

## Application Data

### Overload Heater Tables

#### Overload Relays

#### Electronic Overloads for Circuit Breaker Controllers

Tripping current is 120% of Dial setting. Motors with 1.15-1.25 service factor, set dial to motor FLA Motors with 1.0 service factor, set dial to 0.9 motor FLA.

NEMA Size	FLA Range in Amps	Catalog Number	Breaker Frame & Type
1	0.8 to 1.7	CR324CXD	E Mag. & Thermal Mag.
1	1.8 to 3.4	CR324CXE	E Mag. & Thermal Mag.
1	3.2 to 6.8	CR324CXF	E Mag. & Thermal Mag.
1	6.5 to 13.5	CR324CXG	E Mag. & Thermal Mag.
1	13 to 27	CR324CXH	E Mag. & Thermal Mag.
2	6.5 to 13.5	CR324DXG	E Mag. & Thermal Mag.
2	13 to 27	CR324DXH	E Mag. & Thermal Mag.
2	25 to 50	CR324DXJ	E Mag. & Thermal Mag.
3	17 to 35	CR324FXK	E Mag. & Thermal Mag.
3	35 to 70	CR324FXL	E Mag. & Thermal Mag.
3	65 to 135	CR324FXM	E Mag. & Thermal Mag.
4	17 to 35	CR324FXK	E,F&G Mag. & Thermal Mag.
4	35 to 70	CR324FXL	E,F&G Mag. & Thermal Mag.
4	65 to 135	CR324FXM	E,F&G Mag. & Thermal Mag.
5 ①	35 to 70	CR324GXN	G Mag. & Thermal Mag.
5 ①	65 to 135	CR324GXP	G Mag. & Thermal Mag.
5 ①	130 to 270	CR324GXQ	G Mag. & Thermal Mag.
6 ②	130 to 270	CR324HXS	G,K Mag. & Thermal Mag.
6 ②	260 to 540	CR324HXT	K Mag. & Thermal Mag.

① 300:15 CT's

② 800:5 CT's

#### Overload Relays for Compact 6" Starter CL45A310MJ, NEMA Size 1

FLA Range in Amps	Class 10 Catalog Number	Class 20 Catalog Number	Breaker Frame & Type
0.4-0.65	RTN1D		E Mag. & Thermal Mag.
0.65-1.1	RTN1F		E Mag. & Thermal Mag.
1-1.5	RTN1G		E Mag. & Thermal Mag.
1.3-1.9	RTN1H		E Mag. & Thermal Mag.
1.8-2.7	RTN1J		E Mag. & Thermal Mag.
2.5-4.1	RTNIK	RT12K	E Mag. & Thermal Mag.
4.0-6.3	RTNIL	RT12L	E Mag. & Thermal Mag.
5.5-8.5	RTNIM	RT12M	E Mag. & Thermal Mag.
8.0-12	RTNIN	RT12N	E Mag. & Thermal Mag.
10.0-16	RTNIP	RT12P	E Mag. & Thermal Mag.
14.5-18	RTNIS	RT12S	E Mag. & Thermal Mag.
17.5-22	RTNIT	RT12T	E Mag. & Thermal Mag.
21-26	RTNIU	RT12U	E Mag. & Thermal Mag.



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### Overload Heater Tables

#### Heaters for Fused Controllers

The Mag-Break protector is factory adjusted to the minimum trip setting.

For continuous rated motors with a service factor of 1.15 to 1.25, select heaters from the heater table. For continuous rated motors with a service factor of 1.0, multiply the motor full-load current by 0.9 and use this value to select heaters.

**Table 1—Maximum Fuse and Short-Circuit Rating**

NEMA Size	Class RK Fuse		Class J Fuse		Class K-1, K-5 Fuse	
	Max. Clip	Max. RMS Sym. Amps	Max. Clip	Max. RMS Sym. Amps	Max. Clip	Max. RMS Sym. Amps
1	30A	100,000	60A	100,000	Fuse per Overload Heater Table	5,000
2	60	100,000	100	100,000		5,000
3	100	100,000	200	100,000		5,000
4	200	100,000	400	100,000		10,000
5	400	100,000	600	100,000		10,000

*WARNING: Opening of the fuse(s) may be an indication that a fault current has been interrupted. To provide continued protection against fire or shock hazard, all current-carrying parts and other components of the motor controller should be examined and replaced if damaged. If heater burnout occurs, the complete overload relay must be replaced.*

