

Overload Relay Heater Tables

Selection of Heater Elements for Overload Relays

General

Use only when motor full load current is not known. Motor amps will vary depending on the type and manufacturer of the motor. These average values, for motors with service factor of 1.15, are to be used only as a guide. The formulas at the bottom of the page may be used to obtain approximate amps for other motors.

Note: RPM shown for 60 cycle motors. For 50 cycle motors, multiply RPM by .83.

CAUTION: Actual motor amps may be higher or lower than the values listed below for a particular motor. For more reliable motor protection, select heater elements by using the full load motor nameplate amps.

Single Phase motor full load amps of the same horsepower, voltage and speed vary over wide ranges. The following table conforms with table 430.148 of the NEC.

1-Phase

Hp	Full Load Current (60Hz)	
	115 Volts	230 Volts
1/8	4.4	2.2
1/4	5.8	2.9
1/2	7.2	3.6
3/4	9.8	4.9
1	13.8	6.9
1 1/2	16	8
2	20	10
3	24	12
5	34	17
7 1/2	56	28
10	80	40
15	100	50

3-Phase

Hp	Syn Speed RPM	Full Load Current (60Hz)				50 Hz
		200 Volts	230 Volts	460 Volts	575 Volts	
1/4	1800	1.09	0.95	0.48	0.38	0.55
	1200	1.61	1.40	0.70	0.56	0.81
	900	1.84	1.60	0.80	0.64	0.93
1/2	1800	1.37	1.19	0.60	0.48	0.64
	1200	1.83	1.59	0.80	0.64	0.92
	900	2.07	1.80	0.90	0.72	1.04
3/4	1800	1.98	1.72	0.86	0.69	0.99
	1200	2.47	2.15	1.08	0.86	1.24
	900	2.74	2.38	1.19	0.95	1.38
1	1800	2.83	2.46	1.23	0.98	1.42
	1200	3.36	2.82	1.46	1.17	—
	900	3.75	3.26	1.63	1.30	1.88
1 1/2	3600	3.22	2.80	1.40	1.12	1.70
	1800	4.09	3.56	1.78	1.42	2.06
	1200	4.32	3.76	1.88	1.50	2.28
2	3600	4.95	4.30	2.15	1.72	2.60
	1800	5.01	4.36	2.18	1.74	2.69
	1200	5.59	4.86	2.43	1.94	2.94
3	3600	6.07	5.28	2.64	2.11	3.20
	1800	6.44	5.60	2.80	2.24	3.39
	1200	6.44	5.60	2.80	2.24	3.39
4	3600	6.44	5.60	2.80	2.24	3.39
	1800	7.36	6.40	3.20	2.56	3.84
	1200	7.87	6.84	3.42	2.74	4.14
5	3600	9.09	7.90	3.95	3.16	4.77
	1800	9.59	8.34	4.17	3.34	5.02
	1200	10.8	9.40	4.70	3.76	5.70
7 1/2	3600	11.7	10.2	5.12	4.10	6.20
	1800	13.1	11.4	5.70	4.55	6.80
	1200	13.1	11.4	5.70	4.55	6.80
10	3600	15.5	13.5	5.76	5.41	8.20
	1800	16.6	14.4	7.21	5.78	8.74
	1200	18.2	15.8	7.91	6.32	9.59
15	3600	18.3	15.9	7.92	6.33	9.60
	1800	22.4	19.5	9.79	7.81	11.50
	1200	24.7	21.5	10.7	8.55	13.00
20	3600	25.1	21.8	10.9	8.70	13.20
	1800	26.5	23.0	11.5	9.19	13.90
	1200	29.2	25.4	12.7	10.1	15.40
25	3600	30.8	25.8	13.4	10.7	16.30
	1800	32.2	28.0	14.0	11.2	16.90
	1200	35.1	30.5	15.2	12.2	18.50
30	3600	41.9	36.4	18.2	14.5	22.00
	1800	45.1	39.2	19.6	15.7	23.70
	1200	47.6	41.4	20.7	16.5	25.00
40	3600	51.2	44.5	22.2	17.8	26.90
	1800	58.0	50.4	25.2	20.1	30.50
	1200	58.9	51.2	25.6	20.5	31.00
50	3600	60.7	52.8	26.4	21.1	31.90
	1800	63.1	54.9	27.4	21.9	33.20
	1200	63.1	54.9	27.4	21.9	33.20

