Instructions for A200, Size 00, 0, or 1 3 Pole Motor Controller

I.L. 16958C
Model J

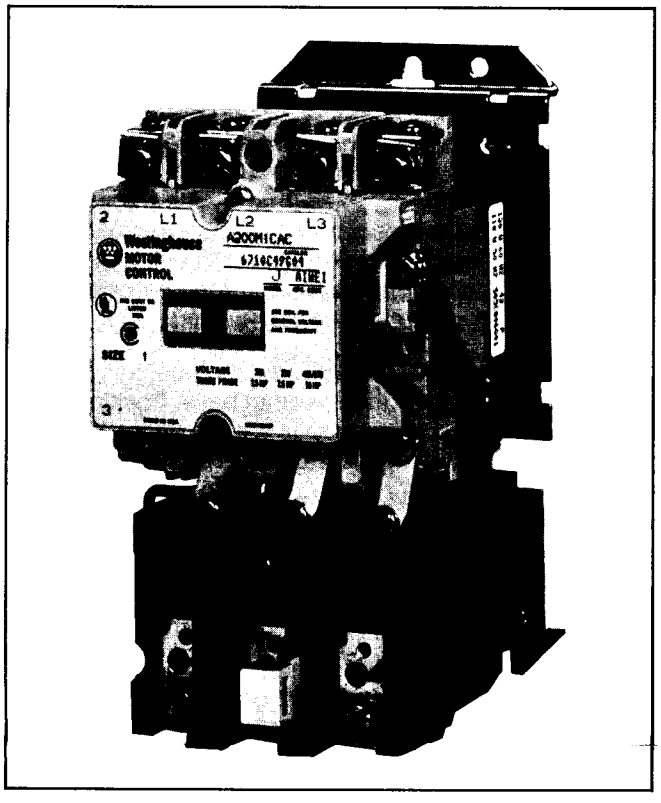

Fig. 1 Size 1 A200 Motor Controller

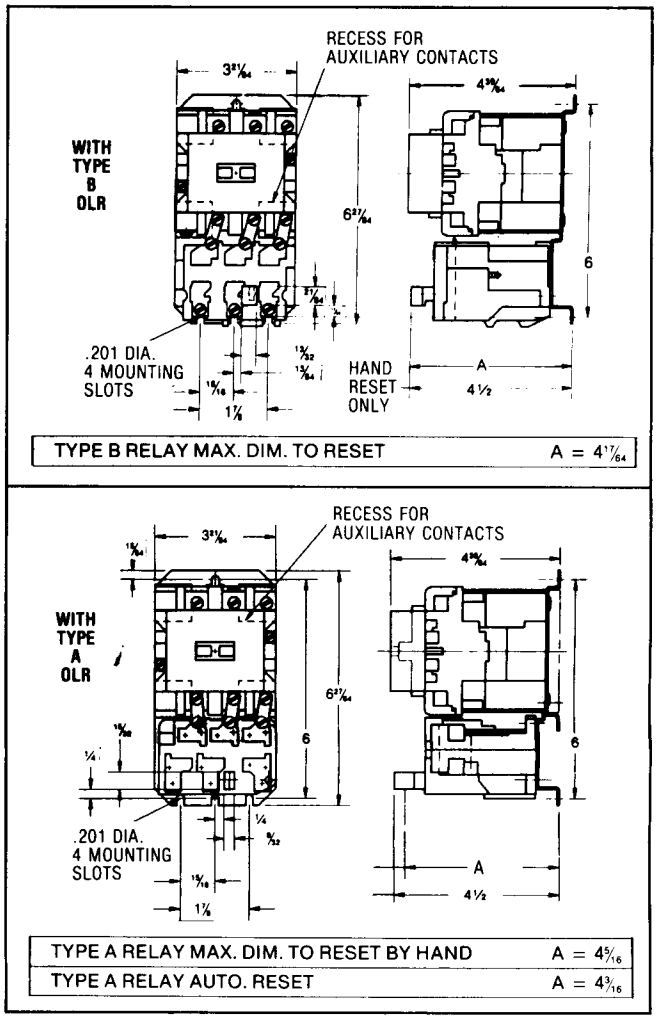

Fig. 2 Dimension Drawings (Dim. in inches)

THE CONTROLLER

The A200 motor controller, when wired as shown in Figure 6 or 7, 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.

