Instructions for A210, A250 Size 00, 0, or 1 Reversing Motor Controller

I.L. 16963
Model J

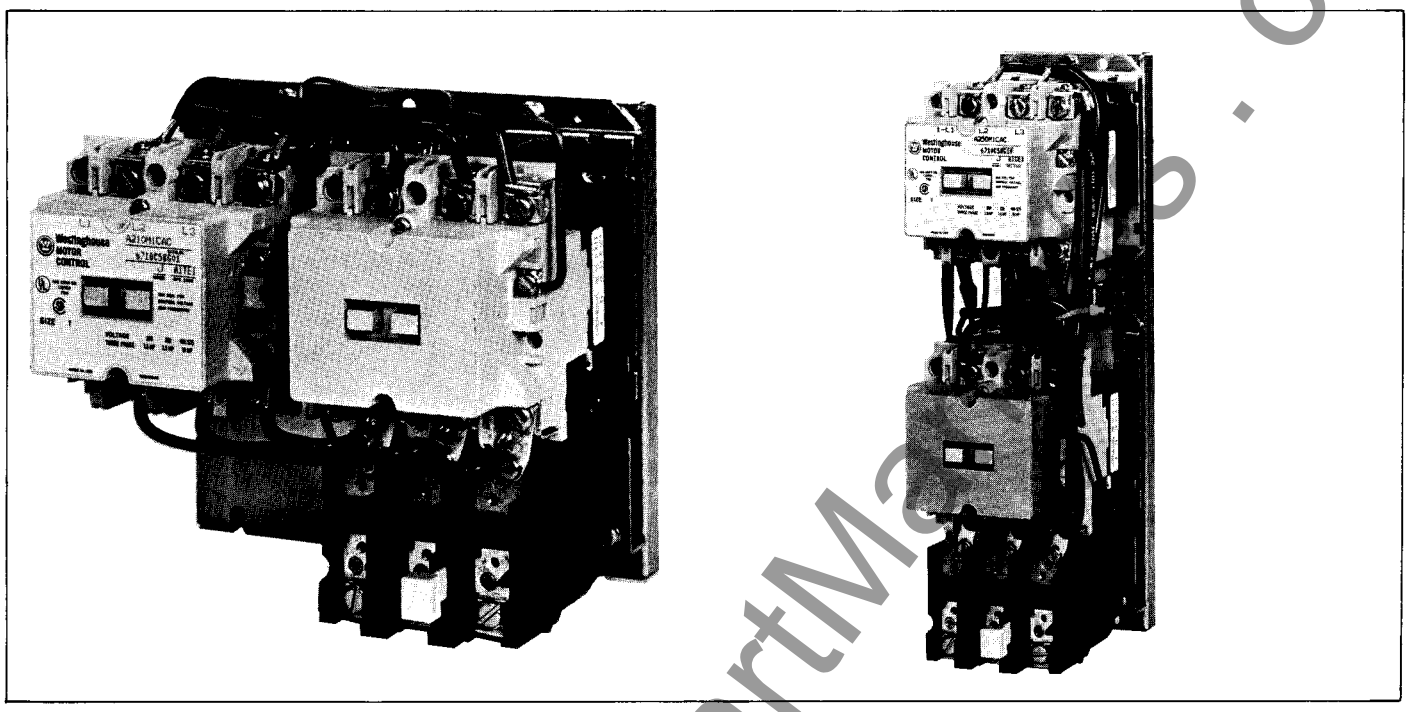

Fig. 1 Size 1 A210 and A250 Motor Controllers

THE CONTROLLER

An A210 or A250 motor controller, when wired as shown in the appropriate connection diagram will operate as a full voltage starter and will give protection against overload, but not against short circuit currents, when wired and provided with overload relay (OLR) heaters as listed in heater selection tables or when used with any means of inherent protection activated by motor temperature.

The controller should be protected against short circuits by providing branch circuit protection not to exceed the maximum protective device ratings listed in Table II.

CONTROLLER RATINGS

NEMA SIZE	3 PHASE HORSEPOWER AT 60 HERTZ 200 V	60 HERTZ 230 V	50 HERTZ 380 V	60 HERTZ 460/575 V
00	1½	1½	1½	2
0	3	3	5	5
1	7½	7½	10	10

This industrial type control is designed to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check out, safe operation, or maintenance. Care must be exercised to comply with local, state, and national regulations, as well as safety practices, for this class of equipment.

POWER CIRCUIT TERMINALS

NEMA Size	Wire Size
00-0-1	#14 - 6 AWG

Wire with copper conductors only.

