



Second Revision No. 7586-NFPA 70-2021 [Global Comment]

[SEE ATTACHED WORD DOCUMENT FOR CHANGES DIRECTED BY CC TO CMP-11 ON VARIOUS DEFINITIONS.]

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP_11_SR-7586_Definitions.docx	Revised definitions - for staff use	
NEC_CMP_11_SR-7586_Definitions.1634302440595_5_JS_Revisions.docx	Ed. use this file updated on 10/29/21. For staff use	
CMP-11_Global_SR-7586_100_for_ballot.docx	For ballot	

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:00:09 EDT 2021

Committee Statement

Committee Statement: The term "as applied to" is being removed from all definitions listed within this PC which have an article reference as directed from the CC.

See SR-7588 for changes to "Electronically Protected."

See SR-7587 for changes to "Branch Circuit, Motor (Motor Branch Circuit)."

Response Message: SR-7586-NFPA 70-2021

[Public Comment No. 1096-NFPA 70-2021 \[Global Input\]](#)

Global SR-7586 [CMP-11]

Branch-Circuit Selection Current (BCSC) ~~(as applied to air-conditioning and refrigerating equipment)~~.

The value in amperes to be used instead of the rated-load current in determining the ratings of motor branch-circuit conductors, disconnecting means, controllers, and branch-circuit short-circuit and ground-fault protective devices wherever the running overload protective device permits a sustained current greater than the specified percentage of the rated-load current. The value of branch-circuit selection current will always be equal to or greater than the marked rated-load current. (440) (CMP-11)

Rated-Load Current (RLC) ~~(as applied to air-conditioning and refrigerating equipment)~~.

The current of a hermetic refrigerant motor-compressor resulting when it is operated at the rated load, rated voltage, and rated frequency of the equipment it serves. (440) (CMP-11)

Safe Zone ~~(as applied to capacitors)~~.

Low probability of damage other than a slight swelling of the capacitor case, as identified by the case rupture curve of the capacitor. (460) (CMP-11)

System Isolation Equipment ~~(as applied to motors)~~.

A redundantly monitored, remotely operated contactor-isolating system, packaged to provide the disconnection/isolation function, capable of verifiable operation from multiple remote locations by means of lockout switches, each having the capability of being padlocked in the "off" (open) position. (430) (CMP-11)



Second Revision No. 7565-NFPA 70-2021 [Detail]

430.208 Disconnecting Means.

The motor controller disconnecting means shall be a switch or circuit breaker having a voltage rating not less than that of the circuit involved, and shall be lockable in accordance with 110.25. The disconnecting means shall have an ampere rating of not less than ~~415~~ 100 percent of the full-load current rating of the motor. For adjustable-speed drive systems, the disconnecting means shall have an ampere rating not less than ~~415 percent~~ 100 percent of the rated input current of the power conversion equipment.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 15:35:07 EDT 2021

Committee Statement

Committee Statement: Medium voltage disconnecting means for motor controllers and adjustable speed drives are already rated at 100%. It is not necessary to rate these to 115% of the full-load current rating of the motor.

Note: SR-7569 also modifies this section.

Response Message: SR-7565-NFPA 70-2021

[Public Comment No. 1575-NFPA 70-2021 \[Section No. 430.208\]](#)



Second Revision No. 7587-NFPA 70-2021 [Definition: Branch Circuit, Motor.]

Branch Circuit, Motor. (Motor Branch Circuit)

The circuit conductors, including equipment, between the motor branch-circuit short-circuit and ground-fault protective device and an individual motor. (CMP-11)

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:02:23 EDT 2021

Committee Statement

Committee Statement: “And” is added between “short-circuit” and “ground-fault” to add accuracy to the term as requested by PC-1171.

The searchable term “Motor Branch Circuit” is added to the definition for compliance to 2.2.2.3.1 of the style manual as requested by PC-1452 and 1096.

Response Message: SR-7587-NFPA 70-2021

[Public Comment No. 1452-NFPA 70-2021 \[Definition: Branch Circuit, Motor.\]](#)

[Public Comment No. 1171-NFPA 70-2021 \[Definition: Branch Circuit, Motor.\]](#)



Second Revision No. 7588-NFPA 70-2021 [Definition: Electronically Protected

(as applied to motors).]

Electronically Protected ~~(as applied to motors)~~ .

A motor provided with electronic control that is an integral part of the motor and protects the motor against dangerous overheating due to failure of the electronic control, overload, and failure to start. (430) (CMP-11)

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:06:47 EDT 2021

Committee Statement

Committee Statement: "430" is added to the definition of electronically protected because the term is only found in Article 430. This is for compliance to 2.2.2.3.2 of the style manual.

"(as applied to motors)" was removed as directed by the CC in PC-1096.

Response Message: SR-7588-NFPA 70-2021

[Public Comment No. 1454-NFPA 70-2021 \[Definition: Electronically Protected \(as applied to motors\).\]](#)



Second Revision No. 7662-NFPA 70-2021 [Section No. 409.3]

409.3 Other Articles.

In addition to the requirements of this article, industrial control panels that contain branch circuits for specific loads or components, or are for control of specific types of equipment addressed in other articles of this *Code*, shall be constructed and installed in accordance with the applicable requirements from the those articles in ~~Table 409.3~~.

Table 409.3 Other Articles

<u>Equipment/Occupancy</u>	<u>Article</u>	<u>Section</u>
Branch circuits	210	
Luminaires	410	
Motors, motor circuits, and controllers	430	
Air-conditioning and refrigerating equipment	440	
Capacitors		460.8 and 460.9
Hazardous (classified) locations	500, 501, 502, 503, 504, and 505	
Commercial garages; aircraft hangars; motor fuel dispensing facilities; bulk storage plants; spray application, dipping, and coating processes; and inhalation anesthetizing locations	511, 513, 514, 515, 516, and 517 Part IV	
Cranes and hoists	610	
Electrically driven or controlled irrigation machines	675	
Elevators, dumbwaiters, escalators, moving walks, wheelchair lifts, and stairway chair lifts	620	
Industrial machinery	670	
Resistors and reactors	470	
Transformers	450	
Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits	725	

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Thu Oct 14 10:48:56 EDT 2021

Committee Statement

Committee Statement: Table 409.3 is removed because the information is redundant to the requirements of 90.3. The first sentence of clause 409.3 is revised to delete the reference to Table 409.3.

Response Message: SR-7662-NFPA 70-2021

Public Comment No. 1000-NFPA 70-2021 [Section No. 409.3]



Second Revision No. 7778-NFPA 70-2021 [Section No. 409.21(A)]

(A) General.

Industrial control panels shall be provided with overcurrent protection in accordance with Parts I, and II, ~~and~~ IX of Article 240.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Fri Oct 15 09:03:08 EDT 2021

Committee Statement

Committee Statement: The panel created this SR in response to PC-1394 which was provided to CMP-11 for informational purposes.

Reference to part IX of 240 was removed ans it is not necessary because the scope of Article 409 is limited to 1000 V or less.

Response Message: SR-7778-NFPA 70-2021



Second Revision No. 7664-NFPA 70-2021 [Section No. 409.60]

409.60 Bonding.

~~Multisection industrial control panels shall be bonded together with an equipment bonding conductor or an equivalent equipment grounding bus sized in accordance with Table 250.122 . Equipment bonding conductors shall be connected to this equipment grounding bus or to an equipment grounding termination point provided in a single-section industrial control panel. Industrial control panels shall be grounded and bonded in accordance with 409.60(A) and (B).~~

(A) Grounding.

~~Equipment bonding conductors~~ An equipment grounding conductor sized in accordance with 250.122 shall be connected to this an equipment grounding bus or to an equipment grounding termination point provided in a single-section industrial control panel.

(B) Bonding.

~~Multisection industrial control panels shall be bonded together with using an equipment bonding conductor or an equivalent equipment grounding bus jumper sized in accordance with Table 250.122 250.102(D) .~~

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Thu Oct 14 10:53:53 EDT 2021

Committee Statement

Committee Statement: The section is revised to clarify requirements for grounding and requirements for bonding of multi-section industrial control panels.

Response Message: SR-7664-NFPA 70-2021

Public Comment No. 934-NFPA 70-2021 [Section No. 409.60]



Second Revision No. 7680-NFPA 70-2021 [Section No. 409.70]

409.70 Surge Protection.

Safety ~~interlock control devices~~ circuits for personnel protection that are subject to damage from surge events shall have surge protection installed ~~in accordance with Part II of Article 242~~ within or immediately adjacent to the control panel .

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Thu Oct 14 11:28:04 EDT 2021

Committee Statement

Committee Statement: Response to PC-1579: "Safety interlock control devices" is changed to "safety circuits" to match the definition of safety circuit in Article 100.

Response to PC-1736: The reference to Article 242 is being removed because it is redundant to the requirements of the code. Additionally, clarification is added with respect to the location of the surge protective device, it must be within or immediately adjacent to the industrial control panel.

CMP-11 requests that the correlating committee remove the "(670)" from the definition for "safety circuit" in accordance with NEC Style Manual section 2.2.2.3.2, as by creating this SR the definition is used in more than one article.