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.

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

AUXILIARY CONTACTS — TYPE J

One normally-open pole adjacent to the power poles is supplied as the holding circuit auxiliary. A maximum of four Type J 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. Auxiliary contacts mount by means of a spring clip and retainer screw. To remove

AUXILIARY CONTACTS — TYPE J (cont.)

the unit rotate the retainer screw several times (counterclockwise) and then slide the auxiliary contact unit out of the recess.

TYPE J AUXILIARY CONTACTS	
Contact Type	**Catalog No.**
2 Normally Closed	J02
2 Normally Open	J20
1 Normally Open and 1 Normally Closed	J11
1 Normally Open and 1 Normally Closed, Delayed Break	J1C

TYPE J CONTACT RATINGS (A600, R300)			
Voltage	**Continuous**	**Make**	**Break**
120-600 VAC	10A	7200VA	720VA
72-120 VAC	10A	60A	720VA
28-72 VAC	10A	60A	10A
28-300 VDC	1.0A	28VA	28VA

TYPE B OVERLOAD RELAY (See Figure 3)

This A200 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 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.

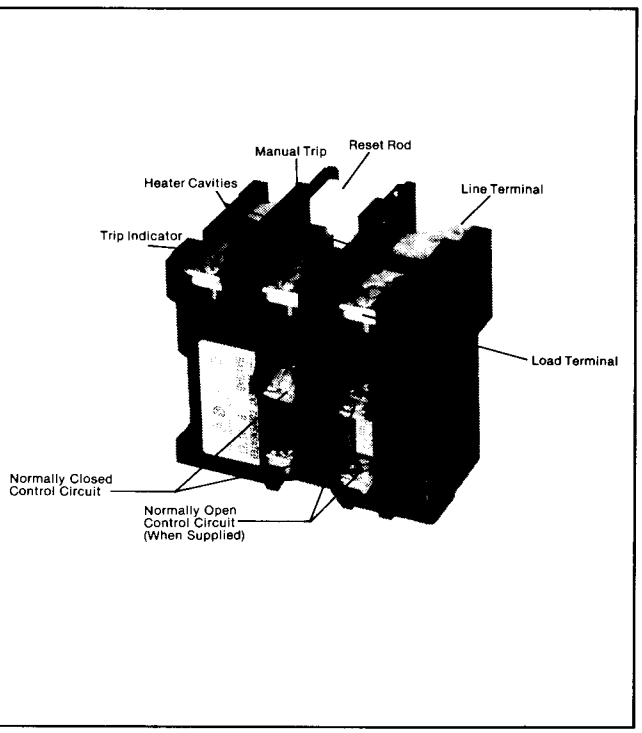

Fig. 3 Type B Overload Relay

TYPE A OVERLOAD RELAY (See Figure 4)

The A200 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.

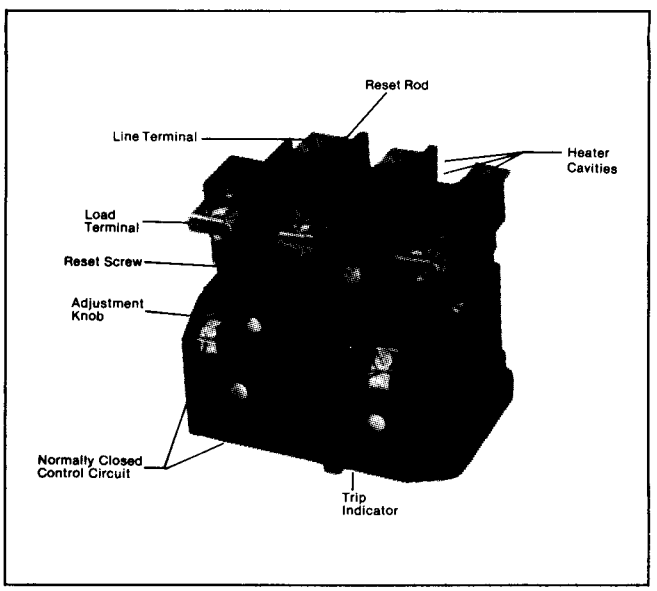

Fig. 4 Type A Block Overload Relay

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 II. 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.

