Fluid Power Design Data Sheet

REVISED SHEET 78 - EVOLUTION DESIGN DATA FILE

WIRE SIZE AND FUSE RATINGS FOR 3-PHASE INDUCTION MOTORS

Motors are usually protected by both fuses (or circuit breakers) and by heater coils in a magnetic starter. Fuses open the circuit quickly in case of a massive overload or short circuit. Heater coils provide a delay and open the circuit if the average current, over a period of time, is greater than the circuit is designed for.

In some cases it may be necessary to use delayed action fuses. These provide a very short delay to prevent blowing a fuse during the short interval while the motor is accelerating up to its normal speed after being started.

Current values in this chart are approximate and are compiled from data published by several motor manufacturers. They may be a little high or low for a specific motor. For selection of magnetic starter heater coils, it is better to follow the nameplate current rating of the actual motor to be used rather than depending on this or any other table.

Wire and fuse sizes are listed for reference only and may vary with type of insulation, number of conductors in a cable, and other factors. For a new design, requirements of the NEC (National Electrical Code) should be followed. Copies of the code can be ordered through most book stores. Other local ordinances may also apply.

HP	Speed RPM	230-Volt Service			460-Volt Service			HP	Speed RPM	230-Volt Service			460-Volt Service		
		Full Load Amps	Wire Size	Fuse Amps	Full Load Amps	Wire Size	Fuse Amps			Full Load Amps	Wire Size	Fuse Amps	Full Load Amps	Wire Size	Fuse Amps
1	1200	3.76	14	10	1.88	14	6	25	1200	65.6	3	120	32.8	6	180
1	1800	3.56	14	10	1.78	14	6	25	1800	64.8	3	120	32.4	6	80
1	3600	2.80	14	10	1.40	14	6	25	3600	60.8	3	120	30.4	6	80
1½	1200	5.28	14	15	2.64	14	10	30	1200	78.8	1	150	39.4	6	80
1½	1800	4.86	14	15	2.43	14	10	30	1800	75.6	1	150	37.8	6	80
1½	3600	4.36	14	15	2.18	14	10	30	3600	73.7	1	150	36.8	6	80
2	1200	6.84	15	20	3.42	14	10	40	1200	102	0	200	50.6	4	110
2	1800	6.40	14	20	3.20	14	10	40	1800	101	0	200	50.4	4	110
2	3600	5.60	14	20	3.00	14	10	40	3600	96.4	0	200	48.2	4	110
3	1200	10.2	14	25	5.12	14	15	50	1200	126	000	250	63.0	3	120
3	1800	9.40	14	25	4.70	14	15	50	1800	124	000	250	62.2	3	120
3	3600	8.34	14	25	4.17	14	15	50	3600	120	000	250	60.1	3	120
5	1200	15.8	12	30	7.91	14	20	60	1200	150	000	300	75.0	2	150
5	1800	14.4	12	30	7.21	14	20	60	1800	149	000	300	74.5	2	150
5	3600	13.5	12	30	6.76	14	20	60	3600	143	000	300	71.7	2	150
7½	1200	21.8	10	40	10.9	14	20	75	1200	184	300	350	92.0	0	200
7½	1800	21.5	10	40	10.7	14	20	75	1800	183	300	350	91.6	0	200
7½	3600	19.5	10	40	9.79	14	20	75	3600	179	300	350	89.6	0	200
10	1200	28.0	8	60	14.0	12	30	100	1200	239	500	500	120	000	250
10	1800	26.8	8	60	13.4	12	30	100	1800	236	500	500	118	000	250
10	3600	25.4	8	60	12.7	12	30	100	3600	231	500	500	115	000	250
15	1200	41.4	6	80	20.7	10	40	125	1200	298	- - -	- - -	149	0000	300
15	1800	39.2	6	80	19.6	10	40	125	1800	293	- - -	- - -	147	0000	300
15	3600	36.4	6	80	18.2	10	40	125	3600	292	- - -	- - -	146	0000	300
20	1200	52.8	4	110	26.4	8	60	150	1200	350	- - -	- - -	174	300	350
20	1800	51.2	4	110	25.6	8	60	150	1800	348	- - -	- - -	174	300	350
20	3600	50.4	4	110	25.2	8	60	150	3600	343	- - -	- - -	174	300	350

For selecting ampere rating of heater coils for magnetic motor starters, select the standard coil closest to the rating on the motor nameplate. If motor operates in cold environment, the coil with next lower rating may be preferred. If in hot environment, the coil with next larger current rating may work better.

For additional information, see Data Sheet 11. See also Data Sheets 33 and 49 for effect of high and low voltage on electric motors. More detailed information on magnetic motor starters including wiring diagrams, will be found in the Evolution book "Electrical Control of Fluid Power." Contact our office for a brochure on Evolution books.

