Electrical Feeder Tables

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General Information and Methods

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Many of us in the electrical trade and the engineering profession must repeatedly determine feeder sizes for panels, services, and motors. When we do, we have a variety of tools available such as the standard amperage, conductor characteristics, and conduit fill tables of the NEC. Numerous rules must be adhered to such as maximum conductor amperage, conduit fill, and the many laws regarding the protection of these conductors as well as the equipment that they serve.

While all electricians and engineers should be familiar with the application of the NEC rules that govern these feeders, much time can be saved by having prepared tables for feeders. The minimum circuit amperage and maximum time-delay fuse for a 208V 3Ø induction motor will always be the same so why figure it out each time you need it?

Naturally, many variable parameters come into play with each circumstance. The bare minimum size conduit needed for a feeder depends on many factors. Schedule 40 PVC can hold more conductors than schedule 80. THHN insulated wire has less cross sectional area than THW. A motor circuit protected by a time delay fuse may not require a grounding conductor as large as it would if were protected by a circuit breaker or non-time delay fuse. Nevertheless, if you find that you need to repeatedly determine various feeders and you stick to some standards, feeder tables such as these can save many hours of labor re-inventing the wheel and reduce the likelihood of errors.

In the creation of these tables, the following standards were incorporated:

1. Wire is always assumed to be THW. The vast majority of wire being installed today is THHN which is much smaller. Basing conduit fills on THW even though THHN will likely be used has several advantages. One is that it is a "worst case scenario" so that the conduit will probably not be too small no matter what insulation wire is used. The second is that a conduit's available cross section varies with the conduit material. EMT is the most popular conduit type but, other than IMC and RMC, all other conduit types have less cross sectional area than EMT. Basing the conduit on THW while using THHN insures that a code violation will not result from a conduit transition. Finally, feeder conduits based on THW will often have enough spare area that larger or extra conductors might be able to be added in the future without replacing the conduit.
2. Conduit is assumed to be EMT as this is the most popular type. Since IMC and RMC are both larger than the same trade size EMT conduits, feeders that require threaded conduit due to specifications or field conditions will still be valid.
3. Conductors are assumed to be copper. The new AA-8000 aluminum alloy conductors are supposed to be very good and resistant to the oxidation problems of the old aluminum conductors that led to so many fires in the past. Even so, copper conductors are still more widely accepted for interior wiring.
4. Motor feeder grounding conductors are based on feeders protected by breakers. Feeders protected by time delay fuses might be able to use smaller grounding conductors but installing a ground based on a breaker allows future flexibility for the owner if he should decide to replace the motor control center or panel in the future.
5. All feeders and branch circuits are assumed to have a copper grounding conductor regardless of the conduit type. Although the NEC allows many metallic conduit types to be used as equipment grounds, the IEEE has determined that having a separate insulated equipment ground wire installed within a metallic conduit offers the very best performance and protection during short circuits. The metal conduit provides excellent physical protection as well as an inherent short circuit path should the conduit be cut into. The insulated ground wire provides a low impedance path to ground which also maintains a ground path should a conduit fitting break or be improperly installed.

If you should find errors, have questions, or observations on this document, please send an email to tstahlnecker@ieee.org.

3Ø 3-Wire Services and 1Ø Services

Feeder	Amperage	Designation
1S1	20	3#12 in 1/2" C
1S2	25	3#10 in 1/2" C
1S2	30	3#10 in 1/2" C
1S3	35	3#8 in 3/4" C
1S3	40	3#8 in 3/4" C
1S3	45	3#8 in 3/4" C
1S3	50	3#8 in 3/4" C
1S4	60	3#6 in 3/4" C
1S5	70	3#4 in 1" C
1S5	80	3#4 in 1" C
1S6	90	3#3 in 1" C
1S6	100	3#3 in 1" C
1S7	110	3#2 in 1-1/4" C
1S8	125	3#1 in 1-1/4" C
1S9	150	3#1/0 in 1-1/2" C
1S10	175	3#2/0 in 1-1/2" C
1S11	200	3#3/0 in 2" C
1S12	225	3#4/0 in 2" C
1S13	250	3#250 in 2" C
1S14	300	3#350 in 2-1/2" C -or- 3#1/0 in ea of (2) 1-1/2" C
1S15	350	3#500 in 2-1/2" C -or- 3#2/0 in ea of (2) 1-1/2" C
1S16	400	3#600 in 3" C -or- 3#3/0 in ea of (2) 2" C
1S17	450	3#4/0 in ea of (2) 2" C -or- 3#1/0 in ea of (3) 1-1/2" C
1S18	500	3#250 in ea of (2) 2" C -or- 3#2/0 in ea of (3) 1-1/2" C
1S19	600	3#350 in ea of (2) 2-1/2" C -or- 3#3/0 in ea of (3) 2" C
1S20	700	3#500 in ea of (2) 2-1/2" C -or- 3#250 in ea of (3) 2" C
1S21	800	3#600 in ea of (2) 3" C -or- 3#300 in ea of (3) 2-1/2" C
1S22	1000	3#400 in ea of (3) 2-1/2" C -or- 3#250 in ea of (4) 2" C
1S23	1200	3#600 in ea of (3) 3" C -or- 3#350 in ea of (4) 2-1/2" C
1S24	1600	3#600 in ea of (4) 3" C -or- 3#300 in ea of (6) 2-1/2" C
1S25	2000	3#600 in ea of (5) 3" C -or- 3#400 in ea of (6) 2-1/2" C
1S26	2500	3#600 in ea of (6) 3" C -or- 3#500 in ea of (7) 2-1/2" C
1S27	3000	3#500 in ea of (8) 2-1/2" C -or- 3#400 in ea of (9) 2-1/2" C
1S28	4000	3#600 in ea of (10) 3" C -or- 3#400 in ea of (12) 2-1/2" C
1S29	5000	3#600 in ea of (12) 3" C -or- 3#400 in ea of (15) 2-1/2" C
1S30	6000	3#600 in ea of (15) 3" C -or- 3#400 in ea of (18) 2-1/2" C