AUXILIARY CONTACTS — L56 (RATED B600)

Two L56's, each with one normally open pole and one normally closed pole, are supplied as the holding circuit auxiliary and electrical interlock between the two coil circuits. A maximum of three L56 auxiliary units can be installed in the recesses of each contactor. These may be mounted with the terminals in line with the power poles or may be mounted with the terminals in a right angle relationship to the power poles. They mount by means of a spring clip which snaps into locations provided in the motor controller unit. To remove the L56 disengage the top spring clip, by pressing on the extended tab, and withdraw the unit.

L56 AUXILIARY CONTACTS

Contact Type	Catalog No.
1 Normally Closed	L56E
1 Normally Open	L56D
2 Normally Closed	L56C
2 Normally Open	L56B
1 Normally Open and 1 Normally Closed	L56

L56 CONTACT RATINGS (B600)

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

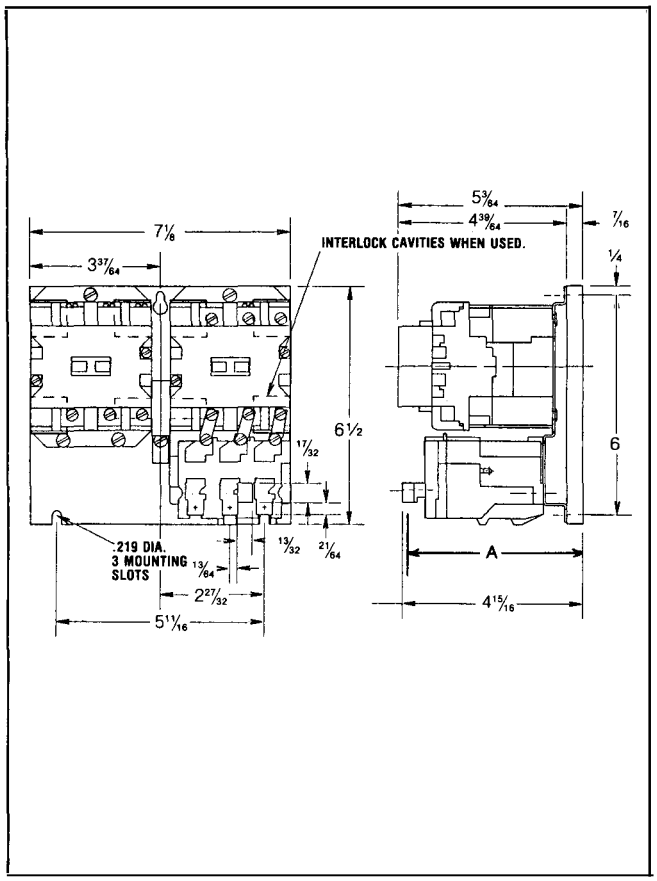

Fig. 2 A210 Dimension Drawing (Dim. in inches)

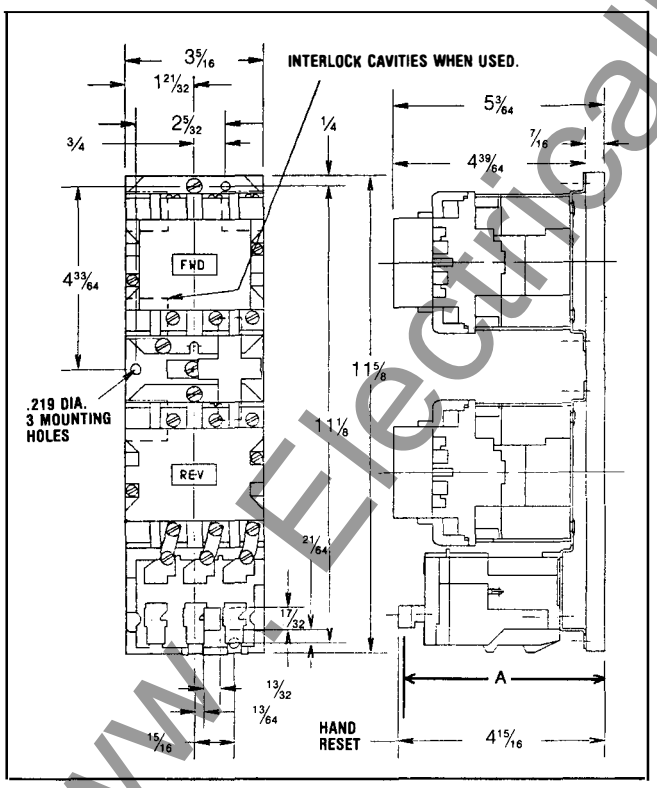

Fig. 3 A250 Dimension Drawing (Dim. in inches)

