

33



Size 3 Starter

Product Selection — Non-reversing, Sizes 00 – 9

When Ordering Specify

Order by Catalog Number from **Table 33-191**, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Heaters

Enter heaters as separate item by listing Catalog Number from tables, **Pages 33-148 – 33-149**, as required per starter.

Table 33-191. Non-reversing Starters Selection

Size	Amps	Max. UL Horsepower						2 Poles ^③		3 Poles	
		1-Phase		3-Phase				Open Catalog Number ^①	Price U.S. \$	Open Catalog Number ^①	Price U.S. \$
		115V	230V	208V	240V	480V	600V				

Sizes 00 – 6

00	9	1/3	—	1-1/2	1-1/2	2	2	A200MABR	193.	A200MAC_	193.
0	18	1	—	3	3	5	5	A200M0BR	217.	A200M0C_	242.
1	27	2	—	7-1/2	7-1/2	10	10	A200M1BR	279.	A200M1C_	279.
1-1/2	36	3	—	—	—	—	—	A200MDBR	330.	—	—
2	45	7-12	—	10	15	25	25	A200M2BR	505.	A200M2C_	505.
3	90	—	—	25	30	50	50	—	—	A200M3C_	820.
4	135	—	—	40	50	100	100	—	—	A200M4C_	1,870.
5	270	—	—	75	100	200	200	—	—	A200M5C_	4,565.
6	540	—	—	150	200	400	400	—	—	A200M6C_	10,840.

Sizes 7 – 9

7 ^②	810	—	—	200	300	600	600	—	—	A200M7C_	16,100.
8 ^②	1215	—	—	400	450	900	900	—	—	A200M8C_	24,100.
9 ^②	2250	—	—	—	800	1600	—	—	—	A200M9C_ ^④	38,900.

① For ambient compensated overload relay with auto-reset, add Suffix **D**.

② Sizes 7 – 9 use rectifier with DC coil.

③ Single-phase with one single-pole overload relay.

④ For Size 9, only available coil voltage is 120V.

Table 33-192. Coils for Sizes 00 – 6

Coil Volts and Hz	Code Suffix
120/60 or 110/50	AC
200 – 208/60	B
240/60	W
480/60	X
600/60	E

Table 33-193. Coils for Sizes 7, 8 and 9^⑤

Coil Volts and Hz	Code Suffix
110 – 120/50 or 60	J
220 – 240/50 or 60	W
440 – 480/50 or 60	X
600/60	E

⑤ For Size 9, only available coil voltage is 120V.

Factory Modifications **Page 33-133**
 Modification Kits,
 Accessories **Pages 33-133 – 33-135**
 Dimensions **Page 33-123**
 Discount Symbol **1CD1**

A200 Line

Contents

<i>Description</i>	<i>Page</i>
Starters — Non-reversing and Reversing	33-121
Product Description — Sizes 00 – 4.	33-121
Product Description — Sizes 5 – 9.	33-121
Features and Benefits	33-122
Instructional Leaflets	33-122
Dimensions and Shipping Weights	33-123
Product Selection — Non-reversing, Sizes 00 – 9.	33-126
Product Selection — Reversing, Sizes 00 – 9.	33-127
Starters — Two-Speed	33-128
Technical Data	33-129
Factory Modifications	33-133
Accessories and Field Modification Kits	33-133
Renewal Parts	33-136



Size 1 Starter

**Product Description —
Sizes 00 – 4**

General

Magnetic starters are used for full-voltage, across-the-line starting and stopping of squirrel cage motors. They can be operated locally or remotely by manual or automatic pilot devices.

**NEMA Sizes 00 – 4;
Three-Phase, 1-1/2 – 100 hp**

These starters use Class A201 contactors as described on **Page 33-115**. Contactor features are enhanced through the ability to provide positive motor protection in the form of several types of overload relays. See **Pages 33-141 – 33-149**.

Type B Overload Relay, Manual Reset Only

Supplied as standard on Class A200 and A900 starters (two-speed). The bi-metallic overload relay offers ambient compensation and trip-to-test feature (relay contact status check) as standard. In addition, an isolated normally-open contact is available in kit form for customer mounting. Type B overload relays are manual reset only.

Type A Overload Relay, Manual or Automatic Reset

This is an optional overload relay, offering the capability of field conversion to automatic reset. It is available as an ambient compensated or non-compensated type.

Non-reversing Starters

Non-reversing starters are supplied as open devices. All starters are supplied with a normally-open holding circuit interlock.

Class A200 starters are available as UL listed or recognized components, as well as with CSA certification.