Response Message: SR-7680-NFPA 70-2021

[Public Comment No. 1579-NFPA 70-2021 \[Section No. 409.70\]](#)

[Public Comment No. 1736-NFPA 70-2021 \[Section No. 409.70\]](#)



Second Revision No. 7742-NFPA 70-2021 [Section No. 409.110]

409.110 Marking.

An industrial control panel shall be marked with a permanent nameplate attached to the outside of the enclosure that is of sufficient durability to withstand the environment involved, that is not handwritten, and that is visible after installation. The nameplate shall include the following information: An industrial control panel shall have permanent markings that are visible after installation. The markings in 409.110(2) and (3) shall be attached to the outside of the enclosure. The markings in 409.110(1), (4), (5), (6), and (7) shall be attached to either the inside or outside of the enclosure. The following markings shall be included:

- (1) Manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product can be identified.
- (2) Supply voltage, number of phases, frequency, and full-load current for each incoming supply circuit.
- (3) ~~Industrial~~ Where the industrial control panel is supplied by more than one electrical source and where more than one disconnecting means is required to disconnect all circuits 50-volts or more within the control panel, shall be marked to indicate that more than one disconnecting means is required to de-energize the equipment. The location of the means necessary to disconnect all circuits 50-volts or more shall be documented and available.
- (4) Short-circuit current rating of the industrial control panel based on one of the following:
 - a. Short-circuit current rating of a listed and labeled assembly
 - b. Short-circuit current rating established utilizing an approved method

Informational Note: See ANSI/UL 508A, *Standard for Industrial Control Panels*, Supplement SB, for an example of an approved method.

Exception to (4): Short-circuit current rating markings are not required for industrial control panels containing only control circuit components.

- (5) If the industrial control panel is intended as service equipment, it shall be marked to identify it as being suitable for use as service equipment.
- (6) Electrical wiring diagram, or the identification number of a separate electrical wiring diagram, or a designation referenced in a separate wiring diagram.
- (7) An enclosure type number marked on the industrial control panel enclosure .

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP_11_SR7742_409.110.docx	For staff use	

Submitter Information Verification

Committee: NEC-P11

Submission Date: Thu Oct 14 15:58:00 EDT 2021

Committee Statement

Committee Statement: The FR was modified to include markings that should be identified on the outside of the industrial control panel while allowing some items to be identified on the inside. Identification of certain markings on the outside of the panel can increase safety of persons working on industrial control panels.

Response to PC-1488: It is important to keep the information in 409.110(2) and (3) on the outside of the enclosure for all industrial control panels.

Response Message: SR-7742-NFPA 70-2021

[Public Comment No. 1898-NFPA 70-2021 \[Section No. 409.110\]](#)

[Public Comment No. 1566-NFPA 70-2021 \[Section No. 409.110\]](#)

[Public Comment No. 936-NFPA 70-2021 \[Section No. 409.110\]](#)

[Public Comment No. 1488-NFPA 70-2021 \[Section No. 409.110\]](#)



Second Revision No. 7504-NFPA 70-2021 [New Section after 430.1]

430.2 Reconditioned Motors.

Reconditioned motors shall be permitted when the reconditioning has been conducted in accordance with the manufacturer's instructions or, when no instructions are provided, nationally recognized standards.

Reconditioned classified (hazardous) motors identified for use in Class I, Division 1 (or Zone 0 or Zone 1) locations shall be listed as reconditioned when installed in Class I, Division 1 (or Zone 0 or Zone 1) locations.

Informational Note: See ANSI/EASA AR100-2020, *Recommended Practice for the Repair of Rotating Electrical Apparatus*, for information on the rewinding and repair of motors.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 11:13:18 EDT 2021

Committee Statement

Committee Statement: PC-938 Response: The language provided creates confusion in how the rebuilt motors should be inspected. There is also concern that whether the motor would be placed into commerce or reused in a facility should not be treated differently.

PC-1559 Response: The SR provides for acceptance of reconditioned motors with guidance utilization of manufacturer's instructions. Information is provided for motors where the manufacturer may no longer be in business. The changes removed redundant requirements.

Response Message: SR-7504-NFPA 70-2021

Public Comment No. 938-NFPA 70-2021 [New Part after I.]

Public Comment No. 1559-NFPA 70-2021 [New Section after 430.1]



Second Revision No. 7802-NFPA 70-2021 [Section No. 430.6]

430.6 Conductor Ampacity and Motor Rating Determination.

The size of conductors supplying equipment covered by this article shall be selected from the ampacity tables in ~~accordance with~~ 310.15 or shall be calculated in accordance with 310.14(B). Where flexible cord is used, the size of the conductor shall be selected in accordance with 400.5. The required conductor ampacity and motor ratings shall be determined in accordance with 430.6(A), (B), (C), and (D).

(A) General Motor Applications.

For general motor applications, current ratings shall be determined based on 430.6(A)(1) and (A)(2).

(1) Table Values.

Other than for motors built for low speeds (less than 1200 RPM) or high torques, and for multispeed motors, the values given in Table 430.247, Table 430.248, Table 430.249, and Table 430.250 shall be used instead of the actual current rating marked on the motor nameplate to determine the following:

- (1) Ampacity of conductors
- (2) Ampere Current ratings of switches
- (3) Ampere Current ratings of branch-circuit short-circuit and ground-fault protection

Where a motor is marked in amperes, but not horsepower, the horsepower rating shall be assumed to be that corresponding to the value given in Table 430.247, Table 430.248, Table 430.249, and Table 430.250, interpolated if necessary.

Exception No. 1: Multispeed motors shall be in accordance with 430.22(B) and 430.52.

Exception No. 2: For equipment that employs a shaded-pole or permanent-split capacitor-type fan or blower motor that is marked with the motor type, ~~the motor and the marking on the equipment nameplate is not less than the current marked on the fan or blower motor nameplate, the full-load current marked on the nameplate of the equipment in which the fan or blower motor is employed~~ appliance shall be used instead of the horsepower rating to determine the ampacity or rating of the disconnecting means, ~~the of~~ branch-circuit conductors, ~~the motor controller, the branch-circuit short-circuit and ground-fault protection, and the separate overload protection. This marking on the equipment nameplate shall not be less than the current marked on the fan or blower motor nameplate. in addition to the current ratings of the following:~~

- (1) Disconnecting means
- (2) Motor controllers
- (3) Short-circuit and ground-fault protective devices
- (4) Separate overload protection

Exception No. 3: For a listed motor-operated appliance that is marked with both motor horsepower and full-load current, the motor full-load current marked on the nameplate of the appliance shall be used instead of the horsepower rating on the appliance nameplate to determine the ampacity or rating of ~~the disconnecting means, the~~ branch-circuit conductors, ~~the motor controller, the branch-circuit short-circuit and ground-fault protection, and any separate overload protection. in addition to the current ratings of the following:~~

- (1) Disconnecting means
- (2) Motor controllers
- (3) Short-circuit and ground-fault protective devices
- (4) Separate overload protection

(2) Nameplate Values.

The motor nameplate current ratings shall be used to determine the values for the following:

- (1) Separate motor overload protection
- (2) For motors built for low speeds (less than 1200 RPM), high torques, canned pumps, or multispeed motors, the following:
 - a. Ampacity of conductors
 - b. Ampere Current ratings of switches
 - c. Ampere Current ratings of branch-circuit short-circuit and ground-fault protection
- (3) Large motors exceeding the values in Part XIV shall use the nameplate ampacity current rating for conductor sizing.

(B) Torque Motors.

For torque motors, the rated current shall be locked-rotor current, and this nameplate current shall be used to determine the ampacity of the branch-circuit conductors covered in 430.22 and 430.24, the ~~ampere current~~ rating of the motor overload protection, and the ~~ampere current~~ rating of motor branch-circuit short-circuit and ground-fault protection in accordance with 430.52(B).

Informational Note: See 430.83(D) and 430.110 for information on motor controllers and disconnecting means.

(C) Alternating-Current Adjustable Voltage Motors.

For motors used in alternating-current, adjustable voltage, variable torque drive systems, the ampacity of conductors, or ~~ampere current~~ ratings of switches, branch-circuit short-circuit and ground-fault protection, and so forth, shall be based on the maximum operating current marked on the motor nameplate or the control nameplate, or both. If the maximum operating current does not appear on the nameplate, the ~~ampacity current rating~~ determination shall be based on 150 percent of the values given in Table 430.249 and Table 430.250.

(D) Valve Actuator Motor Assemblies.

For valve actuator motor assemblies (VAMs), the rated current shall be the nameplate full-load current, and this current shall be used to determine the maximum rating or setting of the motor branch-circuit short-circuit and ground-fault protective device and the ampacity of the conductors.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP_11_SR7802_430.6.docx	For staff use	

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Fri Oct 15 13:52:35 EDT 2021

Committee Statement

Committee Statement: Changes made in the SR to respond to CC concerns on ampere and readability. Section 430.221 clarifies that Parts V-VII do cover MV applications unless modified or amended by this section.

Response Message: SR-7802-NFPA 70-2021

[Public Comment No. 982-NFPA 70-2021 \[Section No. 430.6\]](#)



Second Revision No. 7519-NFPA 70-2021 [Section No. 430.21]

430.21 General.

Part II specifies ampacities of conductors that are capable of carrying the motor current without overheating under the conditions specified.

Part II shall not apply to motor circuits rated over 1000 volts, nominal.

Informational Note No. 1: See Part XI for motor circuits rated over 1000 volts, nominal.

~~Chapter 2 and Chapter 3 requirements shall not apply to conductors that form an integral part of equipment, such as motors, motor controllers, motor control centers, or other factory-assembled control equipment.~~

Informational Note No. 2: See 110.14(C) and 430.9(B) for equipment device terminal requirements.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 11:47:35 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes were made to meet NEC style manual requirements.

Response Message: SR-7519-NFPA 70-2021

[Public Comment No. 983-NFPA 70-2021 \[Section No. 430.21\]](#)



Second Revision No. 7521-NFPA 70-2021 [Section No. 430.42]

430.42 Motors on General-Purpose Branch Circuits.

Overload protection for motors used on general-purpose branch circuits ~~as permitted in Part II of Article 240~~ shall be provided as specified in 430.42(A), (B), (C), or (D).

(A) Not Over 1 Horsepower.

One or more motors without individual overload protection shall be permitted to be connected to a general-purpose branch circuit only where the installation complies with the limiting conditions specified in 430.32(B), 430.32(D), and 430.53(A)(1) and (A)(2).