#### Size 0 and 1 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
.41-.45	C054A	3
.46-.49	C060A	3
.50-.53	C066A	3
.54-.59	C071A	3
.60-.65	C078A	3
.66-.76	C087A	3
.77-.84	C097A	3
.85-.93	C109A	3
.94-1.04	C118A	3
1.05-1.15	C131A	3
1.16-1.27	C148A	3
1.28-1.39	C163A	3
1.40-1.55	C184A	6
1.56-1.73	C196A	6
1.74-1.89	C220A	6
1.90-2.05	C239A	6
2.06-2.28	C268A	6
2.29-2.47	C301A	6
2.48-2.79	C326A	10
2.80-3.31	C356A	10
3.32-3.70	C379A	12
3.71-4.06	C419A	15
4.07-4.47	C466A	15
4.48-4.95	C526A	15
4.96-5.49	C592A	20
5.50-5.91	C630A	20
5.92-6.47	C695A	25
6.48-7.20	C778A	25
7.21-8.22	C867A	30
8.23-8.72	C955A	30
8.73-9.67	C104B	35 <sup>①</sup>
9.68-10.4	C113B	35 <sup>①</sup>
10.5-11.0	C125B	40 <sup>①</sup>
11.1-12.4	C137B	45 <sup>①</sup>
12.5-13.2	C151B	50 <sup>①</sup>
13.3-15.4	C163B	60 <sup>①</sup>
15.5-17.1	C180B	60 <sup>①</sup>
17.2-18.0	C198B	60 <sup>①</sup>

Overload relay tripping current in 40°C ambient is the minimum value of full-load current multiplied by 1.25.

Provide short-circuit protection in accordance with the National Electrical Code, except Fuses are not to exceed the value shown in the table.

Suitable for use in a circuit capable of delivering not more than the maximum RMS symmetrical amperes indicated in the table below, 600-volts maximum, when protected by an appropriate fuse having an interrupting rating not less than the available short-circuit current.

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
Size 1		
17.2-18.1	C198B	60 <sup>①</sup>
18.2-20.0	C214B	60 <sup>①</sup>
20.1-21.5	C228B	60 <sup>①</sup>
21.6-22.5	C250B	60 <sup>①</sup>
22.6-23.9	C273B	60 <sup>①</sup>
24.0-26.3	C303B	60 <sup>①</sup>
26.4-27.0	C330B	60 <sup>①</sup>

#### Size 2 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
5.48-5.85	C630A	20
5.86-6.47	C695A	20
6.48-7.35	C778A	25
7.36-8.06	C867A	30
8.07-9.03	C955A	30
9.04-9.61	C104B	35
9.62-10.5	C113B	35
10.6-11.6	C125B	40
11.7-12.5	C137B	45
12.6-13.6	C151B	50
13.7-16.7	C163B	60
16.8-17.9	C180B	60
18.0-18.7	C198B	70 <sup>①</sup>
18.8-20.4	C214B	80 <sup>①</sup>
20.5-22.7	C228B	80 <sup>①</sup>
22.8-24.7	C250B	90 <sup>①</sup>
24.8-26.3	C273B	90 <sup>①</sup>
26.4-29.5	C303B	100 <sup>①</sup>
29.6-32.5	C330B	100 <sup>①</sup>
32.6-36.7	C366B	100 <sup>①</sup>
36.8-41.9	C400B	100 <sup>①</sup>
42.0-43.2	C440B	100 <sup>①</sup>
43.3-45.0	C460B	100 <sup>①</sup>

<sup>①</sup> See Table 1 for maximum fuse and short-circuit rating.

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### Overload Heater Tables

#### Heaters for Fused Controllers

##### Size 3 (Standard)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
19.0-19.3	F233B	70
19.4-22.1	F243B	80
22.2-23.4	F270B	80
23.5-27.0	F300B	90
27.1-29.1	F327B	100
29.2-31.8	F357B	110 <sup>ⓐ</sup>
31.9-33.9	F395B	125 <sup>ⓐ</sup>
34.0-37.6	F430B	125 <sup>ⓐ</sup>
37.7-41.9	F487B	150 <sup>ⓐ</sup>
42.0-47.7	F567B	175 <sup>ⓐ</sup>
47.8-52.1	F614B	175 <sup>ⓐ</sup>
52.2-55.8	F658B	200 <sup>ⓐ</sup>
55.9-59.7	F719B	200 <sup>ⓐ</sup>
59.8-68.1	F772B	200 <sup>ⓐ</sup>
68.2-71.5	F848B	200 <sup>ⓐ</sup>
71.6-78.2	F914B	200 <sup>ⓐ</sup>
78.3-87.5	F104C	200 <sup>ⓐ</sup>
87.6-90.0	F114C	200 <sup>ⓐ</sup>