Reversing Starters

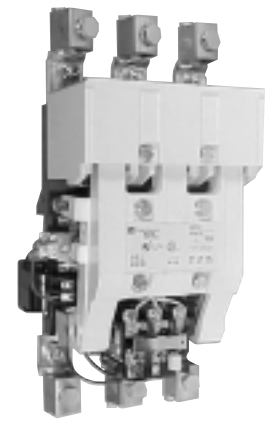
For reversing applications (Class A210), a starter and a contactor electrically and mechanically interlocked are supplied on a common baseplate. Reversing starters are used to start, stop and reverse AC squirrel cage motors and for primary control of reversing wound-rotor motors.

For plugging or inching, when operations exceed five times per minute, decreased horsepower ratings in accordance with NEMA Standard ICS 2-321 are recommended.

Two-Speed Starters, A900s

For across-the-line starting of two-speed constant hp, constant torque and variable torque squirrel cage motors, two-speed starters (Class A900) are available. These starters consist of two starters, one for each motor speed, mechanically and electrically interlocked and wired for manual speed selection by means of pushbuttons. Auxiliary relays may be added to provide automatic acceleration or deceleration.

Starters for two-speed, two independent winding motors consist of two-, three- or four-pole starters electrically and mechanically interlocked. Starters for two-speed, single reconnectable winding motors consist of one three-pole and one five-pole starter mechanically and electrically interlocked.



Size 5 Starter

**Product Description —
Sizes 5 – 9**

**NEMA Sizes 5 – 9;
Three-Phase 75 to 1600 hp**

Non-reversing (Class A200), and reversing (Classes A210, A250) full voltage starters are used for across-the-line starting of squirrel cage induction motors. They are used with motors rated above 50 hp at 230V, and above 100 hp at 460 through 600V.

Sizes 5 and 6 starters use Class A201 contactors as described on **Page 33-116**. In addition to standard motor starters, special application devices are available: Sizes 5 and 6 starters with integrally rectified AC to DC coils for applications where low voltage problems are prevalent are available.

Class A200 starters are UL listed and recognized and also carry CSA certification.

Front Removable Parts — All operating parts can be removed quickly and easily from the front. Straight-through wiring and conveniently located connection points for external wires and cables minimize installation time.

Type B Block Type Thermal Overload Relay — Dependable overload protection is assured by these snap-action, manual reset relays. Automatic reset Type A relays are available as an option.

Technical Data **Pages 33-129 – 33-132**

A200 Line

Replacement Auxiliary Contacts

Table 33-223. Replacement Auxiliary Contacts

Contactor Size	Contact Arrangement	Aux. Elect. Contact		Price U.S. \$
		Catalog Number	Style Number	
5, 6	1NO + 1NC	J11	9084A17G01	58.
	2NO	J20	9084A17G02	58.
	2NC	J02	9084A17G03	58.
7, 8	1NO	—	578D461G01	171.
	1NC	—	578D461G03	182.
9	1NO + 1NC	—	843D943G04	161.
	2NO	—	843D943G05	161.
	2NC	—	843D943G06	161.

Extra Auxiliary Contact Kits

All starters include an auxiliary contact with 1NO and 1NC contact. These kits include an auxiliary contact with contacts as shown, plus operating arm and mounting bracket when required.

Table 33-224. Extra Auxiliary Contact Kits

Contactor Size	Contact Arrangement	Style Number	Price U.S. \$
5, 6	1NO + 1NC	3463D94G18	86.
	2NO	3463D94G04	86.
	2NC	3463D94G19	86.
7, 8 ^①	2NO	818D498G06	453.
	1NO	818D498G04	224.

^① Size 7 and larger use DC coils as standard.

DC Coil Conversion Kits

Kits listed below include all necessary parts to convert from AC to DC control including the DC coil with built-in diode, rectifier, auxiliary interlock and all mounting hardware.

Table 33-225. DC Coil Conversion Kits

Size	Voltage	Kit Style Number	Price U.S. \$
5	110-120	7864A28G01	461.
	220-240	7864A28G02	515.
	440-480	7864A28G03	515.
6	110-120	7864A29G01	515.
	220-240	7864A29G02	570.
	440-480	7864A29G03	570.

Mechanical Interlocks

Table 33-226. Mechanical Interlocks

Contactor Sizes	Style Numbers		Price U.S. \$
	Horizontal	Vertical	
3, 4 and 5	2050A11G75	2050A11G65	349.
5 and 5	2050A11G25	2050A11G15	349.
5 and 6	2050A11G27	2050A11G17	349.
6 and 6	2050A11G26	2050A11G16	349.
6 and 7, 8	—	2050A11G55	349.
7, 8 and 7, 8	No (Rear Conn.)	567D624G01	534.
7, 8 and 7, 8	No (Front Conn.)	567D624G03	534.
7, 8 and 9	No (Rear Conn.)	9944D56G06	534.
9 and 9	No (Rear Conn.)	9944D56G01	534.