Method Used

Only conductors that can supply the full amperage listed are used. Often, conductors that are rated less than the main overcurrent device can be used if the breaker or fuse is 800 amps or less (NEC 240.4(B)). An example would be 500kcmil used on a 400 amp device even though the conductor is only rated at 380 amps. Amperages are taken from the 75º column of Table 310.16 as found in the 2005 NEC. Note that feeders used as service conductors do not require ground wires. Conduit listed is the minimum EMT size allowed by NEC for THW insulated wire. Wire sizes larger than 600kcmil are not used as lugs that accept them are not commonly available for breakers. If the 1Ø service is for a dwelling unit, check Table 310.15(B)(6) for optional conductor sizes.

3Ø 4-Wire Services

Feeder	Amperage	Designation
2S1	20	4#12 in 1/2" C
2S2	25	4#10 in 3/4" C
2S2	30	4#10 in 3/4" C
2S3	35	4#8 in 3/4" C
2S3	40	4#8 in 3/4" C
2S3	45	4#8 in 3/4" C
2S3	50	4#8 in 3/4" C
2S4	60	4#6 in 1" C
2S5	70	4#4 in 1-1/4" C
2S5	80	4#4 in 1-1/4" C
2S6	90	4#3 in 1-1/4" C
2S6	100	4#3 in 1-1/4" C
2S7	110	4#2 in 1-1/4" C
2S8	125	4#1 in 1-1/2" C
2S9	150	4#1/0 in 2" C
2S10	175	4#2/0 in 2" C
2S11	200	4#3/0 in 2" C
2S12	225	4#4/0 in 2-1/2" C
2S13	250	4#250 in 2-1/2" C
2S14	300	4#350 in 2-1/2" C -or- 4#1/0 in ea of (2) 2" C
2S15	350	4#500 in 3" C -or- 4#2/0 in ea of (2) 2" C
2S16	400	4#600 in 3-1/2" C -or- 4#3/0 in ea of (2) 2" C
2S17	450	3#4/0 in ea of (2) 2-1/2" C -or- 4#1/0 in ea of (3) 2" C
2S18	500	4#250 in ea of (2) 2-1/2" C -or- 4#2/0 in ea of (3) 2" C
2S19	600	4#350 in ea of (2) 2-1/2" C -or- 4#3/0 in ea of (3) 2" C
2S20	700	4#500 in ea of (2) 3" C -or- 4#250 in ea of (3) 2-1/2" C
2S21	800	4#600 in ea of (2) 3-1/2" C -or- 4#300 in ea of (3) 2-1/2" C
2S22	1000	4#400 in ea of (3) 3" C -or- 4#250 in ea of (4) 2-1/2" C
2S23	1200	4#600 in ea of (3) 3-1/2" C -or- 4#350 in ea of (4) 2-1/2" C
2S24	1600	4#600 in ea of (4) 3-1/2" C -or- 4#300 in ea of (6) 2-1/2" C
2S25	2000	4#600 in ea of (5) 3-1/2" C -or- 4#400 in ea of (6) 3" C
2S26	2500	4#600 in ea of (6) 3-1/2" C -or- 4#500 in ea of (7) 3" C
2S27	3000	4#500 in ea of (8) 3" C -or- 4#400 in ea of (9) 3" C
2S28	4000	4#600 in ea of (10) 3-1/2" C -or- 4#400 in ea of (12) 3" C
2S29	5000	4#600 in ea of (12) 3-1/2" C -or- 4#400 in ea of (15) 3" C
2S30	6000	4#600 in ea of (15) 3-1/2" C -or- 4#400 in ea of (18) 3" C

Method Used

Only conductors that can supply the full amperage listed are used. Often, conductors that are rated less than the main overcurrent device can be used if the breaker or fuse is 800 amps or less (NEC 240.4(B)). An example would be 500kcmil used on a 400 amp device even though the conductor is only rated at 380 amps. Amperages are taken from the 75º column of Table 310.16 as found in the 2005 NEC. Note that feeders used as service conductors do not require ground wires. Conduit listed is the minimum EMT size allowed by NEC for THW insulated wire. Wire sizes larger than 600kcmil are not used as lugs that accept them are not commonly available for breakers.