(B) Over 1 Horsepower.

Motors of ratings larger than specified in 430.53(A) shall be permitted to be connected to general-purpose branch circuits only where each motor is protected by overload protection selected to protect the motor as specified in 430.32. Both the motor controller and the motor overload device shall be approved for group installation with the short-circuit and ground-fault protective device selected in accordance with 430.53.

(C) Cord-and-Plug-Connected.

Where a motor is connected to a branch circuit by means of an attachment plug and a receptacle or a cord connector, and individual overload protection is omitted in accordance with 430.42(A), the rating of the attachment plug and receptacle or cord connector shall not exceed 15 amperes at 125 volts or 250 volts. Where individual overload protection is required in accordance with 430.42(B) for a motor or motor-operated appliance that is attached to the branch circuit through an attachment plug and a receptacle or a cord connector, the overload device shall be an integral part of the motor or appliance. The rating of the attachment plug and receptacle or ~~the~~ cord connector shall determine the rating of the circuit to which the motor can be connected, in accordance with 210.21(B).

(D) Time Delay.

The branch-circuit short-circuit and ground-fault protective device protecting a circuit to which a motor or motor-operated appliance is connected shall have sufficient time delay to permit the motor to start and accelerate its load.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 12:00:43 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes were made to meet NEC style manual requirements.

Response Message: SR-7521-NFPA 70-2021

[Public Comment No. 984-NFPA 70-2021 \[Section No. 430.42\]](#)



Second Revision No. 7523-NFPA 70-2021 [Section No. 430.51]

430.51 General.

Part IV specifies devices intended to protect the motor branch-circuit conductors, the motor control apparatus, and the motors against overcurrent due to short circuits or ground faults. ~~These rules add to or amend Article 240, Parts I through IX.~~ The devices specified in Part IV do not include the types of devices required by 210.8, 230.95, and 590.6.

Informational Note No. 1: See Informative Annex D, Example D8, for an example of motor branch-circuit short-circuit and ground-fault protection selection.

Part IV shall not apply to motor circuits rated over 1000 volts, nominal.

Informational Note No. 2: See Part ~~IX~~ XI for over 1000 volts, nominal.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 12:05:37 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes were made to meet NEC style manual requirements.

Response Message: SR-7523-NFPA 70-2021

[Public Comment No. 986-NFPA 70-2021 \[Section No. 430.51\]](#)



Second Revision No. 7526-NFPA 70-2021 [Section No. 430.52(C)]

(C) Rating or Setting.

(1) In Accordance with Table 430.52(C)(1).

A protective device that has a rating or setting not exceeding the value calculated according to the values given in Table 430.52(C)(1) shall be used unless otherwise permitted in 430.52(C)(1)(a) or (C)(1)(b).

Table 430.52(C)(1) Maximum Rating or Setting of Motor Branch-Circuit Short-Circuit and Ground-Fault Protective Devices

<u>Type of Motor</u>	<u>Percentage of Full-Load Current</u>			
	<u>Nontime</u>	<u>Dual</u>	<u>Instantaneous-</u>	<u>Inverse</u>
	<u>Delay</u>	<u>Element</u>	<u>Trip</u>	<u>Time</u>
	<u>Fuse¹</u>	<u>(Time- Delay) Fuse¹</u>	<u>Breaker</u>	<u>Breaker²</u>
Single-phase motors	300	175	800	250
AC polyphase motors other than wound-rotor	300	175	800	250
Squirrel cage — other than Design B energy-efficient — and Design B premium efficiency	300	175	800	250
Design B energy-efficient and Design B premium efficiency	300	175	1100	250
Synchronous ³	300	175	800	250
Wound-rotor	150	150	800	150
DC (constant voltage)	150	150	250	150

Note: See 430.54 for certain exceptions to the values specified.

¹The values in the Nontime Delay Fuse column apply to time-delay Class CC fuses.

²The values given in the last column also cover the ratings of nonadjustable inverse time types of circuit breakers that can be modified as in 430.52(C)(1), Exceptions No. 1 and No. 2 430.52(C)(1)(a) and (C)(1)(b).

³Synchronous motors of the low-torque, low-speed type (usually 450 rpm or lower), such as those used to drive reciprocating compressors, pumps, and so forth, that start unloaded, do not require a fuse rating or circuit-breaker setting in excess of 200 percent of full-load current.

Exception No. 1: Where the values for branch-circuit short-circuit and ground-fault protective devices determined by Table 430.52(C)(1) do not correspond to the standard sizes or ratings of fuses, nonadjustable circuit breakers, thermal protective devices, or possible settings of adjustable circuit breakers, a higher size, rating, or possible setting that does not exceed the next higher standard ampere rating according to 240.6 shall be permitted.

Exception No. 2: Where the rating specified in Table 430.52(C)(1), or the rating modified by Exception No. 1, is not sufficient for the starting current of the motor, the following applies:

- (0) *The rating of a nontime-delay fuse not exceeding 600 amperes or a time-delay Class CC fuse shall be permitted to be increased but shall in no case exceed 400 percent of the full-load current.*
- (0) *The rating of a time-delay (dual element) fuse shall be permitted to be increased but shall in no case exceed 225 percent of the full-load current.*
- (0) *The rating of an inverse time circuit breaker shall be permitted to be increased but shall in no case exceed 400 percent for full-load currents of 100 amperes or less or 300 percent for full-load currents greater than 100 amperes.*
- (0) *The rating of a fuse of 601–6000 ampere classification shall be permitted to be*

~~increased but shall in no case exceed 300 percent of the full-load current.~~

(a) Where the values for branch-circuit short-circuit and ground-fault protective devices as determined by Table 430.52(C)(1) do not correspond to the standard sizes or ampere ratings of fuses, nonadjustable circuit breakers, thermal protective devices, or possible and settings of adjustable circuit breakers, a higher size, rating, or possible setting that does not exceed provided in 240.6, the next higher standard ampere rating according to 240.6 or setting shall be permitted.

(b) Where the rating specified in Table 430.52(C)(1), or the rating modified by Exception No. 1, 430.52(C)(1)(a), is not sufficient for the starting current of the motor, any of the following applies shall apply :

- (1) The rating of a nontime-delay fuse not exceeding 600 amperes or a time-delay Class CC fuse shall be permitted to be increased but shall in no case exceed 400 percent of the full-load current.
- (2) The rating of a time-delay (dual-element) fuse shall be permitted to be increased but shall in no case exceed 225 percent of the full-load current.
- (3) The rating of an inverse time circuit breaker shall be permitted to be increased but shall in no case exceed 400 percent for full-load currents of 100 amperes or less or 300 percent for full-load currents greater than 100 amperes.
- (4) The rating of a fuse of 601–6000 ampere classification shall be permitted to be increased but shall in no case exceed 300 percent of the full-load current.

Informational Note: See Informative Annex D, Example D8, for an example of motor branch-circuit short-circuit and ground-fault rating and setting and Informational Note Figure 430.1 for an example location.

(2) Overload Relay Table.

Where maximum branch-circuit short-circuit and ground-fault protective device ratings are shown in the manufacturer's overload relay table for use with a motor controller or are otherwise marked on the equipment, they shall not be exceeded even if higher values are allowed as shown above.

(3) Instantaneous-Trip Circuit Breaker.

An instantaneous-trip circuit breaker shall be permitted if the conditions of 430.52(C)(3)(a) and (C)(3)(b) are met. ~~used only if adjustable and if part of a listed combination motor controller having coordinated motor overload and short-circuit and ground-fault protection in each conductor, and the setting is adjusted to no more than the value specified in Table 430.52(C)(1)~~

(a) *Application.* ~~Instantaneous-trip circuit breakers shall be adjustable and part of a listed combination motor controller having coordinated motor overload and short-circuit and ground-fault protection in each conductor.~~

Informational Note No. 1: Instantaneous-trip circuit breakers are also known as motor-circuit protectors (MCPs).

Informational Note No. 2: For the purpose of this article, instantaneous-trip circuit breakers ~~may~~ might include a damping means to accommodate a transient motor inrush current without nuisance tripping of the circuit breaker.

(b) *Setting.* ~~The instantaneous-trip circuit breaker shall be adjusted to a setting in accordance with one of the following:~~

- (1) ~~No greater than the value specified in Table 430.52(C)(1)~~
- (2) ~~Where the value specified in Table 430.52(C)(1) is not sufficient for the starting current of the motor, one of the following settings shall be permitted:~~
 - a. ~~Motors other than design B energy-efficient and Design B premium efficiency motors shall be permitted to be increased but shall in no case exceed 1300 percent of the motor full-load current.~~
 - b. ~~Design B energy-efficient and Design B premium efficiency motors shall be permitted to be increased but shall in no case exceed 1700 percent of the motor full-load current.~~
 - c. ~~Where an engineering analysis determines the value is not sufficient for the starting current of the motor, it shall not be necessary to first apply the value specified in Table 430.52(C)(1).~~

Informational Note No. 3: See NEMA MG 1-2016, *Motors and Generators*, Part 12.59 for additional information on the requirements for a motor to be classified “energy efficient.”