The conductors attached to the terminals of an overload relay act as a heat sink and are a consideration in establishing the current rating of each heater element. To prevent nuisance tripping, which will occur if undersized conductors are used, select the wire size as if the conductors had an insulation temperature rating of 75°C, even if the conductors actually used have a temperature rating higher than 75°C.

Protect the heater and starter against short circuits by providing branch circuit protection in accordance with the National Electrical Code.

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

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

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.

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.

COIL

The A200 motor controller is available with a single or dual voltage coil. When equipped with a single voltage coil, the contactor is wired as shown in Figures 6 and 7. A connection diagram for a dual voltage coil is shown in Figure 5. When supplied with a dual voltage coil, the motor controller is normally wired for the higher voltage connection. The wiring may be changed to the lower voltage connection by removing and reconnecting the jumpers as illustrated below.

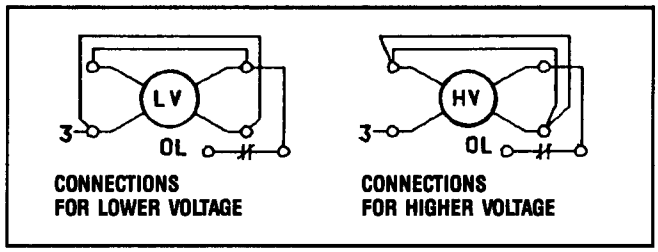

Fig. 5 Dual Voltage Coil Connections

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

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

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.

TABLE III — RENEWAL PARTS

Pole Combination and Size	Contact Kit Part Number
3 Pole Size 00	373B331G18
3 Pole Size 0	373B331G04
3 Pole Size 1	373B331G09

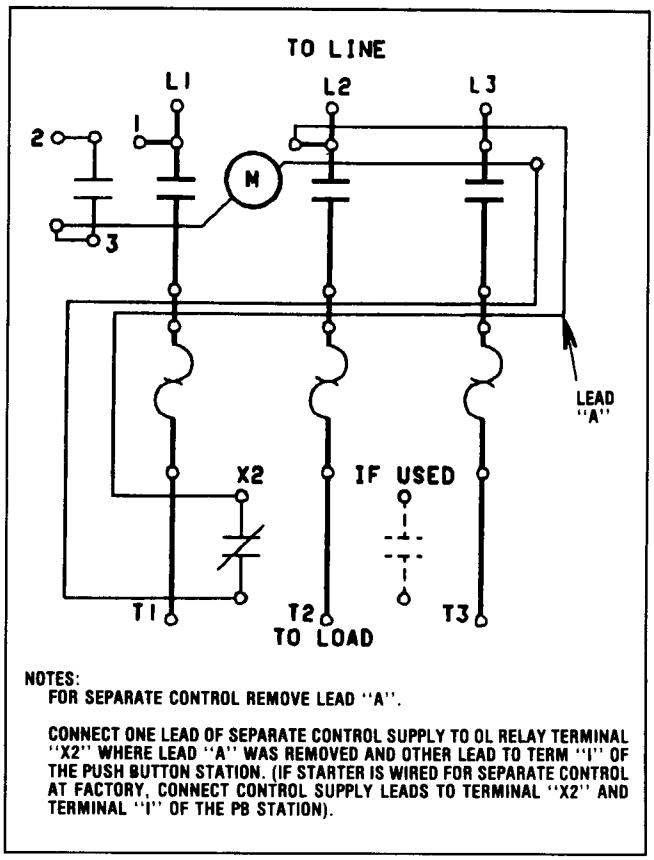

Fig. 6 Connection Diagram (Type B Overload)