3Ø 3-Wire Feeders & 1Ø Feeders

Feeder	Amperage	Designation
1F1	20	3#12 & 1#12 GND in 1/2” C
1F2	25	3#10 & 1#10 GND in 3/4” C
1F2	30	3#10 & 1#10 GND in 3/4” C
1F3	35	3#8 & 1#10 GND in 3/4” C
1F3	40	3#8 & 1#10 GND in 3/4” C
1F3	45	3#8 & 1#10 GND in 3/4” C
1F3	50	3#8 & 1#10 GND in 3/4” C
1F4	60	3#6 & 1#10 GND in 1” C
1F5	70	3#4 & 1#8 GND in 1-1/4” C
1F5	80	3#4 & 1#8 GND in 1-1/4” C
1F6	90	3#3 & 1#8 GND in 1-1/4” C
1F6	100	3#3 & 1#8 GND in 1-1/4” C
1F7	110	3#2 & 1#6 GND in 1-1/4” C
1F8	125	3#1 & 1#6 GND in 1-1/2” C
1F9	150	3#1/0 & 1#6 GND in 1-1/2” C
1F10	175	3#2/0 & 1#6 GND in 2” C
1F11	200	3#3/0 & 1#6 GND in 2” C
1F12	225	3#4/0 & 1#4 GND in 2” C
1F13	250	3#250 & 1#4 GND in 2-1/2” C
1F14	300	3#350 & 1#4 GND in 2-1/2” C -or- 3#1/0 & 1#4 GND in ea of (2) 1-1/2” C
1F15	350	3#500 & 1#3 GND in 3” C -or- 3#2/0 & 1#3 GND in ea of (2) 2” C
1F16	400	3#600 & 1#3 GND in 3” C -or- 3#3/0 & 1#3 GND in ea of (2) 2” C
1F17	450	3#4/0 & 1#2 GND in ea of (2) 2” C -or- 3#1/0 & 1#2 GND in ea of (3) 1-1/2” C
1F18	500	3#250 & 1#2 GND in ea of (2) 2-1/2” C -or- 3#2/0 & 1#2 GND in ea of (3) 2” C
1F19	600	3#350 & 1#1 GND in ea of (2) 2-1/2” C -or- 3#3/0 & 1#1 GND in ea of (3) 2” C
1F20	700	3#500 & 1#1/0 GND in ea of (2) 3” C -or- 3#250 & 1#1/0 GND in ea of (3) 2-1/2” C
1F21	800	3#600 & 1#1/0 GND in ea of (2) 3” C -or- 3#300 & 1#1/0 GND in ea of (3) 2-1/2” C
1F22	1000	3#400 & 1#2/0 GND in ea of (3) 2-1/2” C -or- 3#250 & 1#2/0 GND in ea of (4) 2-1/2” C
1F23	1200	3#600 & 1#3/0 GND in ea of (3) 3” C -or- 3#350 & 1#3/0 GND in ea of (4) 2-1/2” C
1F24	1600	3#600 & 1#4/0 GND in ea of (4) 3” C -or- 3#300 & 1#4/0 GND in ea of (6) 2-1/2” C
1F25	2000	3#600 & 1#250 GND in ea of (5) 3” C -or- 3#400 & 1#250 GND in ea of (6) 3” C
1F26	2500	3#600 & 1#350 GND in ea of (6) 3” C -or- 3#500 & 1#350 GND in ea of (7) 3” C
1F27	3000	3#500 & 1#400 GND in ea of (8) 3” C -or- 3#400 & 1#400 GND in ea of (9) 3” C
1F28	4000	3#600 & 1#500 GND in ea of (10) 3-1/2” C -or- 3#400 & 1#400 GND in ea of (12) 3” C
1F29	5000	3#600 & 1#600 GND in ea of (12) 3-1/2” C
1F30	6000	3#600 & 1#600 GND in ea of (15) 3-1/2” C

Method Used

Only conductors that can supply the full amperage listed are used. Often, conductors that are rated less than the feeder overcurrent device can be used if the breaker or fuse is 800 amps or less (NEC 240.4(B)). An example would be 500kcmil used on a 400 amp device even though the conductor is only rated at 380 amps. Amperages are taken from the 75º column of Table 310.16 as found in the 2005 NEC. Conduit listed is the minimum EMT size allowed by NEC for THW insulated wire. Wire sizes larger than 600kcmil are not used as lugs that accept them are not commonly available for breakers. If the 1Ø feeder is for a dwelling unit, check Table 310.15(B)(6) for optional conductor sizes.