3-Phase

Hp	Syn Speed RPM	Full Load Current (60Hz)				50 Hz
		200 Volts	230 Volts	460 Volts	575 Volts	
25	3600	69.9	60.8	30.4	24.3	36.80
	1800	74.5	64.8	32.4	25.9	39.20
	1200	75.4	65.6	32.8	26.2	39.60
30	3600	77.4	67.3	33.7	27.0	40.70
	1800	84.8	73.7	36.8	29.4	—
	1200	86.9	75.6	37.8	30.2	45.70
40	3600	90.6	78.8	39.4	31.5	47.60
	1800	94.1	81.8	40.9	32.7	49.50
	1200	111	96.4	48.2	38.5	—
50	3600	116	101	50.4	40.3	61.00
	1800	117	102	50.6	40.4	61.20
	1200	121	105	52.2	41.7	63.20
60	3600	138	120	60.1	48.2	—
	1800	143	124	62.2	49.7	75.20
	1200	145	126	63.0	50.4	76.20
75	3600	150	130	65.0	52.0	78.50
	1800	164	143	71.7	57.3	—
	1200	171	149	74.5	59.4	90.00
100	3600	173	150	75.0	60.0	91.10
	1800	177	154	77.0	61.5	93.10
	1200	206	179	89.6	71.7	—
125	3600	210	183	91.6	73.2	111.00
	1800	212	184	92.0	73.5	112.00
	1200	222	193	96.5	77.5	117.00
150	3600	266	231	115	92.2	—
	1800	271	236	118	94.8	144.00
	1200	275	239	120	95.6	145.00
200	3600	290	252	126	101	153.00
	1800	—	292	146	116	—
	1200	—	293	147	117	177.00
250	3600	—	298	149	119	180.00
	1800	—	305	153	122	186.00
	1200	—	343	171	137	—
300	3600	—	348	174	139	210.00
	1800	—	350	174	139	210.00
	1200	—	365	183	146	211.00
400	3600	—	458	229	184	—
	1800	—	452	226	181	274.00
	1200	—	460	230	184	276.00
500	3600	—	482	241	193	279.00
	1800	—	559	279	223	—
	1200	—	568	284	227	343.00
600	3600	—	573	287	229	345.00
	1800	—	600	300	240	347.00
	1200	—	278	339	271	392.00
700	3600	—	684	342	274	395.00
	1800	—	896	448	358	—

Formula—Approximate Full Load Amps for Other Motors

208 Volt Full Load Amp $\approx$ 230 Volt current $\times$ 110%

2-Phase FLA $\approx$ 0.866 $\times$ the 3-Phase FLA

2-Phase, 3-wire current in common wire $\approx$ 1.41 $\times$ that in the other 2 lines

25Hz 1500 RPM, amps $\approx$ amps of 60Hz, 3600 RPM

25Hz 750 RPM, amps $\approx$ amps of 60Hz, 1800 RPM

Service factor 1.0 $\approx$ amps $\times$ 0.9

50°C–55°C motor $\approx$ amps $\times$ 0.9

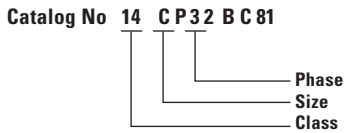
Overload Relay Heater Tables

Selection of Heater Elements for Overload Relays

General

To Select Heater Catalog Number Use

- Product Class
- Controller Size
- Motor Amp
- Phase



- Find heater table number below, using the Product Class, Controller Size and Phase. Heater table number is found in the column under the type of overload and phase.

- Refer to the specified table and use the controller size and motor amps to select the heater catalog number.
 - If motor amps are not known, an approximate value may be found on the previous page. These values should be used with caution and only when motor amps are not available.

Heaters shown on the following pages provide a maximum trip rating of 125% of minimum motor amperes for 40°C motors (service factor 1.15). For other motors (service factor 1.0), select the next lower listed heater catalog number within the designated table which provides a maximum trip rating of approximately 115%.

Overload relays do not provide protection against short circuits. To ensure proper coordination with short circuit protective device, select heaters from the information packaged with the control device.

Class	Description	Size or Amperage	Controller Size Letter	Heater Table Number			
				Bimetal Standard Trip (Class 20)		Bimetal Quick Trip (Class 10)	
				Compensated E Heaters Green Reset		Compensated K Heaters Green Reset	
				1Ph	3Ph	1Ph	3Ph
SMF	Manual	All	—	See Page 8/152			
	Magnetic						
14, 22	Non-reversing, Reversing	00-4	B-J	213	233	313	332
17, 18 25, 26 30, 32 ^① 83, 84 87, 89	Combination Reversing Combination Multi Speed Pump Controllers Motor Control Centers	0-4	C-J	—	233	—	332
48	Panel Mounted Overload Relay	25-180A	D-J	216	238	316	335

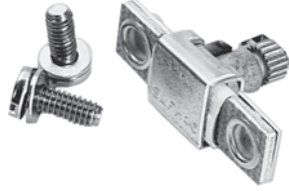
ESP200 starters do not require heater elements.

① Overload Relay Selection Multi-Speed

Each speed requires a separate set of overloads. The adjustment range must be selected on the basis of the full-load current for each particular speed.

Manual Control Heater Elements, Class SMF

General



Heater Elements Class SMF

Ordering Information

- Determine number of heater elements required from Table A.
- Determine motor full load current and service factor.
NOTE: If motor amps are unknown, an approximate value may be found on page 8/150. These values should be used with caution and only when motor amps are not available.
- If the motor and controller are in the same ambient temperature:
 - For 1.15 to 1.25 service factor motors use 100% of motor full load current for heater element selection.
 - For 1.0 service factor motors use 90% of motor full load current for heater element selection.
 - Heater elements are class 20.
- If the motor and controller are in different ambient temperatures multiply motor full load current by the multiplier in Table B. Use the resultant full load current for heater element selection.
- Select proper heater element from table below.
- All tables are based on the operation of the motor and controller in the same ambient temperature, 40°C (104°F) or less. Always be certain the correct heater element is installed in the starter before operating the motor.