- (3) ~~Where the motor full-load current is 8 amperes or less, the setting of the instantaneous-trip circuit breaker with a continuous current rating of 15 amperes or less in a listed combination motor controller that provides coordinated motor branch-circuit overload and short-circuit and ground-fault protection shall be permitted to be increased to the value marked on the motor controller.~~

~~*Exception No. 1: Where the setting specified in Table 430.52(C)(1) is not sufficient for the starting current of the motor, the setting of an instantaneous trip circuit breaker shall be permitted to be increased but shall in no case exceed 1300 percent of the motor full-load current for other than Design B energy-efficient and Design B premium efficiency motors, and no more than 1700 percent of the motor full-load current for Design B energy-efficient and Design B premium efficiency motors. Trip settings above 800 percent for other than Design B energy-efficient and Design B premium efficiency motors, and above 1100 percent for Design B energy-efficient or Design B premium efficiency motors shall be permitted where the need has been demonstrated by an engineering evaluation. In such cases, it shall not be necessary to first apply an instantaneous-trip circuit breaker at 800 percent or 1100 percent.*~~

~~*Exception No. 2: Where the motor full-load current is 8 amperes or less, the setting of the instantaneous-trip circuit breaker with a continuous current rating of 15 amperes or less in a listed combination motor controller that provides coordinated motor branch-circuit overload and short-circuit and ground-fault protection shall be permitted to be increased to the value marked on the motor controller.*~~

(4) Multispeed Motor.

For a multispeed motor, a single short-circuit and ground-fault protective device shall be permitted for two or more windings of the motor if the rating of the protective device does not exceed the above applicable percentage of the nameplate rating of the smallest winding protected.

Exception: For a multispeed motor, a single short-circuit and ground-fault protective device shall be permitted to be used and sized according to the full-load current of the highest current winding, where all of the following conditions are met:

- (1) *Each winding is equipped with individual overload protection sized according to its full-load current.*
- (2) *The branch-circuit conductors supplying each winding are sized according to the full-load current of the highest full-load current winding.*
- (3) *The motor controller for each winding has a horsepower rating not less than that required for the winding having the highest horsepower rating.*

(5) Power Electronic Devices.

Semiconductor fuses intended for the protection of electronic devices shall be permitted in lieu of devices listed in Table 430.52(C)(1) for power electronic devices, associated electromechanical devices (such as bypass contactors and isolation contactors), and conductors in a solid-state motor controller system if the marking for replacement fuses is provided adjacent to the fuses.

(6) Self-Protected Combination Motor Controller.

A listed self-protected combination motor controller shall be permitted in lieu of the devices specified in Table 430.52(C)(1). Adjustable instantaneous-trip settings shall not exceed 1300 percent of the full-load motor current for other than Design B energy-efficient and Design B premium efficiency motors and not more than 1700 percent of the full-load motor current for Design B energy-efficient and Design B premium efficiency motors.

Informational Note: Proper application of self-protected combination motor controllers on 3-phase systems, other than solidly grounded wye, particularly on corner grounded delta systems, considers the self-protected combination motor controllers' individual pole-interrupting capability.

(7) Motor Short-Circuit Protector.

A motor short-circuit protector shall be permitted in lieu of devices listed in Table 430.52(C)(1) if the motor short-circuit protector is part of a listed combination motor controller having coordinated motor overload protection and short-circuit and ground-fault protection in each conductor and it will open the circuit at currents exceeding 1300 percent of the motor full-load current for other than Design B energy-efficient and Design B premium efficiency motors and 1700 percent of the motor full-load current for Design B energy-efficient and Design B premium efficiency motors.

Informational Note: A motor short-circuit protector, as used in this section, is a fused device and is not an instantaneous-trip circuit breaker.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP-11_SR_7526_430.52.docx	For staff use	

Submitter Information Verification

Committee: NEC-P11

Submission Date: Wed Oct 13 12:30:50 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes were made to meet NEC style manual requirements and improve clarity.

Response Message: SR-7526-NFPA 70-2021

[Public Comment No. 987-NFPA 70-2021 \[Section No. 430.52\(C\)\]](#)



Second Revision No. 7805-NFPA 70-2021 [Section No. 430.53]

430.53 Several Motors or Loads on One Branch Circuit.

Two or more motors or one or more motors and other loads shall be permitted to be connected to the same branch circuit under conditions specified in 430.53(D) and in 430.53(A), (B), or (C). The branch-circuit protective device shall be fuses or inverse time circuit breakers.

(A) Not Over 1 Horsepower.

Several motors, each not exceeding 1 hp in rating, shall be permitted on a nominal 120-volt branch circuit protected at not over 20 amperes or a branch circuit of 1000 volts, nominal, or less, protected at not over 15 amperes, if all of the following conditions are met:

- (1) The full-load rating of each motor does not exceed 6 amperes.
- (2) The rating of the branch-circuit short-circuit and ground-fault protective device marked on any of the motor controllers is not exceeded.
- (3) Individual overload protection conforms to 430.32.

(B) If Smallest Rated Motor Protected.

~~If the branch-circuit short-circuit and ground-fault protective device is selected not to exceed that allowed by 430.52 for the smallest rated motor, two or more motors or one or more motors and other load(s), with each motor having individual overload protection, shall be permitted to be connected to a branch circuit where it can be determined that the branch-circuit short-circuit and ground-fault protective device will not open under the most severe normal conditions of service that might be encountered. Two or more motors or one or more motors and other loads shall be permitted to be connected to a branch circuit where all of the following conditions are met:~~

- (1) The branch-circuit short-circuit and ground-fault protective device is selected not to exceed that allowed by 430.52 for the smallest rated motor supplied by the branch circuit.
- (2) Each motor is provided with separate overload protection.
- (3) It can be determined that the branch-circuit short-circuit and ground-fault protective device will not open under the most severe normal conditions of service that might be encountered.

(C) Other Group Installations.

Two or more motors of any rating size or one or more motors and other load(s) loads, with each motor having individual overload protection, shall be permitted to be connected to one a branch circuit where the motor controller(s) and overload device(s) are (1) installed as a listed factory assembly and the motor branch-circuit short-circuit and ground-fault protective device either is provided as part of the assembly or is specified by a marking on the assembly, or (2) the motor branch-circuit short-circuit and ground-fault protective device, the motor controller(s), and overload device(s) are field-installed as separate assemblies listed for such use and provided with manufacturers' instructions for use with each other, and (3) all of the following conditions are met: comply with 430.53(C)(1) through (C)(5).

- (0) ~~Each motor overload device is either (a) listed for group installation with a specified maximum rating of fuse, inverse time circuit breaker, or both, or (b) selected such that the ampere rating of the motor-branch short-circuit and ground-fault protective device does not exceed that permitted by 430.52 for that individual motor overload device and corresponding motor load.~~
- (0) ~~Each motor controller is either (a) listed for group installation with a specified maximum rating of fuse, circuit breaker, or both, or (b) selected such that the ampere rating of the motor-branch short-circuit and ground-fault protective device does not exceed that permitted by 430.52 for that individual motor controller and corresponding motor load.~~
- (0) ~~Each circuit breaker is listed and is of the inverse time type.~~
- (0) ~~The branch circuit shall be protected by fuses or inverse time circuit breakers having a rating not exceeding that specified in 430.52 for the highest rated motor connected to the branch circuit plus an amount equal to the sum of the full-load current ratings of all other motors and the ratings of other loads connected to the circuit. Where this calculation results in a rating less than the ampacity of the branch-circuit conductors, it shall be permitted to increase the maximum rating of the fuses or circuit breaker to a value not exceeding that permitted by 240.4(B) .~~
- (0) ~~The branch-circuit fuses or inverse time circuit breakers are not larger than allowed by 430.40 for the overload relay protecting the smallest rated motor of the group.~~
- (0) ~~Overcurrent protection for loads other than motor loads shall be in accordance with Parts I through VII of Article 240 .~~

(1) Types of Assemblies.

The assembly type shall meet one of the following conditions:

- (1) A listed factory assembly, with the motor branch-circuit short-circuit and ground-fault protective device either provided as part of the assembly or specified by a marking on the assembly
- (2) Field installation of the motor branch-circuit short-circuit and ground-fault protective device, motor controller(s), and overload device(s) as separate assemblies listed for such use and provided with manufacturers' instructions for use with each other

(2) Motor Overload Devices.

Each motor overload device shall meet one of the following conditions:

- (1) Listed for group installation with a specified maximum rating of fuse, inverse time circuit breaker, or both
- (2) Selected such that the ampere rating of the motor-branch short-circuit and ground-fault protective device does not exceed that permitted by 430.52 for that individual motor overload device and corresponding motor load

(3)_ Motor Controllers.

Each motor controller shall meet one of the following conditions:

- (1) Listed for group installation with a specified maximum rating of fuse, circuit breaker, or both
- (2) Selected such that the ampere rating of the motor-branch short-circuit and ground-fault protective device does not exceed that permitted by 430.52 for that individual motor controller and corresponding motor load

(4)_ Short-Circuit & Ground-Fault Protection.

The branch circuit shall be protected by fuses or listed inverse time circuit breakers having a rating not exceeding the sum of all of the following:

- (1) The value specified in 430.52 for the highest rated motor connected to the branch circuit
- (2) The sum of the full-load current ratings of all other motors
- (3) The sum of the current ratings of other loads connected to the circuit

Where this calculation results in a rating less than the ampacity of the branch-circuit conductors, it shall be permitted to increase the maximum rating of the fuses or circuit breaker to a value not exceeding that permitted by 240.4(B). Additionally, this rating shall not be larger than allowed by 430.40 for the overload relay protecting the smallest rated motor of the group.

(5)_ Overcurrent Protection.

Loads other than motor loads shall be protected in accordance with Part I through Part VII of Article 240 .

Informational Note: See 110.10 for circuit impedance and other characteristics.

(D) Single Motor Taps.

For group installations described above in 430.53(A), (B), or (C), the conductors of any tap supplying a single motor shall not be required to have an individual branch-circuit short-circuit and ground-fault protective device if they comply with one of the following: 430.53(D)(1) or (D)(2).

