

Instructions for A201, A202, A211, A251 Size 5, 2 and 3 Pole Contactors Nonreversing, Reversing and Lighting

I.L. 17049D

Model J
formerly GCA5

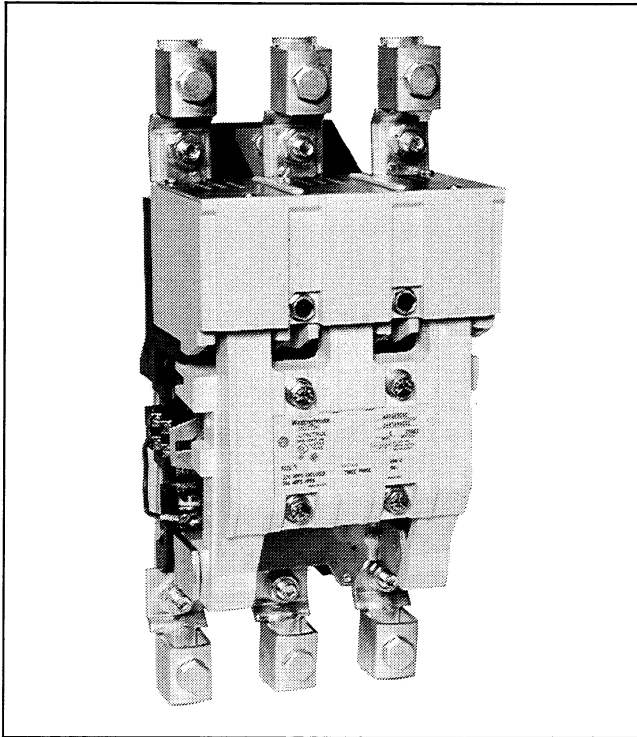


Fig. 1 Size 5 A201 Nonreversing Contactor

THE CONTACTOR

A201 contactors are designed for the control of inductive or non-inductive loads at voltages between 120 and 600, AC. The units are suitable for mounting on either steel or insulated panels. All parts are front removable. Contactors should be protected against short circuits by branch circuit protective devices selected in accordance with the National Electrical Code (NEC).

INSTALLATION

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.

Mount the contactor on a vertical surface with the line terminals above the load terminals. Once installed, the assembly should be checked to ensure proper operation of the basic contactor mechanism and accessory devices **before power is applied**.

The following list and the maintenance instructions should be used as a guide:

- The cross bar and springs must operate freely.
- Auxiliary contacts and mechanical interlocks must be properly installed and adjusted.

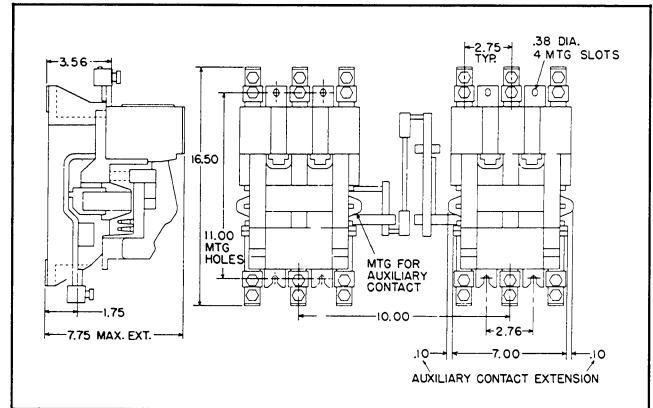


Fig. 2 A211 Dimension Drawing (Dim. in inches)

- The proper operating coil must be installed and properly connected.
- The arc box must be in place. The contactor must **never be operated** in a power circuit unless the arc box is securely bolted in place.
- The main contacts must have overtravel and spring force.

NON-LIGHTING CONTACTOR RATINGS - 3 POLE

| Continuous Current | | Three Phase Horsepower at: | | |
|--------------------------------------|----------|----------------------------|------|------------|
| Open | Enclosed | 200V | 230V | 460/575V |
| 300A | 270A | 75 | 100 | 200 |
| Three Phase Switching at Voltage of: | | Transformers | | Capacitors |
| | | KVA | | KVAR |
| 200-208 | | 41 | | — |
| 230-240 | | 47 | | 80 |
| 460-480 | | 94 | | 160 |
| 575-600 | | 117 | | 200 |

Two-pole contactors have the same current ratings as three-pole devices but are not suitable controlling three-phase motors.