TEMPERATURE CONVERSIONS - FAHRENHEIT AND CELSIUS

Deg. C	Temp	Deg. F	Deg. C	Temp	Deg. F
-17.2	**1**	33.8	13.7	**57**	134.6
-16.6	**2**	35.6	14.3	**58**	136.4
-16.1	**3**	37.4	14.8	**59**	138.2
-15.5	**4**	39.2	15.6	**60**	140.0
-15.0	**5**	41.0	16.1	**61**	141.8
-14.4	**6**	42.8	16.6	**62**	143.6
-13.9	**7**	44.6	17.1	**63**	145.4
-13.3	**8**	46.4	17.7	**64**	147.2
-12.7	**9**	48.2	18.2	**65**	149.0
-12.2	**10**	50.0	18.8	**66**	150.8
-11.6	**11**	51.8	19.3	**67**	152.6
-11.1	**12**	53.6	19.9	**68**	154.4
-10.5	**13**	55.4	20.4	**69**	156.2
-10.0	**14**	57.2	21.0	**70**	158.0
-9.4	**15**	59.0	21.5	**71**	159.8
-8.8	**16**	60.8	22.2	**72**	161.6
-8.3	**17**	62.6	22.7	**73**	163.4
-7.7	**18**	64.4	23.3	**74**	165.2
-7.2	**19**	66.2	23.8	**75**	167.0
-6.6	**20**	68.0	24.4	**76**	168.8
-6.1	**21**	69.8	25.0	**77**	170.6
-5.5	**22**	71.6	25.5	**78**	172.4
-5.0	**23**	73.4	26.2	**79**	174.2
-4.4	**24**	75.2	26.8	**80**	176.0
-3.9	**25**	77.0	27.3	**81**	177.8
-3.3	**26**	78.8	27.7	**82**	179.6
-2.8	**27**	80.6	28.2	**83**	181.4
-2.2	**28**	82.4	28.8	**84**	183.2
-1.6	**29**	84.2	29.3	**85**	185.0
-1.1	**30**	86.0	29.9	**86**	186.8
-0.6	**31**	87.8	30.4	**87**	188.6
0	**32**	89.6	31.0	**88**	190.4
0.5	**33**	91.4	31.5	**89**	192.2
1.1	**34**	93.2	32.1	**90**	194.0
1.6	**35**	95.0	32.6	**91**	195.8
2.2	**36**	96.8	33.3	**92**	197.6
2.7	**37**	98.6	33.8	**93**	199.4
3.3	**38**	100.4	34.4	**94**	201.2
3.8	**39**	102.2	34.9	**95**	203.0
4.4	**40**	104.0	35.5	**96**	204.8
4.9	**41**	105.8	36.1	**97**	206.8
5.5	**42**	107.6	36.6	**98**	208.4
6.0	**43**	109.4	37.1	**99**	210.2
6.6	**44**	111.2	37.8	**100**	212.0
7.1	**45**	113.0	40.6	**105**	221.0
7.7	**46**	114.8	43.3	**110**	230.0
8.2	**47**	116.6	46.1	**115**	239.0
8.8	**48**	118.4	48.9	**120**	248.0
9.3	**49**	120.2	51.7	**125**	257.0
9.9	**50**	122.0	54.4	**130**	266.0
10.4	**51**	123.8	57.2	**135**	275.0
11.1	**52**	125.6	60.0	**140**	284.0
11.5	**53**	127.4	62.8	**145**	293.0
12.1	**54**	129.2	65.6	**150**	302.0
12.6	**55**	131.0	68.3	**155**	311.0
13.2	**56**	132.8	71.1	**160**	320.0

Deg. C	Temp	Deg. F	Deg. C	Temp	Deg. F
73.9	**165**	429	226.7	**440**	824
76.7	**170**	338	232.2	**450**	842
79.4	**175**	347	237.8	**460**	860
82.2	**180**	356	243.3	**470**	878
85.0	**185**	365	248.9	**480**	896
87.8	**190**	374	254.4	**490**	914
90.6	**195**	383	260.0	**500**	932
93.3	**200**	392	265.6	**510**	950
96.1	**205**	401	271.1	**520**	968
98.9	**210**	410	276.7	**530**	986
100	**212**	413	282.2	**540**	1004
101.6	**215**	419	287.8	**550**	1022
104.4	**220**	428	293.3	**560**	1040
107.2	**225**	437	298.9	**570**	1058
110.0	**230**	446	304.4	**580**	1076
112.8	**235**	455	310.0	**590**	1094
115.6	**240**	464	315.6	**600**	1112
118.3	**245**	473	321.1	**610**	1130
121.1	**250**	482	326.7	**620**	1148
123.9	**255**	491	332.2	**630**	1166
126.7	**260**	500	337.8	**640**	1184
129.4	**265**	509	343.3	**650**	1202
132.2	**270**	518	348.9	**660**	1220
135.0	**275**	527	354.4	**670**	1238
137.8	**280**	536	360.0	**680**	1256
140.6	**285**	545	365.6	**690**	1274
143.3	**290**	554	371.1	**700**	1292
146.1	**295**	563	376.7	**710**	1310
148.9	**300**	572	382.2	**720**	1328
151.7	**305**	581	387.8	**730**	1346
154.4	**310**	590	393.3	**740**	1364
157.2	**315**	599	398.9	**750**	1382
160.0	**320**	608	404.4	**760**	1400
162.8	**325**	617	410.0	**770**	1418
165.6	**330**	626	415.6	**780**	1436
171.1	**340**	644	421.1	**790**	1454
176.7	**350**	662	426.7	**800**	1472
182.2	**360**	680	432.2	**810**	1490
187.8	**370**	698	437.8	**820**	1508
193.3	**380**	716	443.3	**830**	1526
198.9	**390**	734	448.9	**840**	1544
204.4	**400**	752	454.4	**850**	1562
210.0	**410**	770	460.0	**860**	1580
215.6	**420**	788	465.6	**870**	1598
221.1	**430**	806	471.1	**880**	1616

Enter one of the columns marked "Temp" (bold) with the ternperature, either Fahrenheit or Celsius, that you wish to convert. If converting to Celsius, read the equivalent value in the column to the left. If converting to Fahrenheit, read the equivalent value in the column to the right. The table was calculated from these formula:

°F= [°C X 9/5] + 32, or,

°C = 5/9 X (°F- 32]