3Ø 4-Wire Feeders

Feeder	Amperage	Designation
2F1	20	4#12 & 1#12 GND in 1/2" C
2F2	25	4#10 & 1#10 GND in 3/4" C
2F2	30	4#10 & 1#10 GND in 3/4" C
2F3	35	4#8 & 1#10 GND in 1" C
2F3	40	4#8 & 1#10 GND in 1" C
2F3	45	4#8 & 1#10 GND in 1" C
2F3	50	4#8 & 1#10 GND in 1" C
2F4	60	4#6 & 1#10 GND in 1" C
2F5	70	4#4 & 1#8 GND in 1-1/4" C
2F5	80	4#4 & 1#8 GND in 1-1/4" C
2F6	90	4#3 & 1#8 GND in 1-1/4" C
2F6	100	4#3 & 1#8 GND in 1-1/4" C
2F7	110	4#2 & 1#6 GND in 1-1/2" C
2F8	125	4#1 & 1#6 GND in 2" C
2F9	150	4#1/0 & 1#6 GND in 2" C
2F10	175	4#2/0 & 1#6 GND in 2" C
2F11	200	4#3/0 & 1#6 GND in 2" C
2F12	225	4#4/0 & 1#4 GND in 2-1/2" C
2F13	250	4#250 & 1#4 GND in 2-1/2" C
2F14	300	4#350 & 1#4 GND in 3" C -or- 4#1/0 & 1#4 GND in ea of (2) 2" C
2F15	350	4#500 & 1#3 GND in 3" C -or- 4#2/0 & 1#3 GND in ea of (2) 2" C
2F16	400	4#600 & 1#3 GND in 3-1/2" C -or- 4#3/0 & 1#3 GND in ea of (2) 2-1/2" C
2F17	450	4#4/0 & 1#2 GND in ea of (2) 2-1/2" C -or- 4#1/0 & 1#2 GND in ea of (3) 2" C
2F18	500	4#250 & 1#2 GND in ea of (2) 2-1/2" C -or- 4#2/0 & 1#2 GND in ea of (3) 2" C
2F19	600	4#350 & 1#1 GND in ea of (2) 3" C -or- 4#3/0 & 1#1 GND in ea of (3) 2-1/2" C
2F20	700	4#500 & 1#1/0 GND in ea of (2) 3" C -or- 4#250 & 1#1/0 GND in ea of (3) 2-1/2" C
2F21	800	4#600 & 1#1/0 GND in ea of (2) 3-1/2" C -or- 4#300 & 1#1/0 GND in ea of (3) 2-1/2" C
2F22	1000	4#400 & 1#2/0 GND in ea of (3) 3" C -or- 4#250 & 1#2/0 GND in ea of (4) 2-1/2" C
2F23	1200	4#600 & 1#3/0 GND in ea of (3) 3-1/2" C -or- 4#350 & 1#3/0 GND in ea of (4) 3" C
2F24	1600	4#600 & 1#4/0 GND in ea of (4) 3-1/2" C -or- 4#300 & 1#4/0 GND in ea of (6) 3" C
2F25	2000	4#600 & 1#250 GND in ea of (5) 3-1/2" C -or- 4#400 & 1#250 GND in ea of (6) 3" C
2F26	2500	4#600 & 1#350 GND in ea of (6) 3-1/2" C -or- 4#500 & 1#350 GND in ea of (7) 3-1/2" C
2F27	3000	4#500 & 1#400 GND in ea of (8) 3-1/2" C -or- 4#400 & 1#400 GND in ea of (9) 3" C
2F28	4000	4#600 & 1#500 GND in ea of (10) 4" C -or- 4#400 & 1#400 GND in ea of (12) 3" C
2F29	5000	4#600 & 1#600 GND in ea of (12) 4" C
2F30	6000	4#600 & 1#600 GND in ea of (15) 4" C

Method Used

Only conductors that can supply the full amperage listed are used. Often, conductors that are rated less than the feeder overcurrent device can be used if the breaker or fuse is 800 amps or less (NEC 240.4(B)). An example would be 500kcmil used on a 400 amp device even though the conductor is only rated at 380 amps. Amperages are taken from the 75º column of Table 310.16 as found in the 2005 NEC. Conduit listed is the minimum EMT size allowed by NEC for THW insulated wire. Wire sizes larger than 600kcmil are not used as lugs that accept them are not commonly available for breakers.

120V Motors

Feeder Num.	HP	FLA	VA per Phase	Min Non-fused Disc	Min Fusible Disc	MCA	Max NON Fuse	Max Time D. Fuse	Max Breaker	Typical Circuit Designation
1M1	1/6 HP	4.4A	528	20A	20A	5.5A	15A	15A	15A	(15/1) 2#12 & 1#12 GND in 1/2" C
1M1	1/4 HP	5.8A	696	20A	20A	7.3A	20A	15A	15A	(15/1) 2#12 & 1#12 GND in 1/2" C
1M1	1/3 HP	7.2A	864	20A	20A	9A	25A	15A	20A	(20/1) 2#12 & 1#12 GND in 1/2" C
1M1	1/2 HP	9.8A	1176	20A	20A	12.3A	30A	20A	25A	(25/1) 2#12 & 1#12 GND in 1/2" C
1M1	3/4 HP	13.8A	1656	20A	30A	17.3A	45A	25A	35A	(35/1) 2#12 & 1#12 GND in 1/2" C
1M1	1 HP	16A	1920	20A	30A	20A	50A	30A	40A	(40/1) 2#12 & 1#12 GND in 1/2" C
1M2	1-1/2 HP	20A	2400	30A	60A	25A	60A	35A	50A	(50/1) 2#10 & 1#10 GND in 1/2" C
1M2	2 HP	24A	2880	30A	60A	30A	80A	45A	60A	(60/1) 2#10 & 1#10 GND in 1/2" C
1M4	3 HP	34A	4080	60A	60A	42.5A	110A	60A	90A	(90/1) 2#6 & 1#8 GND in 3/4" C
1M6	5 HP	56A	6720	100A	100A	70A	175A	100A	150A	(150/1) 2#4 & 1#6 GND in 1" C