NON-LIGHTING CONTACTOR RATINGS - 2 POLE

| Single Phase Switching at: | Transformers |
|----------------------------|--------------|
| 115-120 Volts | 14 KVA |
| 230-240 Volts | 27 KVA |
| 460-480 Volts | 54 KVA |
| 575-600 Volts | 68 KVA |

LIGHTING CONTACTOR RATINGS

| Contactor Size | Continuous Current Per Pole, Enclosed |
|----------------|---------------------------------------|
| Size 5 | 270A |

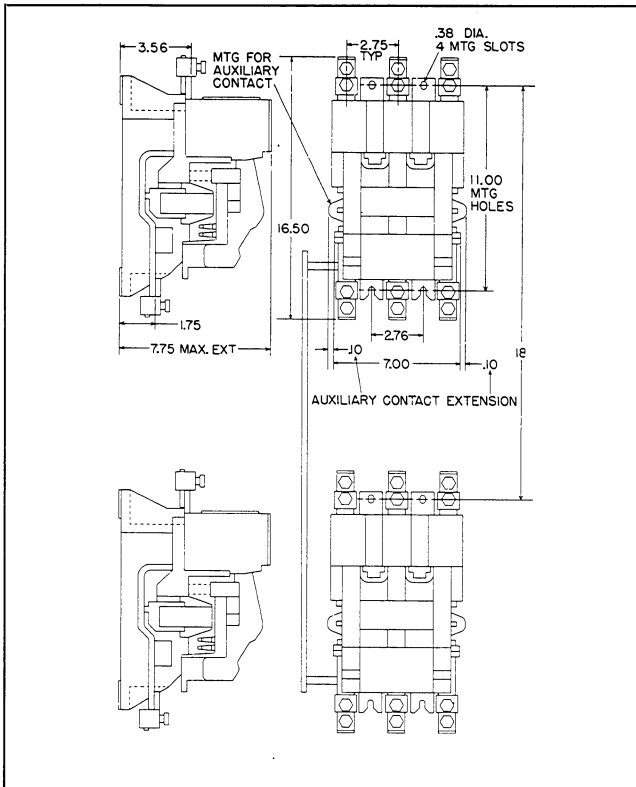


Fig. 3 A251 Dimension Drawing (Dim. in inches)

LINE AND LOAD TERMINALS

Both line and load terminals have 17/32" diameter holes for 1/2" diameter hardware. Pressure type terminals, when used, should be assembled on the rear of the copper line terminals straps, as shown in Figure 4 to provide access to the control connection screws. Pressure type terminals should be assembled on the front of the load terminals. Pressure type terminals are available as separate piece parts. Order part number 2119A76H01.

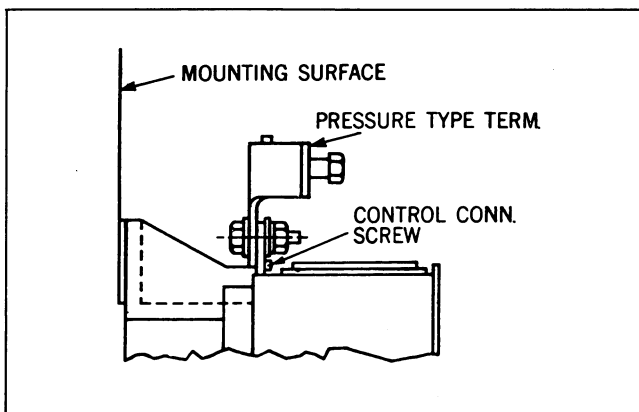


Fig. 4 Proper Assembly of Pressure Type Line Terminal

SHORT-CIRCUIT RATINGS

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

| POWER CIRCUIT TERMINALS | |
|---|---|
| NEMA Size 5 | Wire Size (1) 2/0 AWG - (1) 500 MCM |
| Wire with copper conductors only. Use 75°C Wire. | |