TYPE B RELAY MAX. DIM. TO RESET	A = 4⁵¹⁄₆₄
TYPE A RELAY MAX. DIM. TO RESET	A = 4 ¹⁄₃₂
TYPE A RELAY AUTO. RESET	A = 4⅝

TYPE B OVERLOAD RELAY (See Figure 4)

This A210 or A250 motor controller is usually equipped with a Type B block type ambient compensated overload relay (with gray reset rod). The controller can also be supplied with a non-ambient compensated overload relay (with red reset rod). The relay is of the bimetal actuated type equipped with a normally closed control contact. An optional isolated normally open control circuit contact is available for field mounting. When the overload relay trips, a yellow dot will appear flush with the molded surface below the reset rod. Resetting the relay returns this indicator to its normal concealed position.

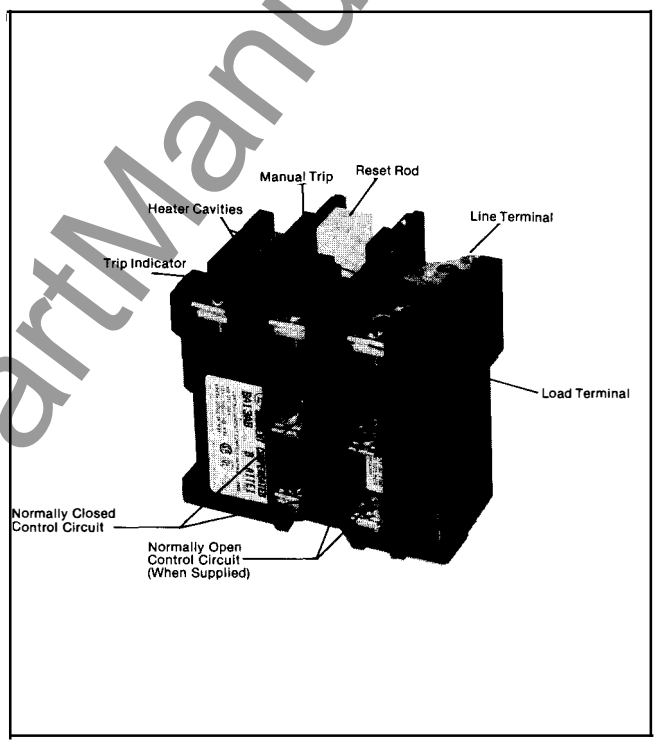

Fig. 4 Type B Overload Relay (OLR)

TYPE A OVERLOAD RELAY (See Figure 5)

The A210 or A250 motor controller can be equipped with a Type A block type non-ambient compensated overload relay (unmarked and with red reset rod) or with a block type temperature compensated overload relay (marked "ambient compensated" and with gray reset rod). The relay is of the bimetal actuated type equipped with trip indicator, trip adjustment covering ±15% of rating and a normally closed control contact. It may be operated with either hand or automatic reset.

Reset operation is determined by the position of the plate on the load side of the overload base. Position the reset plate away from the panel to set the "hand" position. Loosen the locking screw, move the reset plate toward the panel, and retighten the screw to set the "auto" position.

Automatic reset should not be used with 2-wire control circuits where automatic starting of the motor may be hazardous.

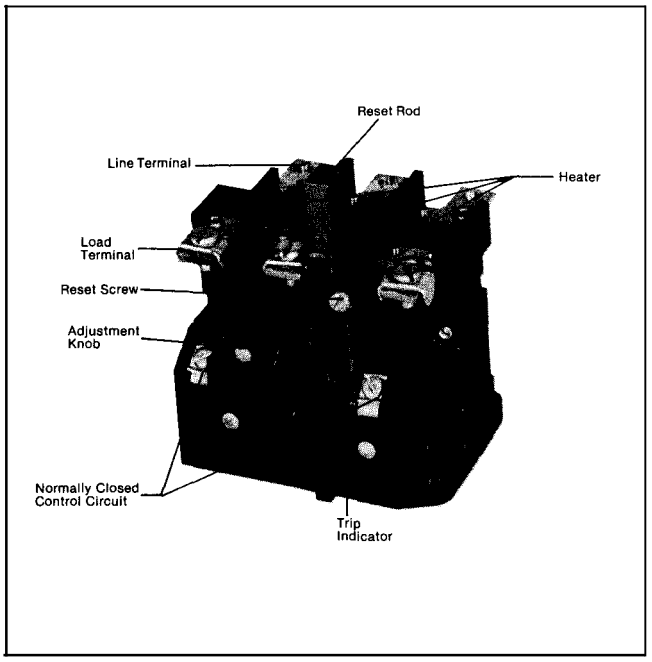

Fig. 5 Type A Block Overload Relay (OLR)

COIL

The A210 or A250 motor controller is available with single or dual voltage coils. When equipped with a single voltage coil, each contactor is wired as shown in Figure 7, 8, 9 or 10. A connection diagram for a dual voltage coil is shown in Figure 6. When supplied with dual voltage coils, the motor controller is normally wired for the high voltage connection. The wiring may be changed to the low voltage connection by removing and reconnecting the jumpers as illustrated below.