- (0) ~~No conductor to the motor shall have an ampacity less than that of the branch-circuit conductors.~~
- (0) ~~No conductor to the motor shall have an ampacity less than one-third of the branch-circuit conductors, with a minimum in accordance with 430.22. The conductors from the point of the tap to the motor overload device shall be not more than 7.5 m (25 ft) long and be protected from physical damage by being enclosed in an approved raceway or by use of other approved means.~~
- (0) ~~Conductors from the point of the tap from the branch circuit to a listed manual motor controller additionally marked "Suitable for Tap Conductor Protection in Group Installations," or to a branch-circuit protective device, shall be permitted to have an ampacity not less than one-tenth of the rating or setting of the branch-circuit short-circuit and ground-fault protective device. The conductors from the motor controller to the motor shall have an ampacity in accordance with 430.22. The conductors from the point of the tap to the motor controller(s) shall (1) be suitably protected from physical damage and enclosed either by an enclosed motor controller or by a raceway and be not more than 3 m (10 ft) long or (2) have an ampacity not less than that of the branch-circuit conductors.~~
- (0) ~~Conductors from the point of the tap from the branch circuit to a listed manual motor controller additionally marked "Suitable for Tap Conductor Protection in Group Installations," or to a branch-circuit protective device, shall be permitted to have an ampacity not less than one-third of the branch-circuit conductors. The conductors from the motor controller to the motor shall have an ampacity in accordance with 430.22. The conductors from the point of the tap to the motor controller(s) shall (1) be suitably protected from physical damage and enclosed either by an enclosed motor controller or by a raceway and be not more than 7.5 m (25 ft) long or (2) have an ampacity not less than that of the branch-circuit conductors.~~

(1) Conductors to the Motor.

Conductors to the motor shall have an ampacity that is not less than the ampacity of the branch-circuit conductors unless all of the following conditions are met:

- (1) The conductors from the point of the tap to the motor overload device shall not be longer than 7.5 m (25 ft).
- (2) The conductor ampacity is not less than one-third the ampacity of the branch-circuit conductors. The minimum ampacity shall not be less than required in 430.22.
- (3) The conductors from the point of the tap to the motor controller(s) shall be protected from physical damage by being enclosed in an approved raceway or other approved means.

(2) Tap Conductors Between the Branch Circuit and Listed Manual Motor Controllers.

Conductors from the point of the tap from the branch circuit to a listed manual motor controller additionally marked "Suitable for Tap Conductor Protection in Group Installations," or to a branch-circuit protective device, shall meet one of the following conditions:

- (1) The length of the motor tap conductors does not exceed 3 m (10 ft) and the tap conductors comply with all of the following:
 - a. The ampacity of the tap conductors is not less than one-tenth of the rating or setting of the branch-circuit short-circuit ground-fault protective device.
 - b. The conductors from the motor controller to the motor shall have an ampacity in accordance with 430.22 .
 - c. The conductors from the point of the tap to the motor controller(s) shall be suitably protected from physical damage and enclosed either by an enclosed motor controller or by a raceway.

Exception to (1): Physical protection of the conductors from the point of the tap to the motor controllers shall not be required if the conductors have an ampacity not less than that of the branch-circuit conductors.

- (2) The length of the motor tap conductors does not exceed 7.5 m (25 ft) and the tap conductors comply with all of the following:
 - a. The ampacity of the tap conductors is not less than one-third of the branch-circuit conductor ampacity.
 - b. The conductors from the motor controller to the motor shall have an ampacity in accordance with 430.22 .
 - c. The conductors from the point of the tap to the motor controller(s) shall be suitably protected from physical damage and enclosed either by an enclosed motor controller or by a raceway.

Exception to (2): Physical protection of the conductors from the point of the tap to the motor controllers shall not be required if the conductors have an ampacity not less than that of the branch-circuit conductors.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP11_SR7805_430.53.docx	For staff use	

Submitter Information Verification

Committee: NEC-P11

Submission Date: Fri Oct 15 14:27:46 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes were made to meet NEC style manual requirements and requirements to expand exceptions in list form. References to parts of article 240 were kept to provide clarity.

Response Message: SR-7805-NFPA 70-2021

Public Comment No. 990-NFPA 70-2021 [Section No. 430.53]



Second Revision No. 7533-NFPA 70-2021 [Section No. 430.62(A)]

(A) Specific Load.

A feeder supplying a specific fixed motor load(s) and consisting of conductor sizes in accordance with 430.24 shall be provided with a protective device having a rating or setting not greater than the largest rating or setting of the branch-circuit short-circuit and ground-fault protective device for any motor supplied by the feeder [based on the maximum permitted value for the specific type of protective device in accordance with 430.52, or 440.22(A) for hermetic refrigerant motor-compressors], plus the sum of the full-load currents of the other motors of the group.

Where the same rating or setting of the branch-circuit short-circuit and ground-fault protective device is used on two or more of the branch circuits supplied by the feeder, one of the protective devices shall be considered the largest for the above calculations.

Exception No. 1: Where one or more instantaneous-trip circuit breakers or motor short-circuit protectors are used for motor branch-circuit short-circuit and ground-fault protection as permitted in 430.52(C), the procedure provided above for determining the maximum rating of the feeder protective device shall apply with the following provision: For the purpose of the calculation, each instantaneous-trip circuit breaker or motor short-circuit protector shall be assumed to have a rating not exceeding the maximum percentage of motor full-load current permitted by Table 430.52(C)(1) for the type of feeder protective device employed.

Exception No. 2: Where the feeder overcurrent protective device also provides overcurrent protection for a motor control center, the provisions of 430.94 shall apply.

Informational Note: See Informative Annex D, Example D8, for an example of motor feeder circuit short-circuit and ground-fault protection rating and setting.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 13:04:23 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes were made to improve clarity and readability.

Response Message: SR-7533-NFPA 70-2021

[Public Comment No. 991-NFPA 70-2021 \[Section No. 430.62\(A\)\]](#)



Second Revision No. 7574-NFPA 70-2021 [Section No. 430.72(C)(1)]

(1) Class 1 Power-Limited, Class 2, or Class 3 Circuits.

Where the transformer supplies a Class 1 power-limited circuit, ~~Class 2, or Class 3~~ the circuit shall comply with 724.30 through 724.52. Where the transformer supplies a ~~Class 2 or Class 3~~ remote-control circuit, the circuit shall comply with the requirements of Part II of Article 725.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 16:13:55 EDT 2021

Committee Statement

Committee Statement: Changes made to update the proper section pointers per cc direction in the global PC-1961.

Response Message: SR-7574-NFPA 70-2021



Second Revision No. 7536-NFPA 70-2021 [Section No. 430.97(C)]

(C) Minimum Wire-Bending Space.

The minimum wire-bending space at the motor control center terminals and minimum gutter space shall be in accordance with ~~312.6(B)~~ 312.6 .

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 13:10:49 EDT 2021

Committee Statement

Committee Statement: Removal of the limitation of 312.6 (B) to 312.6 will improve usability of this section.

Response Message: SR-7536-NFPA 70-2021

Public Comment No. 1875-NFPA 70-2021 [Section No. 430.97(C)]



Second Revision No. 7538-NFPA 70-2021 [Section No. 430.110]

430.110 Ampere Current Rating and Interrupting Capacity.

(A) General.

The disconnecting means for motor circuits rated 1000 volts, nominal, or less shall have an ~~ampere~~ a current rating not less than 115 percent of the full-load current rating of the motor.

Exception: A listed unfused motor-circuit switch having a horsepower rating not less than the motor horsepower shall be permitted to have an ~~ampere~~ a current rating less than 115 percent of the full-load current rating of the motor.

(B) For Torque Motors.

Disconnecting means for a torque motor shall have an ~~ampere~~ a current rating of at least 115 percent of the motor nameplate current.

(C) For Combination Loads.

Where two or more motors are used together or where one or more motors are used in combination with other loads, such as resistance heaters, and where the combined load can be simultaneous on a single disconnecting means, the ~~ampere~~ current and horsepower ratings of the combined load shall be determined in accordance with 430.110(C)(1) through (C)(3).

(1) Horsepower Rating.

The rating of the disconnecting means shall be determined from the sum of all currents, including resistance loads, at the full-load condition and also at the locked-rotor condition. The combined full-load current and the combined locked-rotor current so obtained shall be considered as a single motor for the purpose of this requirement.

The full-load current equivalent to the horsepower rating of each motor shall be selected from Table 430.247, Table 430.248, Table 430.249, or Table 430.250. These full-load currents shall be added to the rating in amperes of other loads to obtain an equivalent full-load current for the combined load.

The locked-rotor current equivalent to the horsepower rating of each motor shall be selected from Table 430.251(A) or Table 430.251(B). The locked-rotor currents shall be added to the rating in amperes of other loads to obtain an equivalent locked-rotor current for the combined load. Where two or more motors or other loads cannot be started simultaneously, the largest sum of locked-rotor currents of a motor or group of motors that can be started simultaneously and the full-load currents of other concurrent loads shall be permitted to be used to determine the equivalent locked-rotor current for the simultaneous combined loads. In cases where different current ratings are obtained when applying these tables, the largest value obtained shall be used.

Exception No. 1: The locked-rotor current equivalent to the horsepower rating of each polyphase motor with design letter A shall be ~~the motor's marked value of locked-rotor amperes~~. one of following:

- (1) *If available, the motor's marked value of locked-rotor amperes*
- (2) *In the absence of a marked value of locked-rotor amperes for the motor, the value calculated from Equation 430.110(C)(1)a:*

$$\text{locked-rotor amperes} = \left(\frac{kVA}{hp} \right) \times \frac{(1000 \times \text{motor's marked value of rated horsepower})}{(\text{motor's marked value of rated volts}) \times (\sqrt{3})} \quad \text{[430.110(C)(1)]}$$

where:

kVA/hp \equiv *maximum range value of kilovolt-amperes per horsepower with locked rotor in Table 430.7(B) associated with the motor's marked locked-rotor indicating code letter*

Informational Note: Equation 430.110(C)(1)a is obtained by solving for locked-rotor amperes in the formula for "kilovolt-amperes per horsepower with locked rotor," as follows:

$$\frac{kVA}{hp} = \frac{(\sqrt{3}) \times (\text{motor's marked value of rated volts}) \times (\text{locked-rotor amperes})}{(1000 \times \text{motor's marked value of rated horsepower})} \quad \text{[430.110(C)(1)]}$$

The numerator of Equation 430.110(C)(1)b for kilovolt-amperes per horsepower is the apparent power input to a three-phase motor with locked rotor in units of volt-amperes. The factor of 1000 VA/kVA in the denominator converts this value to units of kilovolt-amperes and "(marked value of rated horsepower)" in the denominator converts this to kilovolt-amperes per horsepower. Note that "motor's marked value of rated volts" is a line-to-line value and "locked-rotor amperes" is a line value as opposed to a phase value.