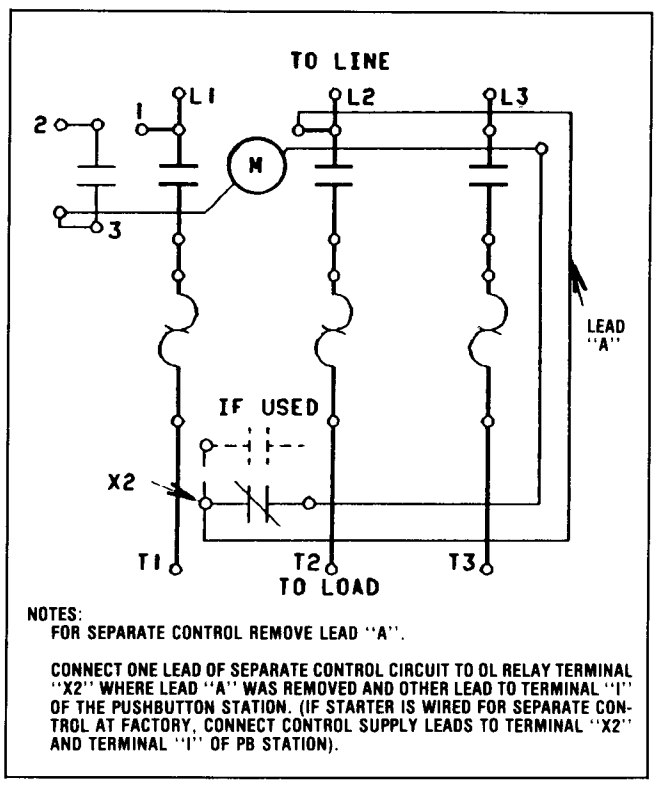

Fig. 7 Connection Diagram (Type A Overload)

TABLE IV — ACCESSORIES

Alarm Circuit Contact for Type B Overload Relay Rated B600 (1 normally-open pole)	Cat. No. B3NO-2

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.

POWER CIRCUIT TERMINALS

NEMA Size	Wire Size
00-0-1	#14 - 8 AWG

Wire with copper conductors only.

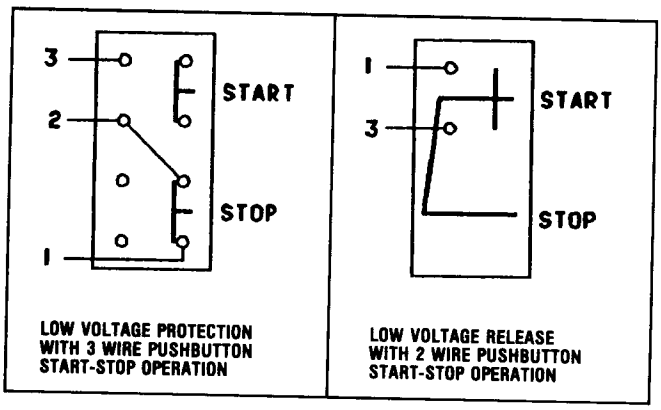

Fig. 8 Control Station Connection Diagram

SHORT-CIRCUIT WITHSTAND

This motor controller is suitable for use on a circuit capable of delivering not more than the current (rms symmetrical amperes) shown below in circuits rated not more than the voltage shown below (Table V).

TABLE V — SHORT-CIRCUIT WITHSTAND RATINGS

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Rating		Typical Disconnect Device Cat. No.
			Current	Voltage	
Class H Fuse	60A	—	5,000A	600V	DS161, DS162
Class J Fuse	60A	—	100,000A	600V	DS161, DS162
Class R Fuse	60A	—	100,000A	600V	DS161, DS162
Class T Fuse	60A	—	100,000A	600V	DS161, DS162
Thermal/Mag. Type CB[3]	50A	14,000A	18,000A	600V	FB
			22,000A	480V	
		25,000A	30,000A	480V	HFB
Magnetic Only[1] Type CB[2]	30A	Marked MCP	5,000A	600V	MCP
			25,000	480V	
Magnetic Only[1] Type CB[2]	30A	Marked HMCP	100,000A	480V	HMCP
			50,000A	600V	
Thermal/Mag. Type CB[3]	50A	25,000A	25,000A	600V	HFD
		65,000A	65,000A	480V	
		100,000A	100,000A	480V	FDC
		65,000A	50,000A	600V	
Mag. Only Type CB + CL[4]	30A	MCP or HMCP plus Current Limiter	100,000A	600V	MCP + EL or HMCP + EL
Thermal/Mag. Type CLB[5]	50A	150,000A	100,000A	480V	FCL

[1] Instantaneous Adjustable Trip
[2] Circuit Breaker
[3] Inverse-Time Circuit Breaker
[4] Instantaneous Adjustable Trip with Current-Limiting Attachment
[5] Inverse-Time Current-Limiting Breaker