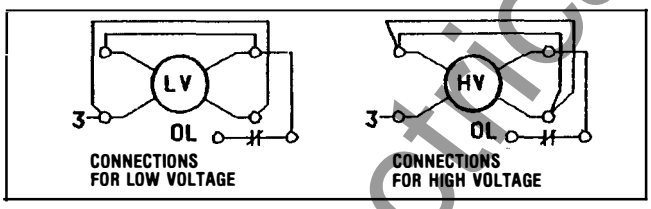

Fig. 6 Dual Voltage Coil Connections

REPLACEMENT COIL: ORDER BY PART NUMBER, VOLTAGE, AND FREQUENCY

SIZE 00, 0, 1 AC OPERATING COILS

Voltage	Freq.	Part Number
24	60	505C806G16
120/110	60/50	505C806G01
208	60	505C806G02
240	60	505C806G12
277	60	505C806G18
380	50	505C806G07
480/440	60/50	505C806G13
600	60	505C806G05
120/240*	60/60	505C806G10
240/480*	60/60	505C806G03

* Dual Voltage Coils. Use only on starters originally supplied with a dual voltage coil

AC COIL DATA, (TYPICAL VALUES) SIZE 00, 0 AND 1

Inrush VA	Sealed VA	Sealed Watts	Pickup (Time In Milliseconds)	Dropout (Time In Milliseconds)
160	25	7.8	16—24	12—16

OVERLOAD RELAY CONTROL CONTACT RATINGS

	Normally Closed		Normally Open	
AC Volts	Make	Break	Make	Break
Type A				
24-120	20A	2A	5A	•5A
120-600	2400VA	240VA	600VA	60VA
Type B				
24-120	30A	3A	30A	3A
120-600	3600VA	360VA	3600VA	360VA

TABLE I — REPLACEMENT OVERLOAD RELAY

OVERLOAD RELAY	CATALOG NUMBER SIZE 00-0-1
Type B Non-ambient compensated	BN13A
Type B Ambient Compensated	BA13A
Type A Non-ambient compensated	AN13A
Type A Ambient Compensated	AA13A

HEATERS

Heaters are not included with the motor controller and must be ordered separately per the heater selection table and the information listed below. When installing heaters be sure that connecting surfaces are clean and heaters are attached securely to the relay in the proper location with the screw provided. The trip rating of a heater in a 40°C Ambient is 125% of the minimum full load current shown in Table I. When tested at 600 percent of its trip rating, the relay will trip in 20 seconds or less.

Heaters should be selected on the basis of the actual full load current and service factor as shown on the motor nameplate or in the manufacturer's published literature. When the service factor of the motor is 1.15 to 1.25, select heaters from the heater application table. If the service factor of the motor is 1.0, or there is no service factor shown, or a maximum of 115% protection is desired, select one size smaller heater than indicated. When motor and overload relay are in different ambients and when using non-compensated overload relays, select heaters from the table using adjusted motor currents as follows: decrease rated motor current 1% for each °C motor ambient exceeds controller ambient. Increase rated motor current 1% for each °C controller ambient exceeds motor ambient.