Exception No. 2: Where part of the concurrent load is resistance load, and where the disconnecting means is a switch rated in horsepower and amperes current, the switch used shall be permitted to have a horsepower rating ~~that is~~ not less than the combined load of the motor(s) if the ampere current rating of the switch is not less than the locked-rotor current of the motor(s) plus the resistance load.

(2) Ampere Current Rating.

The ampere current rating of the disconnecting means shall not be less than 115 percent of the sum of all currents at the full-load condition determined in accordance with 430.110(C)(1).

Exception: A listed nonfused motor-circuit switch having a horsepower rating equal to or greater than the equivalent horsepower of the combined loads, determined in accordance with 430.110(C)(1), shall be permitted to have a an-ampere current rating less than 115 percent of the sum of all currents at the full-load condition.

(3) Small Motors.

For small motors not covered by Table 430.247, Table 430.248, Table 430.249, or Table 430.250, the locked-rotor current shall be assumed to be six times the full-load current.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP-11_SR_7538_Tables.docx	For staff use.	

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 13:28:16 EDT 2021

Committee Statement

Committee Statement: Updates included to address CC concerns on use of ampacity vs current. Changes made to better address Design A motor LRC calculations.

Response Message: SR-7538-NFPA 70-2021

[Public Comment No. 996-NFPA 70-2021 \[Section No. 430.110\]](#)

[Public Comment No. 1582-NFPA 70-2021 \[Section No. 430.110\(C\)\(1\)\]](#)



Second Revision No. 7544-NFPA 70-2021 [Section No. 430.120]

430.120 General.

The installation ~~provisions of requirements for~~ Part I through Part IX are applicable unless modified or supplemented by Part X.

Power conversion equipment used in adjustable-speed drive systems ~~with input ratings of 1000 volts or lower and output ratings of over 1000 volts, or vice versa,~~ shall comply with Part X for ~~circuits an input or output~~ rated 1000 volts or lower and with Part XI for ~~circuits an input or output~~ rated over 1000 volts.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 14:05:56 EDT 2021

Committee Statement

Committee Statement: PC reviewed per CC direction and changes made to improve clarity and meet NEC style manual requirements.

Response Message: SR-7544-NFPA 70-2021

[Public Comment No. 993-NFPA 70-2021 \[Section No. 430.120\]](#)



Second Revision No. 7555-NFPA 70-2021 [Section No. 430.205]

430.205 Size of Conductors.

The ampacities of conductors supplying equipment rated over 1000 volts, nominal, shall be determined in accordance with 315.60 and 430.205(A) and (B).

(A) General Motor Systems .

Conductors supplying motors shall ~~have an ampacity be sized~~ not less than the current at which trip setting of the motor overload protective device(s) ~~is selected to trip~~ .

(B) Adjustable-Speed Drive Systems.

For an adjustable-speed drive system, the ~~ampacity of the~~ conductors supplying the power conversion equipment shall have an ampacity not less than 125 percent of the rated input current to the power conversion equipment.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 15:08:24 EDT 2021

Committee Statement

Committee Statement: Changes made to improve clarity of this section. Also changes made to titles on SR-7559 in Tables 430.249 and 430.250 to include 2300V motors made improve correlation.

Response Message: SR-7555-NFPA 70-2021

Public Comment No. 1093-NFPA 70-2021 [Section No. 430.205]



Second Revision No. 7569-NFPA 70-2021 [Section No. 430.208]

[Detail SR-7565](#)

430.208 Disconnecting Means.

The motor controller disconnecting means shall be a switch or circuit breaker having a voltage rating not less than that of the circuit involved, and shall be lockable in accordance with 110.25. The disconnecting means shall have an ampere current rating of not less than ~~115~~100 percent of the full-load current rating of the motor. For adjustable-speed drive systems, the disconnecting means shall have an ampere current rating not less than ~~115~~100 percent of the rated input current of the power conversion equipment.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 15:59:25 EDT 2021

Committee Statement

Committee Statement: The cc comments on ampere vs current ratings are addressed. The change of FLC sizing percentage is not changed based on technical review.

Response Message: SR-7569-NFPA 70-2021

[Public Comment No. 1094-NFPA 70-2021 \[Section No. 430.208\]](#)



Second Revision No. 7570-NFPA 70-2021 [Section No. 430.241]

430.241 General.

Part XIII specifies the grounding of exposed non-current-carrying metal parts, likely to become energized, of motor and motor controller frames to ~~prevent a~~ limit voltage ~~above to~~ ground in the event of accidental contact between energized parts and frames. Insulation, isolation, or guarding are suitable alternatives to grounding of motors under certain conditions.

Submitter Information Verification

Committee: NEC-P11

Submission Date: Wed Oct 13 16:07:27 EDT 2021

Committee Statement

Committee Statement: Changes made to improve clarity and utilize defined term of Voltage to Ground.

Response Message: SR-7570-NFPA 70-2021

[Public Comment No. 998-NFPA 70-2021 \[Section No. 430.241\]](#)



Second Revision No. 7600-NFPA 70-2021 [Section No. 440.3]

~~440.3~~ Other Articles.

~~(A)~~ Motors.

See Table 440.3. These provisions are in addition to, or amendatory of, other articles in this Code, which apply except as modified in this article.

~~(B)~~ Air-Conditioning and Refrigerating Equipment That Does Not Incorporate a Hermetic Refrigerant Motor-Compressor.

See Table 440.3. This equipment includes devices that employ refrigeration compressors driven by conventional motors, furnaces with air-conditioning evaporator coils installed fan-coil units, remote forced-air cooled condensers, remote commercial refrigerators, and so forth.

~~(C)~~ Room Air Conditioners, Household Refrigerators, and Freezers; Drinking Water Coolers; and Beverage Dispensers.

See Table 440.3(D). This equipment shall be considered appliances and the rules of the applicable article shall apply unless modified in this article.

~~(D)~~ Other Applicable Articles.

Hermetic refrigerant motor compressors, circuits, controllers, and equipment shall also comply with the applicable provisions of Table 440.3(D).

Table 440.3(D) Other Articles

Equipment/Occupancy	Article	Section
Capacitors	-	460.9
Commercial garages; aircraft hangars; motor fuel dispensing facilities; bulk storage plants; spray application, dipping, and coating processes; and inhalation anesthetizing locations	511, 513, 514, 515, 516, and 517 Part IV	-
Hazardous (classified) locations	500-503, 505, and 506	-
Motion picture and television studios and similar locations	530	-
Resistors and reactors	470	-

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:42:22 EDT 2021

Committee Statement

Committee Statement: Table 440.3(D) is not necessary because it is redundant to Article 90. Further, without reference to Table 440.3(D) the rest of 440.3 is not necessary.

PC-134 & 135 are rejected as this SR deletes 440.3.

Response Message: SR-7600-NFPA 70-2021

[Public Comment No. 134-NFPA 70-2021 \[Section No. 440.3\(A\)\]](#)

[Public Comment No. 999-NFPA 70-2021 \[Section No. 440.3\]](#)

[Public Comment No. 135-NFPA 70-2021 \[Section No. 440.3\(C\)\]](#)



Second Revision No. 7604-NFPA 70-2021 [Section No. 440.11]

440.11 General.

Part II is intended to require disconnecting means. Disconnecting means shall be capable of disconnecting air-conditioning and refrigerating equipment, including motor-compressors and controllers, from the circuit conductors. Where if the disconnecting means are is readily accessible to unqualified persons, any enclosure door or hinged cover of a disconnecting means enclosure that exposes live energized parts when open shall be locked or require a tool to open or be capable of being locked.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:52:59 EDT 2021

Committee Statement

Committee Statement: Response to 216: The first sentence of 440.11 is revised to make this clause enforceable per 3.2.1 of the style manual, and the term “shall” is added in accordance with 90.5(A). The term “live” is changed to “energized” to be consistent with other language in the code such as the definitions for “enclosed” and “enclosure”.

Response to PC-1001, 1476 & 1636: “Where” is changed to “if” to improve clarity per 3.3.4 of the style manual. “Locked” is changed to “shall be capable of being locked” to make the requirement enforceable in accordance with 3.2.1 of the style manual. Other revisions (rearranging the last sentence, adding “disconnecting means enclosure”, and adding commas) are made for clarity and readability.

Response Message: SR-7604-NFPA 70-2021

[Public Comment No. 216-NFPA 70-2021 \[Section No. 440.11\]](#)

[Public Comment No. 1001-NFPA 70-2021 \[Section No. 440.11\]](#)

[Public Comment No. 1476-NFPA 70-2021 \[Section No. 440.11\]](#)

[Public Comment No. 1636-NFPA 70-2021 \[Section No. 440.11\]](#)



Second Revision No. 7605-NFPA 70-2021 [Section No. 440.22(A)]

(A) Rating or Setting for Individual Motor-Compressor.

The motor-compressor branch-circuit short-circuit and ground-fault protective device shall be capable of carrying the starting current of the motor. A protective device having a rating or setting not exceeding 175 percent of the motor-compressor rated-load current or branch-circuit selection current, whichever is greater, shall be permitted.