Heater Catalog Number	Motor Full-Load Current (Amps)	List Price \$
SMFH01	0.157–0.173	
SMFH02	0.174–0.192	
SMFH03	0.193–0.212	
SMFH04	0.213–0.235	
SMFH05	0.236–0.261	
SMFH06	0.262–0.289	
SMFH07	0.290–0.321	
SMFH08	0.322–0.355	
SMFH09	0.356–0.399	
SMFH10	0.41–0.44	
SMFH11	0.45–0.49	
SMFH12	0.50–0.53	
SMFH13	0.54–0.58	
SMFH14	0.59–0.65	
SMFH15	0.66–0.71	
SMFH16	0.72–0.78	
SMFH17	0.79–0.85	
SMFH18	0.86–0.96	
SMFH19	0.97–1.04	
SMFH20	1.05–1.16	
SMFH21	1.17–1.25	
SMFH22	1.30–1.39	
SMFH23	1.38–1.54	
SMFH24	1.48–1.63	
SMFH25	1.57–1.75	
SMFH26	1.66–1.86	

Heater Catalog Number	Motor Full-Load Current (Amps)	List Price \$
SMFH27	1.80–1.99	
SMFH28	1.96–2.15	
SMFH29	2.16–2.38	
SMFH30	2.39–2.75	
SMFH31	2.76–2.84	
SMFH32	2.85–3.06	
SMFH33	3.07–3.45	
SMFH34	3.46–3.70	
SMFH35	3.71–4.07	
SMFH36	4.08–4.32	
SMFH37	4.33–4.90	
SMFH38	4.91–5.35	
SMFH39	5.36–5.85	
SMFH40	5.86–6.41	
SMFH41	6.42–6.79	
SMFH42	6.80–7.57	
SMFH43	7.58–8.15	
SMFH44	8.16–8.98	
SMFH45	8.99–9.67	
SMFH46	9.68–9.95	
SMFH47	9.96–10.8	
SMFH48	10.9–12.1	
SMFH49	12.2–13.1	
SMFH50	13.2–13.9	
SMFH51	14.0–15.0	
SMFH52	15.1–16.0	

Table A
Number of Heater Elements

Device	Number of Heater Elements	Notes
SMFF*1 SMFF*2 SMFF*3 SMFF*4 SMFF*5 SMFF*6	1	All single pole and two pole SMF starters require only 1 Heater Element.
SMFF*22 SMFF*44	2	Duplex Unit. One Heater Element per starter.
SMFF*11 SMFF*22	2	Two Speed Starter. One Heater Element per speed.

Table B—Special Applications
Heater Element Selection

Continuous Duty Motor Service Factor	Ambient Temperature of Motor		
	Same as Controller Ambient	Constant 10°C (18°F) Higher Than Controller Ambient	Constant 10°C (18°F) Lower Than Controller Ambient
	Full Load Current Multiplier		
1.15 to 1.25	1.0	0.9	1.05
1.0	0.9	0.8	0.95

Overload Relay Heater Tables

Full Load Motor Amps, Single Phase, Trip Class 20 – Tables 213, 216

Selection

Table 213 for Class 14, 22 (1-Phase)