##### Size 3 (Ambient Comp.)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
17.8-18.4	F233B	70
18.5-21.1	F243B	80
21.2-22.1	F270B	80
22.2-26.1	F300B	90
26.2-28.0	F327B	100
28.1-31.3	F357B	110 <sup>ⓐ</sup>
31.4-33.3	F395B	125 <sup>ⓐ</sup>
33.4-34.3	F430B	125 <sup>ⓐ</sup>
34.4-40.9	F487B	150 <sup>ⓐ</sup>
41.0-44.7	F567B	150 <sup>ⓐ</sup>
44.8-51.0	F614B	175 <sup>ⓐ</sup>
51.1-52.0	F658B	200 <sup>ⓐ</sup>
52.1-55.4	F719B	200 <sup>ⓐ</sup>
55.5-63.3	F772B	200 <sup>ⓐ</sup>
63.4-66.1	F848B	200 <sup>ⓐ</sup>
66.2-73.5	F914B	200 <sup>ⓐ</sup>
73.6-82.2	F104C	200 <sup>ⓐ</sup>
82.3-90.0	F114C	200 <sup>ⓐ</sup>

##### Size 4 (Standard)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
27.1-32.2	F357B	110
32.3-34.0	F395B	125
34.1-36.8	F430B	125
36.9-44.6	F487B	150
44.7-48.4	F567B	175
48.5-53.9	F614B	175
54.0-57.4	F658B	200
57.5-60.0	F719B	225 <sup>ⓐ</sup>
60.1-69.5	F772B	225 <sup>ⓐ</sup>
69.6-71.7	F848B	250 <sup>ⓐ</sup>
71.8-79.9	F914B	275 <sup>ⓐ</sup>
80.0-92.3	F104C	300 <sup>ⓐ</sup>
92.4-97.0	F114C	350 <sup>ⓐ</sup>
97.1-108	F118C	400 <sup>ⓐ</sup>
109-118	F133C	400 <sup>ⓐ</sup>
119-131	F149C	400 <sup>ⓐ</sup>
132-135	F161C	400 <sup>ⓐ</sup>

##### Size 4 (Ambient Comp.)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
28.8-32.0	F357B	110
32.1-34.2	F395B	125
34.3-36.7	F430B	125
36.8-43.9	F487B	150
44.0-46.6	F567B	175
46.7-52.6	F614B	175
52.7-55.6	F658B	200
55.7-58.7	F719B	225 <sup>ⓐ</sup>
58.8-67.1	F772B	225 <sup>ⓐ</sup>
67.2-70.6	F848B	250 <sup>ⓐ</sup>
70.7-76.3	F914B	275 <sup>ⓐ</sup>
76.4-88.7	F104C	300 <sup>ⓐ</sup>
88.8-93.4	F114C	350 <sup>ⓐ</sup>
93.5-105	F118C	350 <sup>ⓐ</sup>
106-114	F133C	400 <sup>ⓐ</sup>
115-128	F149C	400 <sup>ⓐ</sup>
129-131	F161C	400 <sup>ⓐ</sup>
132-135	F174C	400 <sup>ⓐ</sup>

##### Size 5 - 300:15CT (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph., 3-Heater	Heater Number CR123	Maximum Fuse Rating
109-118	C592A	600
119-128	C630A	600
129-138	C695A	600
139-155	C778A	600
156-168	C867A	600
169-184	C955A	600
185-200	C104B	600
201-221	C113B	600
222-237	C125B	600
238-262	C137B	600
263-270	C151B	600

#### Electronic Overload Table for Fusible Controllers

Tripping current is 120% of Dial setting. Motors with 1.15-1.25 service factor, set dial to motor FLA. Motors with 1.0 service factor, set dial to 0.9 motor FLA.

NEMA Size	FLA Range in Amps	Catalog Number	Max. Fuse in Amps	
			Class R 30	Class J 60
1	0.8 to 1.7	CR324CXD		
1	1.8 to 3.4	CR324CXE		
1	3.2 to 6.8	CR324CXF		
1	6.5 to 13.5	CR324CXG		
1	13 to 27	CR324CXH		
2	6.5 to 13.5	CR324DXG	60	100
2	13 to 27	CR324DXH		
2	25 to 50	CR324DXJ		
3	17 to 35	CR324FXK	100	200
3	35 to 70	CR324FXL		
3	65 to 135	CR324FXM		
4	17 to 35	CR324FXK	200	400
4	35 to 70	CR324FXL		
4	65 to 135	CR324FXM		
5 ①	35 to 70	CR324GXN	400	600
5 ①	65 to 135	CR324GXP		
5 ①	130 to 270	CR324GXQ		
6 ②	130 to 270	CR324HXS	600	Class L 1200
6 ②	260 to 540	CR324HXT		

① 300:15 CT's

② 800:5 CT's

ⓐ See Table 1 (page J-17) for maximum fuse and short-circuit rating.