| TABLE I — SHORT-CIRCUIT RATINGS | | | | | | |
|---|----------------|-------------------------------------|--------------------------------|----------|------------------------------|-----|
| Short-Circuit Protective Device (SCPD) | Max. Size SCPD | Circuit Breaker Interrupting Rating | Short-Circuit Withstand Rating | | Westinghouse Cat. No. Prefix | |
| | | | Current | Voltage | | |
| Class H Fuse | 600A | — | 10,000A | 600V | MCS (High Mag. Trip) | |
| Class J, K, R or T Fuse | 600A | — | 65,000A | 600V | MCS (High Mag. Trip) | |
| | | | 100,000A | 480V | | |
| Magnetic Only ¹ Type CB ² | 400A | Marked HMCP | 50,000A | 600V | HMCP | |
| | | | 100,000A | 480V | | |
| Thermal/Mag. ³ Type CB | 400A | — | 35,000A | 25,000A | 600V | HKD |
| | | | 50,000A | 50,000A | 600V | KDC |
| | | | 65,000A | 65,000A | 480V | HKD |
| | | | 100,000A | 100,000A | 480V | KDC |
| Thermal/Mag. CB+CL ⁴ | 400A | 200,000A | 100,000A | 600V | LA+TRI-PAC | |
| Thermal/Mag. CLB ⁵ | 400A | 150,000A | 15,000A | 480V | LCL | |

¹Instantaneous Adjustable Trip

⁴Inverse-Time with Built-in Current Limiting Fuses

²Circuit Breaker

⁵Inverse-Time Current-Limiting Circuit Breaker

³Inverse-Time

AUXILIARY CONTACTS — TYPE J

Each A201 contactor will accommodate a total of two auxiliary contact units, providing a total of 4 auxiliary circuits.

The contact unit is retained in a metal bracket by spring clips and operated by a metal operator mounted on the crossbar.

Additional auxiliary contact units are available with various contact arrangements as listed in Table II. The metal bracket, mounting hardware and operating arm can be ordered as part number 3463D94G01.

The metal mounting bracket is mounted on the contactor base with the hardware provided. The auxiliary contact unit can then be installed.

| TABLE II — 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 |

The metal auxiliary contact operator is then mounted on the crossbar with the hardware provided. Adjust the operating arm so that it strikes the auxiliary contact push rod beyond the beveled edge.

For proper auxiliary contact unit operation, when the contactor is fully closed, the auxiliary contact push rod can be manually depressed 1/16 inch further. If adjustment is necessary, open or close the slot in the end of the operator to obtain this 1/16 inch. Auxiliary contacts mount by means of a spring clip and retainer screw. To remove the unit rotate the retainer screw several times (counterclockwise) and then slide the auxiliary contact unit out of the bracket.

AC/DC COILS

AC/DC coil conversion kits are available for use with Size 5 contactors and controllers where low dropout voltage or exceptionally quiet operation is desired. The low dropout voltage characteristic may be required where the voltage applied to the contactor coil is reduced by the effect of motor inrush current. The AC/DC coil accepts AC control voltage and rectifies it to DC. An interposing control relay is required to accommodate the higher coil current involved. To order, select items from Table III.

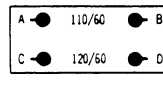
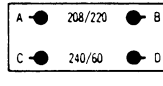
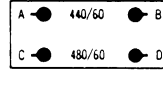
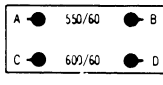
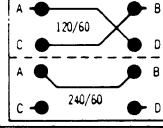
| Control Relay Catalog No. | Control Voltage/Freq. | Contactor AC/DC Coil Kit | |
|---------------------------|-----------------------|--------------------------|------------|
| | | Voltage/Freq. | Part No. |
| AR420A | 110/50, 120/60 | 110-120V/any | 7864A28G01 |
| AR420W | 220/50, 240/60 | 220-240V/any | 7864A28G02 |
| AR420X | 440/50, 480/60 | 440-480V/any | 7864A28G03 |

OPERATING COILS

When installing a new coil, check the identification label for the correct part number, voltage, and frequency.