Full Load Amps			Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1P	Size 2, 2½		
0.37–0.40	—	—	E3	
0.41–0.44	0.41–0.44	—	E4	
0.45–0.47	0.45–0.47	—	E5	
0.48–0.52	0.48–0.52	—	E6	
0.53–0.57	0.53–0.57	—	E7	
0.58–0.62	0.58–0.62	—	E8	
0.63–0.69	0.63–0.69	—	E9	
0.70–0.74	0.70–0.74	—	E11	
0.75–0.81	0.75–0.81	—	E12	
0.82–0.85	0.82–0.85	—	E13	
0.86–0.93	0.86–0.93	—	E14	
0.94–1.03	0.94–1.03	—	E16	
1.04–1.11	1.04–1.11	—	E17	
1.12–1.22	1.12–1.22	—	E18	
1.23–1.34	1.23–1.34	—	E23	
1.35–1.53	1.35–1.53	—	E24	
1.54–1.71	1.54–1.71	—	E26	
1.72–1.92	1.72–1.92	—	E27	
1.93–2.12	1.93–2.12	—	E28	
2.13–2.24	2.13–2.24	—	E29	
2.25–2.43	2.25–2.43	—	E31	
2.44–2.57	2.44–2.57	—	E32	
2.58–2.86	2.58–2.86	—	E33	
2.87–3.16	2.87–3.16	—	E34	
3.17–3.35	3.17–3.35	—	E36	
3.36–3.58	3.36–3.58	—	E37	
3.59–3.90	3.59–3.90	—	E38	
3.91–4.25	3.91–4.25	—	E39	
4.26–4.77	4.26–4.77	—	E41	
4.78–5.35	4.78–5.35	—	E42	
5.36–5.76	5.36–5.76	—	E44	
5.77–6.33	5.77–6.33	—	E46	
6.34–6.98	6.34–6.98	—	E47	
6.99–7.37	6.99–7.37	—	E48	
7.38–7.71	7.38–7.71	—	E49	
7.72–8.51	7.72–8.51	—	E50	
8.52–9.31	8.52–9.31	—	E51	
9.32–10.1	9.32–10.1	—	E52	
10.2–10.9	10.2–10.9	—	E53	
11.0–12.2	11.0–12.2	—	E54	
12.3–13.5	12.3–13.5	—	E55	
13.6–15.7	13.6–15.7	—	E56	
15.8–17.3	15.8–17.3	19.4–22.0	E57	
17.4–19.9	17.4–19.9	22.1–23.5	E60	
20.0–21.7	20.0–21.7	23.6–25.0	E61	
21.8–23.4	21.8–23.4	25.1–27.0	E62	
23.5–24.0	23.5–23.7	27.1–28.9	E65	
—	23.8–25.1	29.0–31.0	E66	
—	25.2–27.9	31.1–34.8	E67	
—	28.0–32.2	34.9–36.9	E69	
—	32.3–34.0	37.0–43.9	E70	
—	—	44.0–46.0	E72	
—	—	46.1–48.3	E73	
—	—	48.4–55.0	E74	
—	—	55.1–60.0	E76	

Table 216 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DA, 48GA	48HA	48JA			
0.34–0.36	—	—		E3	
0.37–0.40	—	—		E4	
0.41–0.43	—	—		E5	
0.44–0.47	—	—		E6	
0.48–0.51	—	—		E7	
0.52–0.56	—	—		E8	
0.57–0.62	—	—		E9	
0.63–0.67	—	—		E11	
0.68–0.73	—	—		E12	
0.74–0.77	—	—		E13	
0.78–0.84	—	—		E14	
0.85–0.93	—	—		E16	
0.94–1.00	—	—		E17	
1.01–1.10	—	—		E18	
—	—	—		E19	
1.11–1.21	—	—		E23	
1.22–1.38	—	—		E24	
1.39–1.54	—	—		E26	
1.55–1.73	—	—		E27	
1.74–1.91	—	—		E28	
1.92–2.02	—	—		E29	
2.03–2.19	—	—		E31	
2.20–2.32	—	—		E32	
2.33–2.58	—	—		E33	
2.59–2.85	—	—		E34	
2.86–3.02	—	—		E36	
3.03–3.23	—	—		E37	
3.24–3.52	—	—		E38	
3.53–3.83	—	—		E39	
3.84–4.30	—	—		E41	
4.31–4.82	—	—		E42	
4.83–5.19	—	—		E44	
5.20–5.71	—	—		E46	
5.72–6.29	—	—		E47	
6.30–6.64	—	—		E48	
6.65–6.95	—	—		E49	
6.96–7.67	—	—		E50	
7.68–8.39	—	—		E51	
8.40–9.19	—	—		E52	
9.20–9.94	—	—		E53	
9.95–10.9	—	—		E54	
11.0–12.2	—	—		E55	
12.3–14.2	—	—		E56	
14.3–15.6	—	—		E57	
—	—	—		E59	
15.7–17.9	—	—		E60	
18.0–19.6	—	—		E61	
19.7–22.3	—	—		E62	
22.4–24.0	—	—		E65	
24.1–25.9	—	—		E66	
26.0–29.5	27.1–30.0	—		E67	
29.6–32.5	30.1–33.2	—		E69	
32.6–33.5	33.3–35.7	—		E70	
33.6–36.9	35.8–39.4	—		E71	
37.0–39.2	39.5–43.4	—		E72	
39.3–43.1	43.5–46.9	—		E73	
43.2–47.4	47.0–51.5	—		E74	
47.5–50.0	51.6–57.0	—		E76	
50.1–55.2	57.1–62.8	—		E77	
55.3–60.0	62.9–69.1	—		E78	
—	69.2–75.0	—		E79	
—	75.1–83.3	—		E80	
—	—	50.0–55.9		E88	
—	—	56.0–60.9		E89	
—	—	61.0–65.9		E91	
—	—	66.0–69.9		E92	
—	—	70.0–75.9		E93	
—	—	76.0–81.9		E94	
—	83.4–86.9	82.0–86.9		E96	
—	87.0–92.9	87.0–92.9		E97	
—	93.0–100.0	93.0–97.9		E98	
—	—	98.0–107.9		E99	
—	—	108.0–113.9		E101	
—	—	114.0–125.0		E102	
—	—	126.0–138.0		E103	
—	—	139.0–153.0		E104	
—	—	154.0–163.0		E106	
—	—	164.0–180.0		E107	

Overload Relay Heater Tables

Full Load Motor Amps, 3-Phase, Trip Class 20 – Tables 233, 238

Selection

Table 233 for Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87 (3-Phase)