Exception No. 1: ~~Where~~ If the values for branch-circuit short-circuit and ground-fault protection in accordance with 440.22(A) do not correspond to the standard sizes or ratings of fuses, nonadjustable circuit breakers, thermal protective devices, or ~~possible~~ available settings of adjustable circuit breakers, a higher size, rating, or ~~possible~~ available setting that does not exceed the next higher standard ampere rating shall be permitted.

Exception No. 2: ~~Where~~ If the values for branch-circuit short-circuit and ground-fault protection in accordance with 440.22(A) or the rating modified by Exception No. 1 is not sufficient for the starting current of the motor, the rating or setting shall be permitted to be increased but shall not exceed 225 percent of the motor rated-load current or branch-circuit selection current, whichever is greater.

Exception No. 3: The rating of the branch-circuit short-circuit and ground-fault protective device shall not be required to be less than 15 amperes.

Submitter Information Verification

Committee: NEC-P11

Submission Date: Wed Oct 13 18:11:13 EDT 2021

Committee Statement

Committee Statement: The first sentence of 440.11 is revised to make this clause enforceable per 3.2.1 of the style manual, and the term “shall” is added in accordance with 90.5(A). The term “live” is changed to “energized” to be consistent with other language in the code such as the definitions for “enclosed” and “enclosure”.

Response Message: SR-7605-NFPA 70-2021

[Public Comment No. 1002-NFPA 70-2021 \[Section No. 440.22\(A\)\]](#)



Second Revision No. 7607-NFPA 70-2021 [Section No. 440.34]

440.34 Combination Load.

Conductors supplying a motor-compressor load(s) in addition to other load(s) ~~as calculated from branch-circuit, feeder, and service load calculations and applicable articles~~ shall have an ampacity sufficient for the other load(s) plus the required ampacity for the motor-compressor load(s). ~~determined in accordance with 440.33 or, for a single motor-compressor, in accordance with 440.32~~. The motor compressor load(s) shall be determined in accordance with 440.32 or 440.33. The other load(s) shall be calculated from branch-circuit, feeder, and service load calculations.

Exception: Where the circuitry is interlocked ~~so as~~ to prevent simultaneous operation of the motor-compressor(s) and all other loads connected, the conductor size shall be determined from the largest size required for the motor-compressor(s) and other loads to be operated at a given time.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 18:20:01 EDT 2021

Committee Statement

Committee Statement: The requirements are re-written to improve usability and to be more clear per 3.3.1.2 of the style manual.

Response Message: SR-7607-NFPA 70-2021

Public Comment No. 1003-NFPA 70-2021 [Section No. 440.34]



Second Revision No. 7610-NFPA 70-2021 [Section No. 440.54]

440.54 Motor-Compressors and Equipment on 15- or 20-Ampere Branch Circuits — Not Cord- and Attachment-Plug-Connected.

Overload protection for motor-compressors and equipment used on 15- or 20-ampere 120-volt, or 15-ampere 208- or 240-volt, single-phase branch circuits ~~as permitted elsewhere in this Code~~ shall be permitted in accordance with 440.54(A) and 440.54(B) (B) .

(A) Overload Protection.

The motor-compressor shall be provided with overload protection selected as specified in 440.52(A). Both the controller and motor overload protective device shall be identified for installation with the short-circuit and ground-fault protective device for the branch circuit to which the equipment is connected.

(B) Time Delay.

The short-circuit and ground-fault protective device protecting the branch circuit shall have sufficient time delay to permit the motor-compressor and other motors to start and accelerate their loads.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 18:23:52 EDT 2021

Committee Statement

Committee Statement: The statement "as permitted elsewhere in this Code" is removed because it is not critical to the requirement of this clause.

Response Message: SR-7610-NFPA 70-2021

[Public Comment No. 1004-NFPA 70-2021 \[Section No. 440.54\]](#)



Second Revision No. 7611-NFPA 70-2021 [Section No. 440.55]

440.55 Cord- and Attachment-Plug-Connected Motor-Compressors and Equipment on 15- or 20-Ampere Branch Circuits.

Overload protection for motor-compressors and equipment that are cord- and attachment-plug-connected and used on 15- or 20-ampere 120-volt, or 15-ampere 208- or 240-volt, single-phase branch circuits ~~as permitted elsewhere in this Code~~ shall be permitted in accordance with 440.55(A), (B), and (C).

(A) Overload Protection.

The motor-compressor shall be provided with overload protection as specified in 440.52(A). Both the controller and the motor overload protective device shall be identified for installation with the short-circuit and ground-fault protective device for the branch circuit to which the equipment is connected.

(B) Attachment Plug and Receptacle or Cord Connector Rating.

The rating of the attachment plug and receptacle or cord connector shall not exceed 20 amperes at 125 volts or 15 amperes at 250 volts.

(C) Time Delay.

The short-circuit and ground-fault protective device protecting the branch circuit shall have sufficient time delay to permit the motor-compressor and other motors to start and accelerate their loads.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 18:26:42 EDT 2021

Committee Statement

Committee Statement: The statement "as permitted elsewhere in this Code" is removed because it is not critical to the requirement of this clause.

Response Message: SR-7611-NFPA 70-2021

[Public Comment No. 1005-NFPA 70-2021 \[Section No. 440.55\]](#)



Second Revision No. 7598-NFPA 70-2021 [Section No. 460.24(A)]

(A) Load Current.

Switches shall be ~~specifically~~ rated for switching of capacitive loads. Capacitor switch operation shall open all ungrounded conductors and the switch shall be capable of the following:

- (1) Carrying continuously not less than 135 percent of the rated current of the capacitor installation
- (2) Interrupting the maximum continuous load current of each capacitor, capacitor bank, or capacitor installation that will be switched as a unit
- (3) Withstanding the maximum inrush current, including contributions from adjacent capacitor installations
- (4) Carrying currents due to faults on capacitor side of switch

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:35:35 EDT 2021

Committee Statement

Committee Statement: The term "specifically" is removed because it is not necessary in the context of the clause.

Response Message: SR-7598-NFPA 70-2021

[Public Comment No. 1006-NFPA 70-2021 \[Section No. 460.24\(A\)\]](#)



Second Revision No. 7717-NFPA 70-2021 [Section No. 460.24(B)(2)]

(2) Isolating or Disconnecting Switches with No Interrupting Rating.

Isolating or disconnecting switches (with no interrupting rating) shall be interlocked with the load-interrupting device or ~~shall~~ be provided with prominently displayed caution signs in accordance with ~~490.22~~ 495.22 to prevent switching load current.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Thu Oct 14 14:49:52 EDT 2021

Committee Statement

Committee Statement: The reference to 490.22 in 460.24(B)(2) is revised to 495.22 due to the change in location of the requirement in response to Global PC-460 and Global PC-1963.

Response Message: SR-7717-NFPA 70-2021



Second Revision No. 7591-NFPA 70-2021 [Article 470]

Article 470 Resistors and Reactors

Part I. General

470.1 Scope.

This article covers the installation of separate resistors and reactors on electrical circuits.

Exception: This article does not cover resistors and reactors that are component parts of other apparatus.

470.2 Reconditioned Equipment.

(A) Resistors.

Resistors shall not be reconditioned.

(B) Reactors.

Reconditioning of reactors shall be in accordance with the manufacturer's instructions or industry consensus standards.

Part II. 1000 Volts, Nominal, or Less

470.10 Location.

Resistors and reactors shall not be placed where exposed to physical damage.

470.11 Space Separation.

A thermal barrier shall be required if the space between the resistors and or reactors and any combustible material is less than 305 mm (12 in.).

470.12 Conductor Insulation.

Insulated conductors used for connections between resistance elements and controllers shall be suitable for an operating temperature of not less than 90°C (194°F).

Exception: Other conductor insulations shall be permitted for the motor starting service.

~~**470.5** Reconditioning of Equipment.~~

~~Reconditioning of resistors shall not be permitted. Reconditioning of reactors shall be in accordance with the manufacturer's instructions or industry consensus standards.~~

Part III. Over 1000 Volts, Nominal

470.20 General.

(A) Protected Against Physical Damage.

Resistors and reactors shall be protected against physical damage.

(B) Isolated by Enclosure or Elevation.

Resistors and reactors shall be isolated by enclosure or elevation to protect personnel from accidental contact with energized parts.

(C) Combustible Materials.

Resistors and reactors shall not be installed in close enough proximity to combustible materials to constitute a fire hazard and shall have a clearance of not less than 305 mm (12 in.) from combustible materials.

(D) Clearances.

Clearances from resistors and reactors to grounded surfaces shall be adequate for the voltage involved.

(E) Temperature Rise from Induced Circulating Currents.

Metallic enclosures of reactors and adjacent metal parts shall be installed so that the temperature rise from induced circulating currents is not hazardous to personnel or does not constitute a fire hazard.

470.21 Grounding.

Resistor and reactor cases or enclosures shall be connected to the equipment grounding conductor.

Exception: Resistor or reactor cases or enclosures supported on a structure designed to operate at other than ground potential shall not be connected to the equipment grounding conductor.

470.22 Oil-Filled Reactors.

Installation of oil-filled reactors, in addition to the above requirements, shall comply with applicable requirements of Part II and Part III of Article 450.

~~470.21~~ Reconditioning of Equipment.

~~Reconditioning of resistors shall not be permitted. Reconditioning of reactors shall be in accordance with the manufacturer's instructions or industry consensus standards.~~

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 17:20:06 EDT 2021

Committee Statement

Committee Statement: The first sentence is simplified for readability. The second sentence is not deleted or revised as the requirements are not fully covered by FR 8663, Article 110.20.