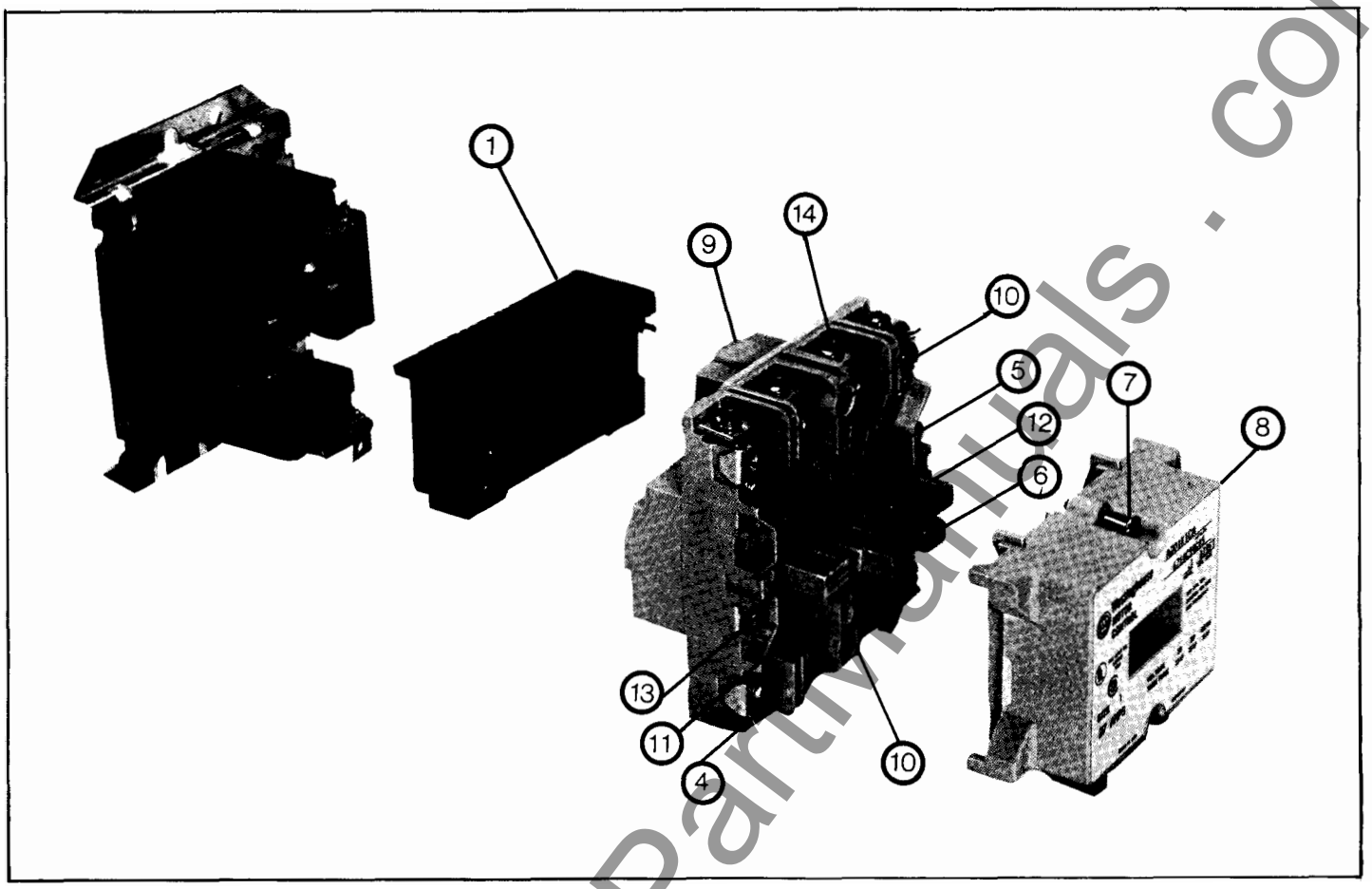

Fig. 11 Size 1 A210 or A250 Contactor (Exploded View)

MAINTENANCE — First Turn Off Power

To Inspect Contacts

Refer to Figure 11. Loosen the two arc box assembly screws (7) located immediately above and below the nameplate and remove the arc box (8). Contacts (5) are visible. Retighten the screws per Table V.

To Replace Contacts

After removing the arc box and with replacement contacts at hand, compress the overtravel spring (12) and remove the moving contact (5) from the crossbar (6). Disconnect any power cables. Remove the retaining screws (11) and lift out the stationary contact assembly (14).

To replace contacts, reverse the above procedure, making sure that stationary contacts are secure, (see Table V) moving contacts are free to move, overtravel springs are seated and the crossbar moves freely when the arc box is in position.

The silver cadmium oxide contact buttons need **NO** dressing or lubricant throughout their life.

Important — Replace all contacts and springs as a group to avoid misalignment.

To Replace The Coil

Refer to Figure 11. Loosen the assembly screws (10) located to the immediate top and bottom of the arc box. Remove connector straps to the overload relay. Pull the loosened upper base structure (9) forward. Pull the coil (1) from the upper base, plug in a new coil, replace the upper base structure and check the auxiliary contacts for secureness when repositioning the upper base. Tighten the assembly screws and the connector straps screws referring to Table V.

Magnet — Armature Assembly

Self alignment and permanent air gap features of the magnet armature make replacement unnecessary. Mating pole face surfaces should be kept clean.

Arc box must be in place when the contactor interrupts a circuit.