Full Load Amps					Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1¼	Size 2, 2½	Size 3, 3½	Size 4		
0.38–0.40	—	—	—	—	E6	
0.41–0.43	—	—	—	—	E7	
0.44–0.48	—	—	—	—	E8	
0.49–0.53	—	—	—	—	E9	
0.54–0.57	—	—	—	—	E11	
0.58–0.62	—	—	—	—	E12	
0.63–0.66	—	—	—	—	E13	
0.67–0.72	—	—	—	—	E14	
0.73–0.80	—	—	—	—	E16	
0.81–0.85	—	—	—	—	E17	
0.86–0.92	—	—	—	—	E18	
0.93–0.99	—	—	—	—	E19	
1.00–1.08	—	—	—	—	E23	
1.09–1.23	—	—	—	—	E24	
1.24–1.37	—	—	—	—	E26	
1.38–1.54	—	—	—	—	E27	
1.55–1.69	—	—	—	—	E28	
1.70–1.80	—	—	—	—	E29	
1.81–1.94	—	—	—	—	E31	
1.95–2.07	—	—	—	—	E32	
2.08–2.26	—	—	—	—	E33	
2.27–2.54	2.27–2.54	—	—	—	E34	
2.55–2.69	2.55–2.69	—	—	—	E36	
2.70–2.88	2.70–2.88	—	—	—	E37	
2.89–3.14	2.89–3.14	—	—	—	E38	
3.15–3.40	3.15–3.40	—	—	—	E39	
3.41–3.81	3.41–3.81	—	—	—	E41	
3.82–4.26	3.82–4.25	—	—	—	E42	
4.27–4.62	4.26–4.62	—	—	—	E44	
4.63–5.09	4.63–5.09	—	—	—	E46	
5.10–5.61	5.10–5.61	—	—	—	E47	
5.62–5.91	5.62–5.91	—	—	—	E48	
5.92–6.15	5.92–6.15	—	—	—	E49	
6.16–6.70	6.16–6.70	—	—	—	E50	
6.71–7.54	6.71–7.54	—	—	—	E51	
7.55–8.29	7.55–8.29	—	—	—	E52	
8.30–8.99	8.30–8.99	—	—	—	E53	
9.00–9.85	9.00–9.85	—	—	—	E54	
9.86–10.4	9.86–10.4	—	—	—	E55	
10.5–12.0	10.5–12.0	10.5–12.0	—	—	E56	
12.1–13.6	12.1–13.6	12.1–13.6	—	—	E57	
13.7–15.6	13.7–15.6	13.7–15.6	—	—	E60	
15.7–17.0	15.7–17.0	15.7–17.1	—	—	E61	
17.1–18.4	17.1–19.4	17.2–19.4	—	—	E62	
18.5–19.4	19.5–20.9	19.5–20.9	—	—	E65	
19.5–21.3	21.0–22.2	21.0–22.2	—	—	E66	
21.4–24.4	22.3–25.3	22.3–25.3	—	—	E67	
24.5–25.9	25.4–26.9	25.4–26.9	30.0–33.5	—	E69	
26.0–27.0	27.0–30.2	27.0–30.2	33.6–36.4	—	E70	
—	—	—	36.5–39.6	—	E71	
—	30.3–33.3	30.3–33.3	—	—	E72	
—	33.4–36.0	33.4–35.3	39.7–43.6	—	E73	
—	—	—	43.7–46.5	—	E73A	
—	—	35.4–41.5	46.6–51.6	—	E74	
—	—	41.6–45.0	51.7–54.4	—	E76	
—	—	45.1–52.3	54.5–58.0	—	E77	
—	—	52.4–55.7	58.1–63.0	—	E78	
—	—	55.8–60.0	63.1–67.7	—	E79	
—	—	—	67.8–72.4	—	E80	
—	—	—	—	—	E88	
—	—	—	—	56.9–60.9	E89	
—	—	—	—	61.0–63.9	E91	
—	—	—	—	64.0–67.7	E92	
—	—	—	—	67.8–72.4	E93	
—	—	—	72.5–80.0	72.5–77.7	E94	
—	—	—	80.1–88.1	77.8–85.9	E96	
—	—	—	88.2–91.5	86.0–91.9	E97	
—	—	—	91.6–96.8	92.0–96.7	E98	
—	—	—	96.9–99.0	96.8–105	E99	
—	—	—	99.1–108.0	—	E101	
—	—	—	—	—	E102	
—	—	—	—	106–115	E103	
—	—	—	—	116–130	E104	