Overload Protection

Overload Protection Size 5 Starters

Type B overload relay is a three-pole, block type, thermal ambient compensated device with manual reset mounted integrally. Current transformers are enclosed in a protective case and integrally mounted to save panel space. Standard ratio is 300:5.

Overload Protection Size 6 Starters

Overload protection assembly consists of three current transformers, Type B three-pole block overload relay and an optional interposing relay. These parts are mounted on a panel which connects directly to the load terminal of the contactor. Current transformers are 600:5 ratio as standard.

If automatic reset is required, the Type A, three-pole block, ambient compensated relay is available upon request.

Overload Relay Kits

Each kit includes three current transformers (standard ratio) and one Type B, three-pole block overload relay, ambient compensated with manual reset.

Table 33-227. Overload Relay Kits

Kit Size	Kit Part Number	Price U.S. \$
5	2057A34G01	500.
6	6379D80G10	675.

Table 33-228. Replacement Terminal Lugs^②

Contactor Size	Cable Size	Kit Style Number	Price U.S. \$	Terminals	
				Qty. in Kit	Qty. Req'd. per Pole
5	1-500 MCM	2119A76G01	73.	6	2
6	2-500 MCM	7858A96G01	172.	6	2
7	4-500 MCM	7858A96G02	343.	12	4
8	4-500 MCM	7858A96G03	343.	12	4

^② All mounting hardware is included in kit.

Discount Symbol **1CD1C**

Contents

<i>Description</i>	<i>Page</i>
Thermal and Fast Trip Overload Relays	
Product Description	33-141
Design Features	33-141
Instruction Leaflets	33-141
Thermal Type B, Class 20, Manual Reset	33-142
Thermal Type A, Class 20, Auto/Manual Reset	33-144
Type FT Fast Trip, Class 10	33-146
Heater Selection	33-148



*Type A Overload Relay
3-Pole Panel Mount*

Product Description

Type B and Type A, Class 20 Thermal Overload Relays will protect the motor against abnormal overload conditions. Bimetallic actuated, they are available as either ambient compensated or non-compensated in either single-pole or block type three-pole design. The Type B use one pole of the three-pole block for single-phase.

Single-pole relays are also available as Fast Trip Class 10 ambient compensated type, which provides approximately 125% motor protection with a tripping time of less than 10 seconds, at 600% of heater current rating.

Fast trip relays can be identified by the green reset rods. They are available for panel or starter mounting. The three-pole fast trip design is composed of three single-pole relays on a common baseplate, with a common reset bar.

The bimetal element is actuated by precisely calibrated heater elements which are connected directly in the circuit to be protected. Thermal actuation of this device opens the contacts in the coil circuit of a contactor or relay which results in the disconnection of power to the overloaded circuit.

Interchangeable thermal heater elements for single-pole standard trip and block type overload relays are available to cover motor full load currents from .29 to 133A in approximately 10% steps (see Heater Application Table). Fast trip overload relays do not have interchangeable heater elements but are available in a series of ratings to cover motor full load currents from 1.6 to 150A in approximately 50% steps.

Design Features

Manual or Automatic Reset

The Type B is furnished with a manual reset. The Type A is normally furnished set for manual reset operation and may be quickly adjusted for automatic reset when required. Automatic reset should not be used with 2-wire control or where automatic restarting would endanger either personnel or equipment.

Trip Indication

An immediate visible indication of trip is provided on the overload relay. When an overload occurs, which causes the relay to operate, a trip indicator projects out and thus shows positive visual indication of trip. The Type B has a mechanical trip bar to manually check the NC contact operation on the overload relay.

Adjustable Trip

On the Type A, the trip rating of a specific heater element can be adjusted over a range of approximately 85% to 115% of its respective rating to permit the desired close protection.

This is accomplished by turning the adjusting knob on the relay to the respective stop position.

Positive Contact Break

A follow-through contact, provided on the stationary terminal of the snap action control switch, provides reliable electrical continuity during toggling, thus eliminating false trip sometimes prevalent with thermally operated switches. This contact also allows contact wipe for further reliability.

Ambient Compensation

Motor overload protection can be provided with the same trip characteristics in ambient temperature from -40° to 77°C (-40° to 167°F). A compensating bimetal maintains a constant "travel to trip" distance independent of ambient conditions. The compensating feature is fully automatic and no adjustments are required over wide fluctuations in ambient temperatures. Compensated relays are identified by black reset rods on the Type A and light gray reset rods on the Type B, while non-compensated relays use red reset rods. AA three-pole units have gray reset rods. AA one-pole units have black reset rods.