TABLE V RECOMMENDED DRIVING TORQUE

Location (Qty.)	Driving Torque (lb.-in.)	Fig. 11 Item
Cover Screw (2)	7- 9	7
Coil Wire Connector (2)	7- 9	13
Stationary Contact Screw (6)	7- 9	11
Main Power Connector (6)	18-21	4
Overload Relay Connecting Screws (3)	16-18	—
Overload Heater Fastening Screws (6)	16-18	—

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Westinghouse Electric Corporation
Control Division
Asheville, N.C., U.S.A. 28813

Printed in USA

TABLE II — F SERIES HEATER SELECTION

For compensated OLR's in any size enclosure, and non-compensated OLR's in enclosures with volume not less than 5500 cu. in. Wire with 75°C wire.

Code Marking	Full Load Current of Motor (Amperes) (40°C Ambient)	Max. Protect. Device (Amp)	Load Wire Size
FH03	.25 — .27	1*	#14
FH04	.28 — .31	1*	#14
FH05	.32 — .34	1*	#14
FH06	.35 — .38	1*	#14 •
FH07	.39 — .42	1*	#14
FH08	.43 — .46	2*	#14
FH09	.47 — .50	2*	#14
FH10	.51 — .55	2*	#14
FH11	.56 — .62	3*	#14
FH12	.63 — .68	3*	#14
FH13	.69 — .75	3*	#14
FH14	.76 — .83	3*	#14
FH15	.84 — .91	3*	#14
FH16	.92 — 1.00	3*	#14
FH17	1.01 — 1.11	3*	#14
FH18	1.12 — 1.22	3*	#14
FH19	1.23 — 1.34	5*	#14
FH20	1.35 — 1.47	6*	#14
FH21	1.48 — 1.62	6*	#14
FH22	1.63 — 1.78	6*	#14
FH23	1.79 — 1.95	6*	#14
FH24	1.96 — 2.15	6*	#14
FH25	2.16 — 2.35	10*	#14
FH26	2.36 — 2.58	10*	#14
FH27	2.59 — 2.83	10*	#14
FH28	2.84 — 3.11	15	#14
FH29	3.12 — 3.42	15	#14
FH30	3.43 — 3.73	15	#14
FH31	3.74 — 4.07	15	#14
FH32	4.08 — 4.39	15	#14
FH33	4.40 — 4.87	15	#14
FH34	4.88 — 5.3	20	#14
FH35	5.4 — 5.9	20	#14
FH36	6.0 — 6.4	20	#14
FH37	6.5 — 7.1	25	#14
FH38	7.2 — 7.8	25	#14
FH39	7.9 — 8.5	30	#14
Above Heaters for use on Size 00			
FH40	8.6 — 9.4	30	#14
FH41	9.5 — 10.3	35	#14
FH42	10.4 — 11.3	35	#14
FH43	11.4 — 12.4	40	#14
FH44	12.5 — 13.5	45	#14
FH45	13.6 — 14.9	45	#14
FH46	15.0 — 16.3	50	#12
FH47	16.4 — 18.0	60	#12
Above Heaters for use on Size 0			
FH48	18.1 — 19.8	60	#12
FH49	19.9 — 21.7	70	#10
FH50	21.8 — 23.9	80	#10
FH51	24.0 — 26.2	80	#10
Above Heaters for use on Size 1			

*15 ampere protective device is permitted by NEC. Fuse size shown in table limits fault current.

WARNING: To provide continued protection against fire and shock hazard, the complete overload relay must be replaced if burnout of a current element occurs. See Table I.

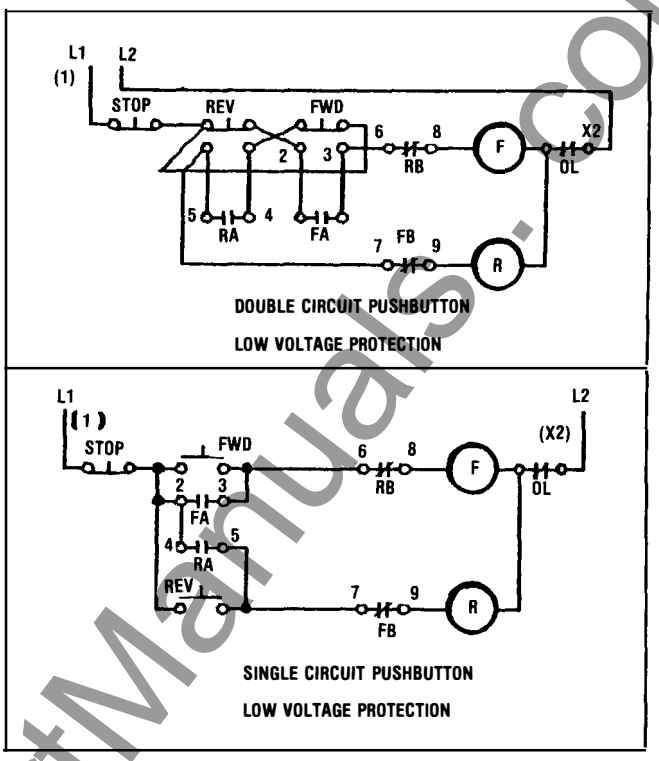


Fig. 6 Control Station Connection Diagrams

TABLE III — ACCESSORIES

	Cat. No.
Alarm Circuit Contact for Type B Overload Relay Rated B600 (1 normally open pole)	B3NO

Fuse Block Kits — Meet requirements of NEC concerning common control fusing.