Table IV lists the more commonly used coils and shows the connection diagram for each voltage. To replace an operating coil, proceed as follows:

1. Remove all power to the contactor and operating coil.
2. Remove coil leads.
3. Remove the arc box. (2 screws)
4. Gently lower the crossbar.
5. Remove the old coil from the magnet by removing the two mounting screws.
6. Place the new coil on the contactor and replace the two mounting screws.
7. Raise the crossbar into its proper position with the moving contacts inside the arc box.
8. Replace the arc box on the contactor and securely tighten both mounting bolts. Make sure both kickout springs are properly seated.
9. Reconnect the leads to the new coil. Move crossbar by hand and make sure it moves freely with no mechanical friction.

| Label Marking | Control Volts | Connect To | Operating Coil Part Number And Color Of Label |
|--|---------------|------------|---|
|  | 110 | A - B | 2050A14G05 RED |
| | 120 | C - D | |
|  | 208 220 | A - B | 2050A14G10 GREEN |
| | 240 | C - D | |
|  | 440 | A - B | 2050A14G15 YELLOW |
| | 480 | C - D | |
|  | 550 | A - B | 2050A14G17 GRAY |
| | 600 | C - D | |
|  | 120 | A - B | 2050A14G20* GRAY |
| | 240 | C - D | |

***NOTE:** Supplied connected for 240 volts with both jumpers wired A to B. For 120 volts reconnect the jumpers A to D and B to C as shown on coil label.

| Power AC | Inrush VA | Sealed VA | Sealed Watts |
|----------|-----------|-----------|--------------|
| | 1700 | 180 | 32 |

MECHANICAL INTERLOCKS

An A201 Size 5 contactor, when used in combination with other contactors, may be mechanically interlocked to protect against closing one when the other is already closed. Mechanical interlock combinations, for both vertical and horizontal assemblies, are shown in Table VII.

| Location (Qty.) | Driving Torque (lb.-in.) |
|-----------------------------------|--------------------------|
| Arc box screw (2) | 90-100 |
| Coil term. screw (2) | 15-18 |
| Coil mounting screw (2) | 15-18 |
| Stationary contact screw (6) | 150-175 |
| Power wire lugs (2/pole) | 300-400 |
| Lug mtg. bolt (2/pole) | 550 |
| Moving cont. assy. screw (1/pole) | 55-65 |

MAINTENANCE

Contact Forces

With new contacts, the total contact force per pole should be:

Initial force: 6 to 7 pounds (Fig. 5)

Final force: 7.5 to 8.5 pounds (Fig. 6)

After turning off the power, measure the force by exerting a measured pull until the paper is allowed to move, using the method shown in Figures 5 and 6.

Contact Overtravel

The initial contact overtravel, with new contacts, is $\frac{13}{64}$ to $\frac{17}{64}$ inches and is measured with the power off as shown in Figure 6. Contact replacement is necessary when the overtravel on any pole has been reduced to $\frac{1}{16}$ inch. The contacts must be replaced on all poles at the same time. Replace the contacts in the following manner **with the power off**:

1. Remove the arc box and gently lower the crossbar.
2. Remove the three moving contact assemblies.
3. Remove the compression springs from the