Method Used

The FLA (Full Load Amps) is taken from NEC Table 430.248. The VA per phase is this FLA multiplied by 120V. The minimum non-fused disconnect is the first standard disconnect size that is equal to or larger than 115% of the FLA. The minimum fusible disconnect is the smallest standard disconnect that can hold the maximum time delay fuse. The MCA (Minimum Circuit Ampacity) is 125% of the FLA making it possible for the MCA to be slightly larger than the minimum disconnect. The maximum non-time delay fuse is 300% of the FLA or the next larger standard fuse. Non-time delay fuses may be used to protect lighting, heating, and other circuits that are not subject to temporary surges and where short circuit currents are low. Non-time delay fuses are generally not suitable for motors. The maximum time delay or dual element fuse is 175% of the FLA or the next larger standard fuse. The maximum breaker is 250% of the FLA or the next larger standard breaker size. Although not listed in the chart, the maximum MCP (motor circuit protector or instantaneous trip breaker) is generally 800% of the FLA. The circuit designation is based upon conductors able to provide the MCA from the maximum breaker. If the motor is being fed from a fuse rather than a breaker and Table 250.122 allows it, it may be permissible to use a smaller ground wire.

208V 1Ø Motors

Feeder Num.	HP	FLA	VA per Phase	Min Non-fused Disc	Min Fusible Disc	MCA	Max NON Fuse	Max Time D. Fuse	Max Breaker	Typical Circuit Designation
1M1	1/6 HP	2.4A	250	20A	20A	3.0A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	1/4 HP	3.2A	333	20A	20A	4.0A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	1/3 HP	4.0A	416	20A	20A	5A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	1/2 HP	5.4A	562	20A	20A	6.8A	20A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	3/4 HP	7.6A	790	20A	20A	9.5A	25A	15A	20A	(20/2) 2#12 & 1#12 GND in 1/2" C
1M1	1 HP	8.8A	915	20A	20A	11A	30A	20A	25A	(25/2) 2#12 & 1#12 GND in 1/2" C
1M1	1-1/2 HP	11.0A	1144	20A	20A	13.8A	35A	20A	30A	(30/2) 2#12 & 1#12 GND in 1/2" C
1M1	2 HP	13.2A	1373	20A	30A	16.5A	40A	25A	35A	(35/2) 2#12 & 1#12 GND in 1/2" C
1M2	3 HP	18.7A	1945	30A	60A	23.4A	60A	35A	50A	(50/2) 2#10 & 1#10 GND in 1/2" C
1M3	5 HP	30.8A	3203	60A	60A	38.5A	100A	60A	80A	(80/2) 2#8 & 1#8 GND in 3/4" C
1M5	7-1/2 HP	44.0A	4576	60A	100A	55A	150A	80A	110A	(110/2) 2#6 & 1#6 GND in 3/4" C
1M6	10 HP	55.0A	5720	100A	100A	68.8A	175A	100A	150A	(150/2) 2#4 & 1#6 GND in 1" C

Method Used

The FLA (Full Load Amps) is taken from NEC Table 430.248. The VA per phase is this FLA multiplied by 208 and then divided by 2. The minimum non-fused disconnect is the first standard disconnect size that is equal to or larger than 115% of the FLA. The minimum fusible disconnect is the smallest standard disconnect that can hold the maximum time delay fuse. The MCA (Minimum Circuit Ampacity) is 125% of the FLA making it possible for the MCA to be slightly larger than the minimum disconnect. The maximum non-time delay fuse is 300% of the FLA or the next larger standard fuse. Non-time delay fuses may be used to protect lighting, heating, and other circuits that are not subject to temporary surges and where short circuit currents are low. Non-time delay fuses are generally not suitable for motors. The maximum time delay or dual element fuse is 175% of the FLA or the next larger standard fuse. The maximum breaker is 250% of the FLA or the next larger standard breaker size. Although not listed in the chart, the maximum MCP (motor circuit protector or instantaneous trip breaker) is generally 800% of the FLA. The circuit designation is based upon conductors able to provide the MCA from the maximum breaker. If the motor is being fed from a fuse rather than a breaker and Table 250.122 allows it, it may be permissible to use a smaller ground wire.