Table 238 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DC	48GC	48HA	48JA		
0.30–0.32	—	—	—	E3	
0.33–0.35	—	—	—	E4	
0.36–0.38	—	—	—	E5	
0.39–0.41	—	—	—	E6	
0.42–0.44	—	—	—	E7	
0.45–0.49	—	—	—	E8	
0.50–0.54	—	—	—	E9	
0.55–0.58	—	—	—	E11	
0.59–0.63	—	—	—	E12	
0.64–0.67	—	—	—	E13	
0.68–0.73	—	—	—	E14	
0.74–0.81	—	—	—	E16	
0.82–0.87	—	—	—	E17	
0.88–0.94	—	—	—	E18	
0.95–1.00	—	—	—	E19	
1.01–1.10	—	—	—	E23	
1.11–1.26	—	—	—	E24	
1.27–1.40	—	—	—	E26	
1.41–1.58	—	—	—	E27	
1.59–1.74	—	—	—	E28	
1.75–1.85	—	—	—	E29	
1.86–1.99	—	—	—	E31	
2.00–2.11	—	—	—	E32	
2.12–2.31	—	—	—	E33	
2.32–2.59	—	—	—	E34	
2.60–2.75	—	—	—	E36	
2.76–2.95	—	—	—	E37	
2.96–3.21	—	—	—	E38	
3.22–3.48	—	—	—	E39	
3.49–3.89	—	—	—	E41	
3.90–4.35	—	—	—	E42	
4.36–4.73	—	—	—	E44	
4.74–5.21	—	—	—	E46	
5.22–5.74	—	—	—	E47	
5.75–6.05	—	—	—	E48	
6.06–6.46	—	—	—	E49	
6.47–6.95	—	—	—	E50	
6.96–8.09	—	—	—	E51	
8.10–9.29	—	—	—	E52	
9.30–10.4	—	—	—	E53	
—	—	—	—	E54	
10.5–10.9	—	—	—	E55	
11.0–12.0	—	—	—	E56	
12.1–14.5	—	—	—	E57	
14.6–16.8	—	—	—	E60	
16.9–18.4	16.9–18.4	—	—	E61	
18.5–20.9	18.5–20.9	—	—	E62	
21.0–22.5	21.0–22.5	—	—	E65	
22.6–24.3	22.6–24.7	—	—	E66	
24.4–27.2	24.8–27.2	27.1–30.0	—	E67	
27.3–29.2	27.3–29.2	30.1–33.2	—	E69	
29.3–30.0	29.3–32.0	33.3–35.7	—	E70	
—	32.1–34.9	35.8–39.4	—	E71	
—	—	39.5–43.4	—	E72	
—	35.0–37.8	43.5–46.9	—	E73	
—	37.9–41.7	—	—	E73A	
—	41.8–45.9	47.0–51.5	—	E74	
—	46.0–49.0	51.6–57.0	—	E76	
—	49.1–54.2	57.1–62.8	—	E77	
—	54.3–60.0	62.9–69.1	—	E78	
—	—	69.2–75.0	—	E79	
—	—	75.1–83.3	—	E80	
—	—	—	50.0–55.9	E88	
—	—	—	56.0–60.9	E89	
—	—	—	61.0–65.9	E91	
—	—	—	66.0–69.9	E92	
—	—	—	70.0–75.9	E93	
—	—	—	76.0–81.9	E94	
—	—	83.4–86.9	82.0–86.9	E96	
—	—	87.0–92.9	87.0–92.9	E97	
—	—	93.0–100.0	93.0–97.9	E98	
—	—	—	98.0–107.9	E99	
—	—	—	108–113.9	E101	
—	—	—	114–125.9	E102	
—	—	—	126–138.9	E103	
—	—	—	139–153.9	E104	
—	—	—	154–163.9	E106	
—	—	—	164–180.9	E107	

Overload Relay Heater Tables

Full Load Motor Amps, Single Phase, Trip Class 10 – Tables 313, 316

Selection

Table 313 for Class 14, 22 (1-Phase)

Full Load Amps			Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1P	Size 2, 2½		
1.85–2.05	1.85–2.05	—	K21	
2.06–2.35	2.06–2.35	—	K22	
2.36–2.64	2.36–2.64	—	K24	
2.65–2.96	2.65–2.96	—	K27	
2.97–3.31	2.97–3.31	—	K28	
3.32–3.51	3.32–3.51	—	K29	
3.52–3.87	3.52–3.87	—	K31	
3.88–4.31	3.88–4.31	—	K32	
4.32–4.79	4.32–4.79	—	K33	
4.80–5.21	4.80–5.21	—	K34	
5.22–5.75	5.22–5.75	—	K36	
5.76–6.11	5.76–6.11	—	K37	
6.12–6.95	6.12–6.95	—	K39	
6.96–7.73	6.96–7.73	—	K41	
7.74–8.47	7.74–8.47	—	K42	
8.48–9.52	8.48–9.52	—	K43	
9.53–10.4	9.53–10.4	—	K49	
10.5–11.1	10.5–11.1	—	K50	
11.2–12.4	11.2–12.4	—	K52	
12.5–13.5	12.5–13.5	—	K53	
13.6–15.1	13.6–15.1	—	K54	
15.2–16.6	15.2–16.6	—	K55	
16.7–17.6	16.7–17.6	—	K57	
17.7–18.8	17.7–18.8	18.7–19.7	K58	
18.9–21.6	18.9–21.6	19.8–21.3	K60	
21.7–22.7	21.7–22.7	21.4–22.8	K61	
22.8–25.3	22.8–25.3	22.9–24.2	K62	
—	25.4–26.6	24.3–26.5	K63	
—	26.7–30.1	26.6–29.3	K64	
—	30.2–33.0	29.4–32.0	K67	
—	33.1–34.1	32.1–35.6	K68	
—	—	35.7–37.9	K69	
—	—	38.0–40.3	K70	
—	—	40.4–44.3	K72	
—	—	44.4–49.5	K73	
—	—	49.6–52.1	K74	
—	—	52.2–53.7	K75	
—	—	53.8–60.0	K76	