Cat. No.	Qty.	Description
F56	2	Contactor mounted Fuse Holder for 1 600 volt Bussman KTK Fuse
FKR	1	Panel mounted Fuse Holder for 2 Class CC (Bussman KTKR) Fuses*

*Use when available fault current exceeds 10,000 amperes

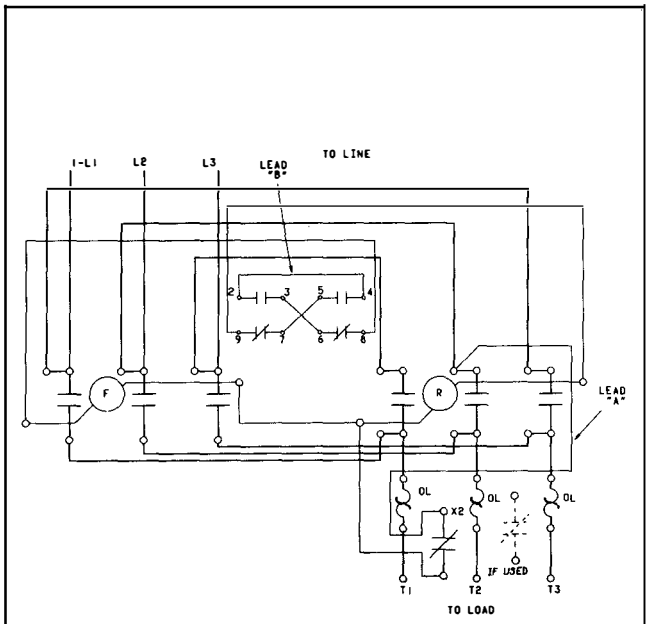
Order Fuses Separately By Ampere Rating.

Controller Size	Minimum Wire Size in Control Circuit	Suggested Fuse Size†
00-0-1	#16 AWG	10 AMP

†When using a control transformer, select fuse size per the National Electrical Code.

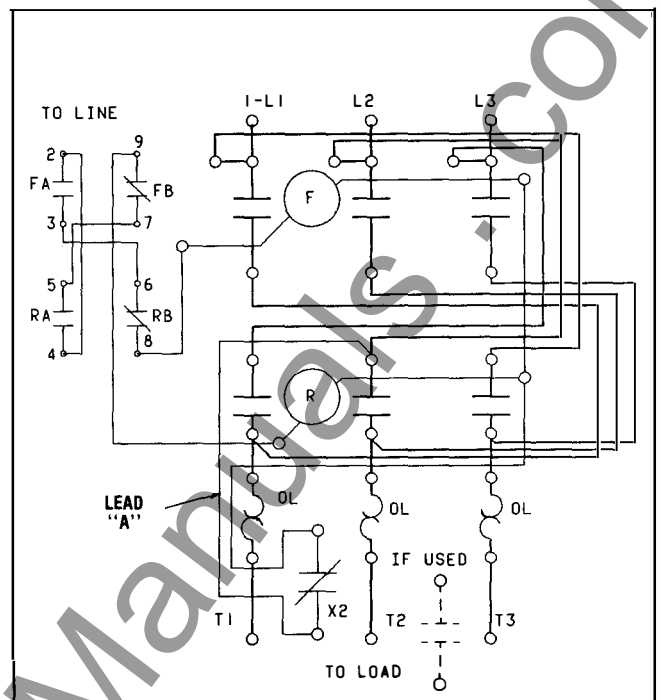
TABLE IV — RENEWAL PARTS

Pole Combination and Size	Contact Kit Part Number
3 Pole Size 00, Single Contactor	373B331G18
3 Pole Size 0 , Single Contactor	373B331G04
3 Pole Size 1 , Single Contactor	373B331G09
3x3 Pole Size 00, Reversing Contactor (Qty. 2)	373B331G18
3x3 Pole Size 0, Reversing Contactor (Qty. 2)	373B331G03
3x3 Pole Size 1, Reversing Contactor (Qty. 2)	373B331G08