240V 1Ø Motors

Feeder Num.	HP	FLA	VA per Phase	Min Non-fused Disc	Min Fusible Disc	MCA	Max NON Fuse	Max Time D. Fuse	Max Breaker	Typical Circuit Designation
1M1	1/6 HP	2.2A	253	20A	20A	2.8A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	1/4 HP	2.9A	334	20A	20A	3.6A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	1/3 HP	3.6A	414	20A	20A	4.5A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	1/2 HP	4.9A	564	20A	20A	6.1A	15A	15A	15A	(15/2) 2#12 & 1#12 GND in 1/2" C
1M1	3/4 HP	6.9A	794	20A	20A	8.6A	25A	15A	20A	(20/2) 2#12 & 1#12 GND in 1/2" C
1M1	1 HP	8.0A	920	20A	20A	10A	25A	15A	20A	(20/2) 2#12 & 1#12 GND in 1/2" C
1M1	1-1/2 HP	10A	1150	20A	20A	12.5A	30A	20A	25A	(25/2) 2#12 & 1#12 GND in 1/2" C
1M1	2 HP	12A	1380	20A	30A	15A	40A	25A	30A	(30/2) 2#12 & 1#12 GND in 1/2" C
1M2	3 HP	17A	1955	20A	30A	21.3A	60A	30A	45A	(45/2) 2#10 & 1#10 GND in 1/2" C
1M3	5 HP	28A	3220	60A	60A	35A	90A	50A	70A	(70/2) 2#8 & 1#8 GND in 3/4" C
1M3	7-1/2 HP	40A	4600	60A	100A	50A	125A	70A	100A	(100/2) 2#8 & 1#8 GND in 3/4" C
1M5	10 HP	50A	5750	60A	100A	62.5A	150A	90A	125A	(125/2) 2#6 & 1#6 GND in 3/4" C

Method Used

The FLA (Full Load Amps) is taken from NEC Table 430.248. The VA per phase is this FLA multiplied by 230 and then divided by 2. The minimum non-fused disconnect is the first standard disconnect size that is equal to or larger than 115% of the FLA. The minimum fusible disconnect is the smallest standard disconnect that can hold the maximum time delay fuse. The MCA (Minimum Circuit Ampacity) is 125% of the FLA making it possible for the MCA to be slightly larger than the minimum disconnect. The maximum non-time delay fuse is 300% of the FLA or the next larger standard fuse. Non-time delay fuses may be used to protect lighting, heating, and other circuits that are not subject to temporary surges and where short circuit currents are low. Non-time delay fuses are generally not suitable for motors. The maximum time delay or dual element fuse is 175% of the FLA or the next larger standard fuse. The maximum breaker is 250% of the FLA or the next larger standard breaker size. Although not listed in the chart, the maximum MCP (motor circuit protector or instantaneous trip breaker) is generally 800% of the FLA. The circuit designation is based upon conductors able to provide the MCA from the maximum breaker. If the motor is being fed from a fuse rather than a breaker and Table 250.122 allows it, it may be permissible to use a smaller ground wire.

208V 3Ø Motors

Feeder Num.	HP	FLA	VA per Phase	Min Non-fused Disc	Min Fusible Disc	MCA	Max NON Fuse	Max Time D. Fuse	Max Breaker	Typical Circuit Designation
3M1	1/2 HP	2.4A	288	20A	20A	3.0A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	3/4 HP	3.5A	420	20A	20A	4.4A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	1 HP	4.6A	552	20A	20A	5.8A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	1-1/2 HP	6.6A	564	20A	20A	8.3A	20A	15A	20A	(20/3) 3#12 & 1#12 GND in 1/2" C
3M1	2 HP	7.5A	792	20A	20A	9.4A	25A	15A	20A	(20/3) 3#12 & 1#12 GND in 1/2" C
3M1	3 HP	10.6A	1272	20A	20A	13.3A	35A	20A	30A	(30/3) 3#12 & 1#12 GND in 1/2" C
3M2	5 HP	16.7A	2004	20A	30A	20.9A	50A	30A	45A	(45/3) 3#10 & 1#10 GND in 3/4" C
3M3	7-1/2 HP	24.2A	2904	30A	60A	30.3A	80A	45A	70A	(70/3) 3#8 & 1#8 GND in 3/4" C
3M3	10 HP	30.8A	3696	60A	60A	38.5A	100A	60A	80A	(80/3) 3#8 & 1#8 GND in 3/4" C
3M4	15 HP	46.2A	5544	60A	100A	57.8A	150A	90A	125A	(125/3) 3#6 & 1#6 GND in 1" C
3M5	20 HP	59.4A	7128	100A	200A	74.3A	200A	110A	150A	(150/3) 3#4 & 1#6 GND in 1-1/4" C
3M6	25 HP	74.8A	8976	100A	200A	93.5A	225A	150A	200A	(200/3) 3#3 & 1#6 GND in 1-1/4" C
3M7	30 HP	88A	10560	200A	200A	110A	300A	175A	225A	(225/3) 3#2 & 1#4 GND in 1-1/4" C
3M9	40 HP	114A	13680	200A	200A	143A	350A	200A	300A	(300/3) 3#1/0 & 1#4 GND in 1-1/2" C
3M11	50 HP	143A	17160	200A	400A	179A	450A	250A	400A	(400/3) 3#3/0 & 1#3 GND in 2" C
3M12	60 HP	169A	20280	200A	400A	211A	600A	300A	450A	(450/3) 3#4/0 & 1#2 GND in 2" C
3M14	75 HP	211A	25320	400A	400A	264A	700A	400A	600A	(600/3) 3#300 & 1#1 GND in 2-1/2" C
3M17	100 HP	273A	32760	400A	600A	341A	1000A	500A	700A	(700/3) 3#500 & 1#1/0 GND in 3" C
3M19	125 HP	343A	41160	400A	600A	429A	1200A	600A	1000A	(1000/3) 3#4/0 & 1#2/0 GND in ea of (2) 2-1/2" C
3M20	150 HP	396A	47520	600A	800A	495A	1200A	700A	1000A	(1000/3) 3#250 & 1#2/0 GND in ea of (2) 2-1/2" C
3M22	200 HP	528A	63360	800A	1000A	660A	1600A	1000A	1600A	(1600/3) 3#400 & 1#4/0 GND in ea of (2) 3" C