Table 316 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DA	48GA	48HA	48JA		
1.69–1.88	—	—	—	K21	
1.89–2.05	—	—	—	K22	
2.06–2.21	—	—	—	K23	
2.22–2.44	—	—	—	K24	
2.45–2.70	—	—	—	K26	
2.71–2.92	—	—	—	K27	
2.93–3.27	—	—	—	K28	
3.28–3.56	—	—	—	K29	
3.57–3.83	—	—	—	K31	
3.84–4.23	—	—	—	K32	
4.24–4.57	—	—	—	K33	
4.58–4.97	—	—	—	K34	
4.98–5.67	—	—	—	K36	
5.68–6.11	—	—	—	K37	
6.12–6.91	—	—	—	K39	
6.92–7.65	—	—	—	K41	
7.66–8.4	—	—	—	K42	
8.5–8.9	—	—	—	K43	
9.0–10.1	9.12–9.6	—	—	K49	
10.2–11.2	9.7–10.4	—	—	K50	
11.3–12.3	10.5–11.4	—	—	K52	
12.4–13.3	11.5–12.1	—	—	K53	
13.4–14.1	12.2–12.9	—	—	K54	
14.2–15.0	13.0–13.7	—	—	K55	
15.1–16.2	13.8–14.8	—	—	K56	
16.3–17.5	14.9–16.4	—	—	K57	
17.6–18.6	16.5–18.2	—	—	K58	
18.7–19.9	18.3–19.5	—	—	K60	
20.0–21.3	19.6–20.9	—	—	K61	
21.4–22.8	21.0–22.8	23.2–25.1	—	K62	
22.9–25.1	22.9–24.7	25.2–27.3	—	K63	
25.2–27.6	24.8–27.6	27.4–30.4	—	K64	
27.7–30.0	27.7–30.5	30.5–33.3	—	K67	
—	30.6–33.9	33.4–36.5	—	K68	
—	34.0–37.3	36.6–39.3	—	K69	
—	37.4–40.2	39.4–43.5	—	K70	
—	40.3–41.9	43.6–46.6	43.0–46.5	K72	
—	42.0–45.9	46.7–51.1	46.6–50.9	K73	
—	46.0–50.9	51.2–56.3	51.0–55.9	K74	
—	51.0–52.9	56.4–61.1	56.0–59.1	K75	
—	53.0–57.7	61.2–64.9	59.2–68.7	K76	
—	57.8–60.0	65.0–71.9	—	K77	
—	—	72.0–80.7	68.8–80.7	K78	
—	—	80.8–92.7	80.8–92.7	K85	
—	—	92.8–100.0	92.8–103.9	K86	
—	—	—	104.0–113.5	K87	
—	—	—	113.6–127.9	K89	
—	—	—	128.0–143.9	K92	
—	—	—	144.0–163.9	K94	
—	—	—	164.0–180.0	K96	

Overload Relay Heater Tables

Full Load Motor Amps, 3-Phase, Trip Class 10 – Tables 332, 335

Selection

Table 332 for Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87 (3-Phase)