"Reconditioned Equipment" in Article 470. Combine and move 470.5 and 470.21 were combined into a single clause under Part I General (470.2) as requested by Global PC-896. Then renumber remaining clauses in accordance with 2.4.2.1 of the style manual.

Response Message: SR-7591-NFPA 70-2021

[Public Comment No. 1739-NFPA 70-2021 \[Section No. 470.21\]](#)

[Public Comment No. 1737-NFPA 70-2021 \[Section No. 470.5\]](#)



Second Revision No. 7596-NFPA 70-2021 [Part II.]

Part II. 1000 Volts, Nominal, and ~~Under~~ or Less

Submitter Information Verification

Committee: NEC-P11

Submission Date: Wed Oct 13 17:32:23 EDT 2021

Committee Statement

Committee Statement: The term “and under” is changed to “or less” for consistency with other parts of the code.

Response Message: SR-7596-NFPA 70-2021

[Public Comment No. 1095-NFPA 70-2021 \[Part I.\]](#)



Second Revision No. 7559-NFPA 70-2021 [Part XIV.]



Part XIV. Tables

Table 430.247 Full-Load Current in Amperes, Direct-Current Motors

The following values of full-load currents* are for motors running at base speed.

Horsepower	Armature Voltage Rating*					
	90 Volts	120 Volts	180 Volts	240 Volts	500 Volts	550 Volts
¼	4.0	3.1	2.0	1.6	—	—
⅓	5.2	4.1	2.6	2.0	—	—
½	6.8	5.4	3.4	2.7	—	—
¾	9.6	7.6	4.8	3.8	—	—
1	12.2	9.5	6.1	4.7	—	—
1½	—	13.2	8.3	6.6	—	—
2	—	17	10.8	8.5	—	—
3	—	25	16	12.2	—	—
5	—	40	27	20	—	—
7½	—	58	—	29	13.6	12.2
10	—	76	—	38	18	16
15	—	—	—	55	27	24
20	—	—	—	72	34	31
25	—	—	—	89	43	38
30	—	—	—	106	51	46
40	—	—	—	140	67	61
50	—	—	—	173	83	75
60	—	—	—	206	99	90
75	—	—	—	255	123	111
100	—	—	—	341	164	148
125	—	—	—	425	205	185
150	—	—	—	506	246	222
200	—	—	—	675	330	294

*These are average dc quantities.

Table 430.248 Full-Load Currents in Amperes, Single-Phase Alternating-Current Motors

The following values of full-load currents are for motors running at usual speeds and motors with normal torque characteristics. The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120 and 220 to 240 volts.

Horsepower	115 Volts	200 Volts	208 Volts	230 Volts
⅙	4.4	2.5	2.4	2.2
¼	5.8	3.3	3.2	2.9
⅓	7.2	4.1	4.0	3.6
½	9.8	5.6	5.4	4.9
¾	13.8	7.9	7.6	6.9
1	16	9.2	8.8	8.0
1½	20	11.5	11.0	10
2	24	13.8	13.2	12

<u>Horsepower</u>	<u>115</u> <u>Volts</u>	<u>200</u> <u>Volts</u>	<u>208</u> <u>Volts</u>	<u>230</u> <u>Volts</u>
3	34	19.6	18.7	17
5	56	32.2	30.8	28
7½	80	46.0	44.0	40
10	100	57.5	55.0	50

Table 430.249 Full-Load Current, Two-Phase Alternating-Current Motors (4-Wire)

The following values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Current in the common conductor of a 2-phase, 3-wire system will be 1.41 times the value given. The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480, and 550 to 600, and 2300 to 2400 volts.

<u>Horsepower</u>	<u>Induction-Type Squirrel Cage and</u> <u>Wound Rotor (Amperes)</u>				
	<u>115</u> <u>Volts</u>	<u>230</u> <u>Volts</u>	<u>460</u> <u>Volts</u>	<u>575</u> <u>Volts</u>	<u>2300</u> <u>Volts</u>
½	4.0	2.0	1.0	0.8	—
¾	4.8	2.4	1.2	1.0	—
1	6.4	3.2	1.6	1.3	—
1½	9.0	4.5	2.3	1.8	—
2	11.8	5.9	3.0	2.4	—
3	—	8.3	4.2	3.3	—
5	—	13.2	6.6	5.3	—
7½	—	19	9.0	8.0	—
10	—	24	12	10	—
15	—	36	18	14	—
20	—	47	23	19	—
25	—	59	29	24	—
30	—	69	35	28	—
40	—	90	45	36	—
50	—	113	56	45	—
60	—	133	67	53	14
75	—	166	83	66	18
100	—	218	109	87	23
125	—	270	135	108	28
150	—	312	156	125	32
200	—	416	208	167	43

Table 430.250 Full-Load Current, Three-Phase Alternating-Current Motors

The following values of full-load currents are typical for motors running at speeds usual for belted motors and motors with normal torque characteristics. The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480, and 550 to 600, and 2300 to 2400 volts.

Horsepower Induction-Type Squirrel Cage and Wound Rotor (Amperes)

	<u>115 Volts</u>	<u>200 Volts</u>	<u>208 Volts</u>	<u>230 Volts</u>	<u>460 Volts</u>	<u>575 Volts</u>	<u>2300 Volts</u>	<u>2300</u>
½	4.4	2.5	2.4	2.2	1.1	0.9	—	
¾	6.4	3.7	3.5	3.2	1.6	1.3	—	
1	8.4	4.8	4.6	4.2	2.1	1.7	—	
1½	12.0	6.9	6.6	6.0	3.0	2.4	—	
2	13.6	7.8	7.5	6.8	3.4	2.7	—	
3	—	11.0	10.6	9.6	4.8	3.9	—	
5	—	17.5	16.7	15.2	7.6	6.1	—	
7½	—	25.3	24.2	22	11	9	—	
10	—	32.2	30.8	28	14	11	—	
15	—	48.3	46.2	42	21	17	—	
20	—	62.1	59.4	54	27	22	—	
25	—	78.2	74.8	68	34	27	—	53
30	—	92	88	80	40	32	—	63
40	—	120	114	104	52	41	—	83
50	—	150	143	130	65	52	—	104
60	—	177	169	154	77	62	16	123
75	—	221	211	192	96	77	20	155
100	—	285	273	248	124	99	26	202
125	—	359	343	312	156	125	31	253
150	—	414	396	360	180	144	37	302
200	—	552	528	480	240	192	49	400
250	—	—	—	—	302	242	60	
300	—	—	—	—	361	289	72	
350	—	—	—	—	414	336	83	
400	—	—	—	—	477	382	95	
450	—	—	—	—	515	412	103	
500	—	—	—	—	590	472	118	

*For 90 and 80 percent power factor, the figures shall be multiplied by 1.1 and 1.25, respectively.

Table 430.251(A) Conversion Table of Single-Phase Locked-Rotor Currents for Selection of Disconnecting Means and Controllers as Determined from Horsepower and Voltage Rating

For use only with 430.110, 440.12, 440.41, and 455.8(C).

<u>Rated Horsepower</u>	<u>Maximum Locked-Rotor Current in Amperes, Single-Phase</u>		
	<u>115 Volts</u>	<u>208 Volts</u>	<u>230 Volts</u>
½	58.8	32.5	29.4
¾	82.8	45.8	41.4
1	96	53	48
1½	120	66	60
2	144	80	72
3	204	113	102
5	336	186	168
7½	480	265	240

<u>Rated Horsepower</u>	<u>Maximum Locked-Rotor Current in Amperes, Single-Phase</u>		
	<u>115 Volts</u>	<u>208 Volts</u>	<u>230 Volts</u>
10	1000	332	300

Table 430.251(B) Conversion Table of Polyphase Design B, C, and D Maximum Locked-Rotor Currents for Selection of Disconnecting Means and Controllers as Determined from Horsepower and Voltage Rating and Design Letter

For use only with 430.110, 440.12, 440.41, and 455.8(C).

<u>Rated Horsepower</u>	<u>Maximum Motor Locked-Rotor Current in Amperes, Two- and Three- Phase, Design B, C, and D*</u>					
	<u>115 Volts</u>	<u>200 Volts</u>	<u>208 Volts</u>	<u>230 Volts</u>	<u>460 Volts</u>	<u>575 Volts</u>
	<u>B, C, D</u>	<u>B, C, D</u>	<u>B, C, D</u>	<u>B, C, D</u>	<u>B, C, D</u>	<u>B, C, D</u>
½	40	23	22.1	20	10	8
¾	50	28.8	27.6	25	12.5	10
1	60	34.5	33	30	15	12
1½	80	46	44	40	20	16
2	100	57.5	55	50	25	20
3	—	73.6	71	64	32	25.6
5	—	105.8	102	92	46	36.8
7½	—	146	140	127	63.5	50.8
10	—	186.3	179	162	81	64.8
15	—	267	257	232	116	93
20	—	334	321	290	145	116
25	—	420	404	365	183	146
30	—	500	481	435	218	174
40	—	667	641	580	290	232
50	—	834	802	725	363	290
60	—	1001	962	870	435	348
75	—	1248	1200	1085	543	434
100	—	1668	1603	1450	725	580
125	—	2087	2007	1815	908	726
150	—	2496	2400	2170	1085	868
200	—	3335	3207	2900	1450	1160
250	—	—	—	—	1825	1460
300	—	—	—	—	2200	1760
350	—	—	—	—	2550	2040
400	—	—	—	—	2900	2320
450	—	—	—	—	3250	2600
500	—	—	—	—	3625	2900

*Design A motors are not limited to a maximum starting current or locked rotor current.

Submitter Information Verification

Committee: NEC-P11

Submittal Date: Wed Oct 13 15:16:22 EDT 2021

Committee Statement

Committee Statement: Changes made to correlate with SR-7555 by updating titles of tables. See related public comment no. 1093, SR-7555.

Response Message: SR-7559-NFPA 70-2021