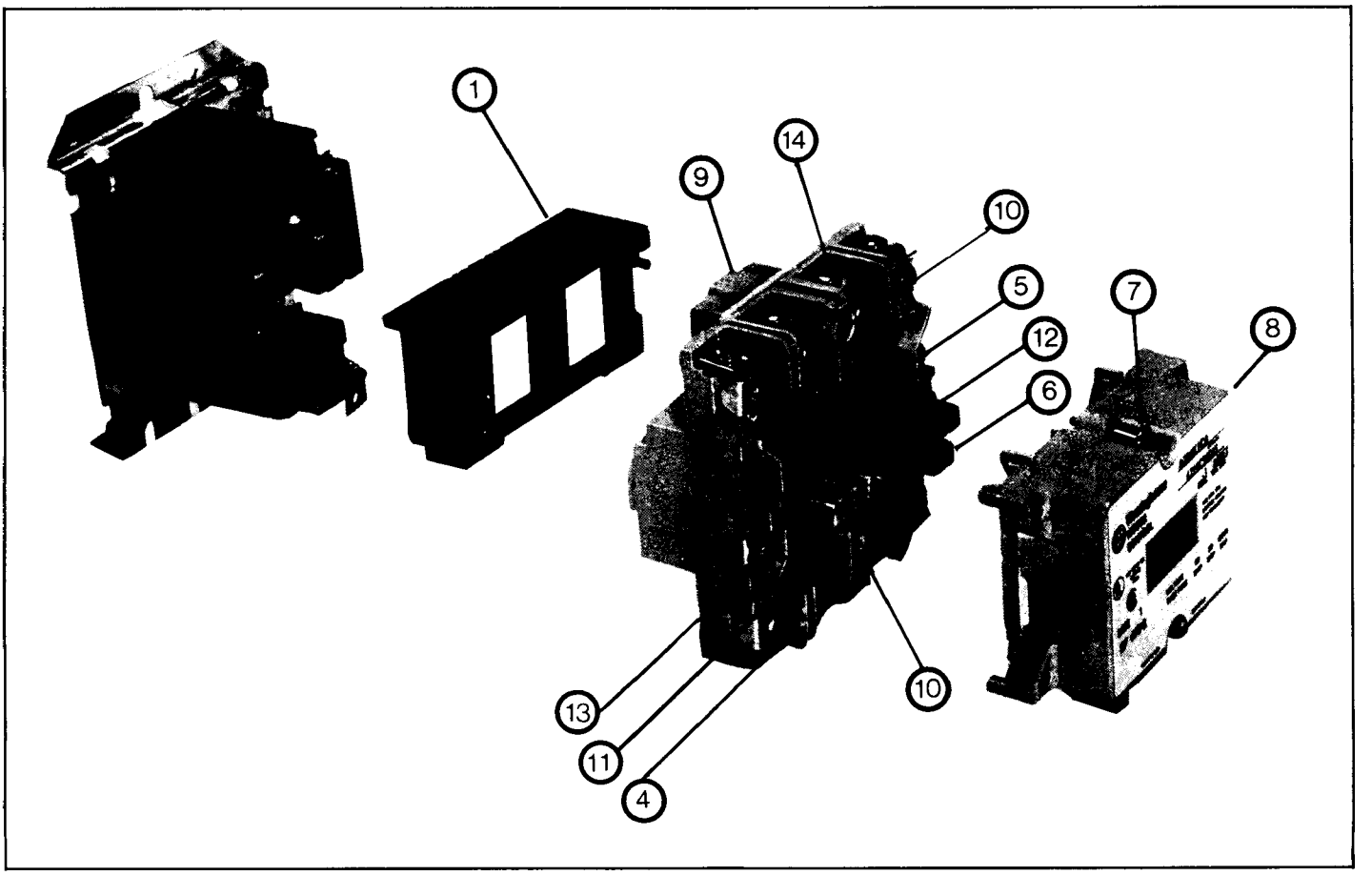

Fig. 9 Size 1 Contactor (Exploded View)

MAINTENANCE — First Turn Off Power

To Inspect Contacts

Refer to Figure 9. 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 VI.

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 VI), 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 9. 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. Refer to Table VI.

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 VI — RECOMMENDED DRIVING TORQUE

Location (Qty.)	Torque (lb.-in.)	Fig. 9 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 — 20	4
Overload Relay Connecting Screws (3)	16 — 18	—
Overload Heater Fastening Screws (6)	16 — 18	—

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