Full Load Amps					Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1 1/4	Size 2, 2 1/2	Size 3, 3 1/2	Size 4		
1.52–1.65	1.52–1.65	—	—	—	K21	
1.66–1.79	1.66–1.79	—	—	—	K22	
1.80–1.94	1.80–1.94	—	—	—	K23	
1.95–2.15	1.95–2.15	—	—	—	K24	
2.16–2.37	2.16–2.37	—	—	—	K26	
2.38–2.56	2.38–2.56	—	—	—	K27	
2.57–2.87	2.57–2.87	—	—	—	K28	
2.88–3.13	2.88–3.13	—	—	—	K29	
3.14–3.37	3.14–3.37	—	—	—	K31	
3.38–3.72	3.38–3.72	—	—	—	K32	
3.73–4.00	3.73–4.00	—	—	—	K33	
4.01–4.35	4.01–4.35	—	—	—	K34	
4.36–4.99	4.36–4.99	—	—	—	K36	
5.00–5.38	5.00–5.38	—	—	—	K37	
5.39–5.79	5.39–5.79	—	—	—	K39	
5.80–6.43	5.80–6.43	—	—	—	K41	
6.44–6.83	6.44–6.83	—	—	—	K42	
6.84–7.83	6.84–7.83	—	—	—	K43	
7.84–8.23	7.84–8.23	—	—	—	K49	
8.24–9.59	8.24–9.59	—	—	—	K50	
9.60–9.90	9.60–9.90	—	—	—	K52	
10.0–10.7	10.0–10.7	—	—	—	K53	
10.8–11.6	10.8–11.6	12.1–12.7	—	—	K54	
11.7–12.3	11.7–12.3	12.8–13.5	—	—	K55	
12.4–13.4	12.4–13.4	13.6–14.6	—	—	K56	
13.5–14.2	13.5–14.2	14.7–15.9	—	—	K57	
14.3–15.1	14.3–15.1	16.0–16.9	—	—	K58	
15.2–17.5	15.2–17.5	17.0–18.2	—	—	K60	
17.6–18.7	17.6–18.7	18.3–19.5	—	—	K61	
18.8–20.0	18.8–20.0	19.6–20.9	—	—	K62	
20.1–21.5	20.1–21.5	21.0–23.1	—	—	K63	
21.6–23.9	21.6–23.9	23.2–25.4	—	—	K64	
24.0–25.8	24.0–25.8	25.5–27.9	—	—	K67	
—	25.9–29.5	—	—	—	K68	
—	—	28.0–30.5	—	—	K69	
—	29.6–32.7	30.6–33.5	36.8–40.0	—	K70	
—	32.8–36.0	33.6–37.2	40.1–42.4	—	K72	
—	—	37.3–40.7	42.5–46.3	—	K73	
—	—	40.8–43.0	46.4–49.6	—	K74	
—	—	43.1–47.9	49.7–52.3	49.7–52.3	K75	
—	—	48.0–52.7	52.4–57.5	52.4–57.5	K76	
—	—	52.8–58.3	57.6–63.9	57.6–63.0	K77	
—	—	58.4–60.0	64.0–67.9	63.1–68.1	K78	
—	—	—	68.0–74.3	68.2–74.3	K83	
—	—	—	74.4–77.9	74.4–79.9	K85	
—	—	—	78.0–83.1	80.0–87.4	K86	
—	—	—	83.2–91.4	87.5–90.0	K87	
—	—	—	91.5–99.9	90.1–100.0	K88	
—	—	—	100.0–108.0	100.1–108.0	K89	
—	—	—	—	108.1–119.0	K90	
—	—	—	—	119.1–130.0	K92	
—	—	—	—	—	K94	
—	—	—	—	—	K96	

Table 335 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DC	48GC	48HA	48JA		
1.56–1.69	—	—	—	K21	
1.70–1.84	—	—	—	K22	
1.85–1.98	—	—	—	K23	
1.99–2.19	—	—	—	K24	
2.20–2.43	—	—	—	K26	
2.44–2.63	—	—	—	K27	
2.64–2.95	—	—	—	K28	
2.96–3.21	—	—	—	K29	
3.22–3.45	—	—	—	K31	
3.46–3.81	—	—	—	K32	
3.82–4.10	—	—	—	K33	
4.11–4.46	—	—	—	K34	
4.47–5.10	—	—	—	K36	
5.11–5.49	—	—	—	K37	
5.50–6.21	—	—	—	K39	
6.22–6.76	—	—	—	K41	
6.77–7.62	—	—	—	K42	
7.63–8.07	—	—	—	K43	
8.08–9.19	—	—	—	K49	
9.20–10.0	—	—	—	K50	
10.1–11.0	—	—	—	K52	
11.1–12.0	—	—	—	K53	
12.1–12.7	—	—	—	K54	
12.8–13.5	—	—	—	K55	
13.6–14.5	—	—	—	K56	
14.6–15.7	—	—	—	K57	
15.8–16.7	—	—	—	K58	
16.8–17.9	—	—	—	K60	
18.0–19.2	18.0–19.2	—	—	K61	
19.3–20.5	19.3–20.5	23.2–25.1	—	K62	
20.6–22.5	20.6–22.5	25.2–27.3	—	K63	
22.6–24.8	22.6–24.8	27.4–30.4	—	K64	
24.9–27.6	24.9–27.6	30.5–33.3	—	K67	
27.7–30.0	—	33.4–36.5	—	K68	
—	27.7–30.1	36.6–39.3	—	K69	
—	30.2–33.1	39.4–43.5	—	K70	
—	33.2–36.7	43.6–46.6	43.0–46.5	K72	
—	36.8–40.1	46.7–51.1	46.6–50.9	K73	
—	40.2–45.5	51.2–56.3	51.0–55.9	K74	
—	45.6–47.9	56.4–61.1	56.0–59.1	K75	
—	48.0–52.7	61.2–64.9	59.2–68.7	K76	
—	52.8–55.1	65.0–71.9	—	K77	
—	55.2–60.0	72.0–80.7	68.8–80.7	K78	
—	—	80.8–92.7	80.8–92.7	K85	
—	—	92.8–100.0	92.8–103.9	K86	
—	—	—	104.0–113.5	K87	
—	—	—	113.6–127.9	K89	
—	—	—	128.0–143.9	K92	
—	—	—	144.0–163.9	K94	
—	—	—	164.0–180.0	K96	