Method Used

The FLA (Full Load Amps) is taken from NEC Table 430.250. The VA per phase is this FLA multiplied by 120. The minimum non-fused disconnect is the first standard disconnect size that is equal to or larger than 115% of the FLA. The minimum fusible disconnect is the smallest standard disconnect that can hold the maximum time delay fuse. The MCA (Minimum Circuit Ampacity) is 125% of the FLA making it possible for the MCA to be slightly larger than the minimum disconnect. The maximum non-time delay fuse is 300% of the FLA or the next larger standard fuse. Non-time delay fuses may be used to protect lighting, heating, and other circuits that are not subject to temporary surges and where short circuit currents are low. Non-time delay fuses are generally not suitable for motors. The maximum time delay or dual element fuse is 175% of the FLA or the next larger standard fuse. The maximum breaker is 250% of the FLA or the next larger standard breaker size. Although not listed in the chart, the maximum MCP (motor circuit protector or instantaneous trip breaker) is generally 800% of the FLA. The circuit designation is based upon conductors able to provide the MCA from the maximum breaker. If the motor is being fed from a fuse rather than a breaker and Table 250.122 allows it, it may be permissible to use a smaller ground wire.

240V 3Ø Motors

Feeder Num.	HP	FLA	VA per Phase	Min Non-fused Disc	Min Fusible Disc	MCA	Max NON Fuse	Max Time D. Fuse	Max Breaker	Typical Circuit Designation
3M1	1/2 HP	2.2A	305	20A	20A	2.8A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	3/4 HP	3.2A	443	20A	20A	4.0A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	1 HP	4.2A	582	20A	20A	5.2A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	1-1/2 HP	6.0A	831	20A	20A	7.5A	20A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	2 HP	6.8A	942	20A	20A	8.5A	25A	15A	20A	(20/3) 3#12 & 1#12 GND in 1/2" C
3M1	3 HP	9.6A	1330	20A	20A	12.0A	30A	20A	25A	(25/3) 3#12 & 1#12 GND in 1/2" C
3M1	5 HP	15.2A	2106	20A	30A	19.0A	50A	30A	40A	(40/3) 3#12 & 1#12 GND in 1/2" C
3M2	7-1/2 HP	22A	3048	30A	60A	27.5A	70A	40A	60A	(60/3) 3#10 & 1#10 GND in 3/4" C
3M3	10 HP	28A	3880	60A	60A	35.0A	90A	50A	70A	(70/3) 3#8 & 1#8 GND in 3/4" C
3M4	15 HP	42A	5820	60A	100A	52.5A	150A	80A	110A	(110/3) 3#6 & 1#6 GND in 1" C
3M5	20 HP	54A	7482	100A	100A	67.5A	175A	100A	150A	(150/3) 3#4 & 1#6 GND in 1-1/4" C
3M5	25 HP	68A	9422	100A	200A	85.0A	225A	125A	175A	(175/3) 3#4 & 1#6 GND in 1-1/4" C
3M6	30 HP	80A	11085	100A	200A	100A	250A	150A	200A	(200/3) 3#3 & 1#6 GND in 1-1/4" C
3M8	40 HP	104A	14410	200A	200A	130A	350A	200A	300A	(300/3) 3#1 & 1#4 GND in 1-1/2" C
3M10	50 HP	130A	18013	200A	400A	163A	400A	250A	350A	(350/3) 3#2/0 & 1#3 GND in 2" C
3M11	60 HP	154A	21338	200A	400A	193A	500A	300A	400A	(400/3) 3#3/0 & 1#3 GND in 2" C
3M13	75 HP	192A	26604	400A	400A	240A	600A	350A	500A	(500/3) 3#250 & 1#2 GND in 2-1/2" C
3M16	100 HP	248A	34363	400A	600A	310A	800A	450A	700A	(700/3) 3#350 & 1#1/0 GND in 2-1/2" C
3M18	125 HP	312A	43231	400A	600A	390A	1000A	600A	800A	(800/3) 3#3/0 & 1#1/0 GND in ea of (2) 2" C
3M19	150 HP	360A	49882	600A	800A	450A	1200A	700A	1000A	(1000/3) 3#4/0 & 1#2/0 GND in ea of (2) 2-1/2" C
3M21	200 HP	480A	66509	600A	1000A	600A	1600A	1000A	1200A	(1200/3) 3#350 & 1#3/0 GND in ea of (2) 2-1/2" C