Control Contact

Single-pole and block type relays are supplied as standard with a SPST NC control contact. A SPDT NO-NC with common is available as a factory modification on the Type A. An isolated NO contact can be supplied on the Type B as either a factory modification or as a field kit.

Instruction Leaflets

- 14885B Fast Trip A Sizes 0 – 4, 3-Pole OL Relay
- 14567E Type A Sizes 1 – 2, 1-Pole OL Relay Mod A
- 14568 Type A Sizes 1 – 2, 3-Pole OL Relay Mod J
- 14570D Type A Sizes 3 – 4, 3-Pole OL Relay Mod J
- 14569C Type A Sizes 3 – 4, 1-Pole OL Relay Mod A
- 17093A Type B OLR for Sizes 7, 8 and 9 Contactors
- 16955A Type B Sizes 1 – 2, 1-Pole OL Relay
- 16954A Type B Sizes 1 – 2, 3-Pole OL Relay
- 15392B Type B Sizes 3 – 4, 3-Pole OL Relay
- 13676F Fast Trip Sizes 0 – 4, 1-Pole OL Relay

Thermal Type B, Class 20, Manual Reset



Type B Overload Relay Panel Mounting

Application Description

The Type B overload relay is designed to protect industrial motors against overload conditions. Using modern block type, bimetallic design, this relay will provide Class 20 operation in either single-phase or 3-phase applications.

Features

- Ambient compensation standard
- Alarm contact field mountable
- Class 20 — 600V design
- Inverse time delay trip
- Test trip device for weld check
- Hi-visibility up-front trip indication
- Trip-free reset mechanism

Operation

The Type B overload relay is a bimetallic actuated device. The bimetal elements are operated by precisely calibrated heaters. The heater elements are connected either directly in the circuit to be measured, or through current transformers on applications NEMA Size 5 and larger.

As the bimetals are heated by motor current flow, a deflection force is produced. Upon a sustained level of abnormal current flow, the deflection becomes great enough to open the snap-action output contact.

Ambient Compensation

The Type B ambient compensated design is supplied as standard on all A200 starters. This design uses a second compensating bimetal responsive to ambient air temperature in the surrounding enclosure. This feature reduces nuisance tripping in applications using compact control panels and motor control centers where internal temperature rise is significant compared to motor ambient temperature. The compensating characteristic is maintained in ambient temperatures from 40° to 77°C.

Standards and Certifications

- UL508
- CSA
- ANSI/NEMA ICS 2-222

Technical Data

Table 33-243. Control Contact Ratings — NEMA B600 NO and NC Control Contact Rating

AC Volts	Make	Break
24 – 120	30A	3A
120 – 600	3600 VA	360 VA

Accessories

Table 33-244. Alarm Contact Kit Selection ①

Type B Overload Relay Size	Catalog Number	Price U.S. \$
1, 2	B3NO-2	21.40
3, 4	B3NO-4	21.40

① Alarm contact available as factory modification of field mountable. For factory modification, add suffix B.

Product Selection

Heaters

Enter heaters as separate item by listing Catalog Number from tables, **Pages 33-148 – 33-149**, as required per starter.

Relays

Table 33-245. Product Selection — Thermal Type B Overload Relay Selection

Motor Full Load Amps	Panel Mounted		Starter Mounted Catalog Numbers				Price U.S. \$
	Catalog Numbers		Replacement for Type B Overload Relays		Replacement for Type A Overload Relays in Manual Reset Mode (3-Pole Only) ②		
	Ambient Comp.	Non comp.	Ambient Comp.	Non-comp.	Ambient Comp.	Non-comp.	

Single-Pole (One NC Contact)

.25 – 26.2	BA11JP	BN11JP	BA11A	BN11A	—	—	32.25
26.3 – 45	BA21JP	BN21JP	BA21A	BN21A	—	—	46.25

19 – 90
19 – 135
Use 3-Pole Design, Wire 3 Poles in Series

Three-Pole (One NC Contact)

.25 – 26.2	BA13JP	BN13JP	BA13A ③	BN13A ③	BA13J	BN13J	64.50
26.3 – 45	BA23JP	BN23JP	BA23A	BN23A	BA23J	BN23J	92.50
19 – 90	BA33P	BN33P	BA33A	BN33A	BA33A	BN33A	123.00
19 – 135	BA43P	BN43P	BA43A	BN43A	BA43A	BN43A	193.00

② Includes contactor mounting bracket, overload relay and connection straps to contactor.

③ For replacement on B200 size 00, 0, 1 use BA23A instead of BA13A and use BN23A instead of BN13A.

Discount Symbol **1CD1C**