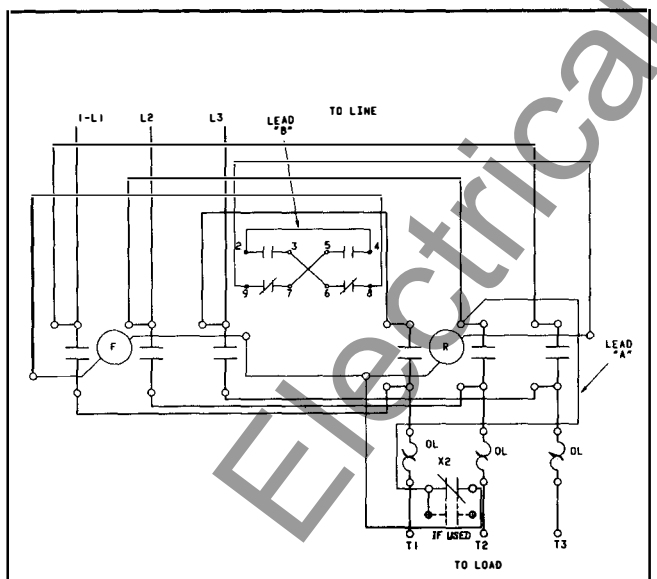
1. FOR SEPARATE CONTROL REMOVE LEAD "A" CONNECT ONE SIDE OF SEPARATE CONTROL CIRCUIT TO OL RELAY TERMINAL WHERE LEAD WAS REMOVED AND OTHER SIDE TO TERMINAL "1" OF PB STATION.

Fig. 7 A210 Connection Diagram (Type B OLR)



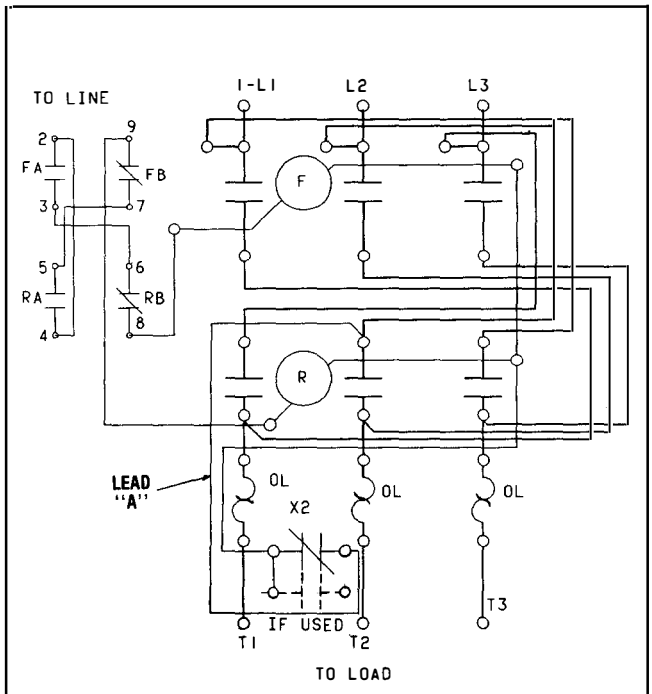
FOR SEPARATE CONTROL REMOVE LEAD "A". CONNECT ONE SIDE OF SEPARATE CONTROL SUPPLY TO OL RELAY TERMINAL WHERE LEAD WAS REMOVED AND OTHER SIDE TO TERMINAL "1" OF THE PB STATION. (IF STARTER IS WIRED FOR SEPARATE CONTROL AT FACTORY, CONNECT CONTROL SUPPLY LEADS TO TERMINAL "X2" AND TERMINAL "I" OF PB STATION.)

Fig. 9 A250 Connection Diagram (Type B OLR)



1. FOR SEPARATE CONTROL REMOVE LEAD "A" CONNECT ONE SIDE OF SEPARATE CONTROL CIRCUIT TO OL RELAY TERMINAL WHERE LEAD WAS REMOVED AND OTHER SIDE TO TERMINAL "1" OF PB STATION.

Fig. 8 A210 Connection Diagram (Type A OLR)



FOR SEPARATE CONTROL REMOVE LEAD "A". CONNECT ONE LEAD OF SEPARATE CONTROL SUPPLY TO OL RELAY TERMINAL "X2" WHERE LEAD "A" WAS REMOVED AND OTHER LEAD TO TERM "I" OF THE PUSH BUTTON STATION. (IF STARTER IS WIRED FOR SEPARATE CONTROL AT FACTORY, CONNECT CONTROL SUPPLY LEADS TO TERMINAL "X2" AND TERMINAL "I" OF THE PB STATION).

Fig. 10 A250 Connection Diagram (Type A OLR)