Method Used

The FLA (Full Load Amps) is taken from NEC Table 430.250. The VA per phase is this FLA multiplied by 138.56. The minimum non-fused disconnect is the first standard disconnect size that is equal to or larger than 115% of the FLA. The minimum fusible disconnect is the smallest standard disconnect that can hold the maximum time delay fuse. The MCA (Minimum Circuit Ampacity) is 125% of the FLA making it possible for the MCA to be slightly larger than the minimum disconnect. The maximum non-time delay fuse is 300% of the FLA or the next larger standard fuse. Non-time delay fuses may be used to protect lighting, heating, and other circuits that are not subject to temporary surges and where short circuit currents are low. Non-time delay fuses are generally not suitable for motors. The maximum time delay or dual element fuse is 175% of the FLA or the next larger standard fuse. The maximum breaker is 250% of the FLA or the next larger standard breaker size. Although not listed in the chart, the maximum MCP (motor circuit protector or instantaneous trip breaker) is generally 800% of the FLA. The circuit designation is based upon conductors able to provide the MCA from the maximum breaker. If the motor is being fed from a fuse rather than a breaker and Table 250.122 allows it, it may be permissible to use a smaller ground wire.

480V 3Ø Motors

Feeder Num.	HP	FLA	VA per Phase	Min Non-fused Disc	Min Fusible Disc	MCA	Max NON Fuse	Max Time D. Fuse	Max Breaker	Typical Circuit Designation
3M1	1/2 HP	1.1A	305	20A	20A	1.4A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	3/4 HP	1.6A	443	20A	20A	2.0A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	1 HP	2.1A	582	20A	20A	2.6A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	1-1/2 HP	3.0A	831	20A	20A	3.8A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	2 HP	3.4A	942	20A	20A	4.2A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	3 HP	4.8A	1330	20A	20A	6.0A	15A	15A	15A	(15/3) 3#12 & 1#12 GND in 1/2" C
3M1	5 HP	7.6A	2105	20A	20A	9.5A	25A	15A	20A	(20/3) 3#12 & 1#12 GND in 1/2" C
3M1	7-1/2 HP	11A	3047	20A	20A	13.8A	35A	20A	30A	(30/3) 3#12 & 1#12 GND in 1/2" C
3M1	10 HP	14A	3878	20A	30A	17.5A	45A	25A	35A	(35/3) 3#12 & 1#12 GND in 1/2" C
3M2	15 HP	21A	5817	30A	60A	26.2A	70A	40A	60A	(60/3) 3#10 & 1#10 GND in 3/4" C
3M3	20 HP	27A	7479	60A	60A	33.8A	90A	50A	70A	(70/3) 3#8 & 1#8 GND in 3/4" C
3M3	25 HP	34A	9418	60A	60A	42.5A	110A	60A	90A	(90/3) 3#8 & 1#8 GND in 3/4" C
3M3	30 HP	40A	11080	60A	100A	50.0A	125A	70A	100A	(100/3) 3#8 & 1#8 GND in 3/4" C
3M4	40 HP	52A	14404	60A	100A	65.0A	175A	100A	150A	(150/3) 3#6 & 1#6 GND in 1" C
3M5	50 HP	65A	18005	100A	200A	81.2A	200A	125A	175A	(175/3) 3#4 & 1#6 GND in 1-1/4" C
3M6	60 HP	77A	21329	100A	200A	96.2A	250A	150A	200A	(200/3) 3#3 & 1#6 GND in 1-1/4" C
3M8	75 HP	96A	26592	200A	200A	120A	300A	175A	250A	(250/3) 3#1 & 1#4 GND in 1-1/2" C
3M10	100 HP	124A	34348	200A	400A	155A	400A	225A	350A	(350/3) 3#2/0 & 1#3 GND in 2" C
3M11	125 HP	156A	43212	200A	400A	195A	500A	300A	400A	(400/3) 3#3/0 & 1#3 GND in 2" C
3M12	150 HP	180A	49860	400A	400A	225A	600A	350A	450A	(450/3) 3#4/0 & 1#2 GND in 2" C
3M15	200 HP	240A	66480	400A	600A	300A	800A	450A	600A	(600/3) 3#350 & 1#1 GND in 2-1/2" C

Method Used

The FLA (Full Load Amps) is taken from the 460V column of NEC Table 430.250. The 480V motors on the NEC table goes up to 500 HP but this feeder table stops at 200 HP. The VA per phase is this FLA multiplied by 277. The minimum non-fused disconnect is the first standard disconnect size that is equal to or larger than 115% of the FLA. The minimum fusible disconnect is the smallest standard disconnect that can hold the maximum time delay fuse. The MCA (Minimum Circuit Ampacity) is 125% of the FLA making it possible for the MCA to be slightly larger than the minimum disconnect. The maximum non-time delay fuse is 300% of the FLA or the next larger standard fuse. Non-time delay fuses may be used to protect lighting, heating, and other circuits that are not subject to temporary surges and where short circuit currents are low. Non-time delay fuses are generally not suitable for motors. The maximum time delay or dual element fuse is 175% of the FLA or the next larger standard fuse. The maximum breaker is 250% of the FLA or the next larger standard breaker size. Although not listed in the chart, the maximum MCP (motor circuit protector or instantaneous trip breaker) is generally 800% of the FLA. The circuit designation is based upon conductors able to provide the MCA from the maximum breaker. If the motor is being fed from a fuse rather than a breaker and Table 250.122 allows it, it may be permissible to use a smaller ground wire.