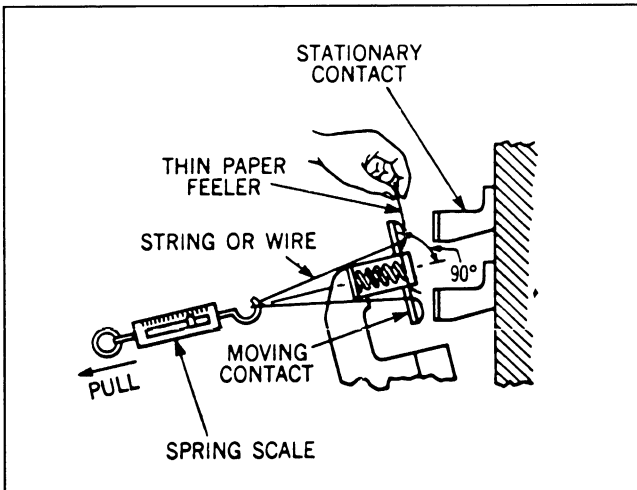


Fig. 5 Initial Contact Force Measurement

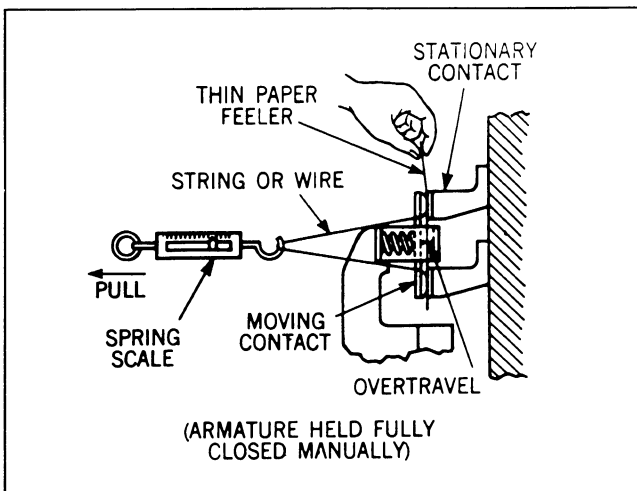


Fig. 6 Final Contact Force Measurement

assemblies and twist the moving contacts to remove them from the saddles.

4. Remove the stationary contacts. A $\frac{1}{4}$ " allen wrench is required for the $\frac{5}{16}$ " socket head cap screws.
5. To install new contacts, reverse the procedure making sure all bolts and screws are tight (the stationary contact mounting bolts must be tightened to 150-175 pound-inches), the crossbar is raised into its proper position with the moving contacts inside the arc box, and the **arc box is securely in place**. Check to be sure both kick-out springs are properly seated.

The main contacts, when new, are designed to touch the bottom faces before the top faces touch. Also, the moving contacts should touch the stationary contacts at the same instant within $\frac{1}{32}$ inch maximum error on all poles as the contactor is closed.

Arc Box

The arc box provides the mechanical stop for the moving contact assembly while maintaining the proper open gap for the main contacts. The molded box also supports the De-ion® type arc quenchers which are contained within the arc box. Two, front accessible, screws hold the arc box in place. This arc box requires no maintenance except for a periodic inspection to check if any grids have been damaged by fault conditions. The contactor must **never be operated** in a power circuit unless the arc box is securely fastened in place.

Kickout Springs

Normally no maintenance is required for these springs other than to make sure that they are properly seated on the molded crossbar assembly. In case they are inadvertently removed from the molded base where they are captivated in a hole slightly smaller than the

TABLE VII — MECHANICAL INTERLOCKS

| Vertically Mounted Contactors (A251) | | |
|--|------------------|-----------------------|
| Upper Contactor | Lower Contactor | Use Mech. Intlk. Type |
| A201 Size 5 | A201 Size 5 or 6 | M47 |
| A201 Size 3 or 4 | A201 Size 5 | M49 |
| Horizontally Mounted Contactors (A211) | | |
| Left Contactor | Right Contactor | Use Mech. Intlk. Type |
| A201 Size 5 | A201 Size 5 or 6 | M48 |
| A201 Size 3 or 4 | A201 Size 5 | M50 |

A201, A202, A211, A251 SIZE 5, 2 AND 3 POLE CONTACTORS I.L. 17049D

MAINTENANCE (Cont.)

free spring outside diameter, they can be reinstalled readily with a needle-nose plier as follows: Hold the front end of the spring. Insert the pliers inside the spring and rotate the offset pin end of the spring in a direction to decrease its outside diameter. Keep the spring restrained until the pin end has been inserted into the molded base.

Magnet Suspension

Both the stationary and moving magnet assemblies are flexibly mounted to ensure proper sealing of the magnet for quiet operation. Both helical compression springs and flat leaf springs are in back of each magnet part. The moving armature has less spring force and restraint than the stiffer stationary magnet assembly. In case these magnets are ever disassembled, particular care must be used to make sure that the flat leaf springs are centered on the laminated magnet assemblies and are not jammed between the magnets and the molded guide projections. After reassembly, be sure to check that both the stationary and moving magnets can be manually depressed or rocked in their mountings. Again, the moving armature assembly can be rocked with much less force and more freedom than the stationary assembly.

LIGHTING CONTACTOR

The A202 Size 5 Model J lighting contactor when wired as shown in Figure 7 will control tungsten, fluorescent or metal-vapor lamp loads. The contactor and its associated load should be protected against short circuits by a suitable branch circuit protective device selected in accordance with the National Electrical Code (NEC).

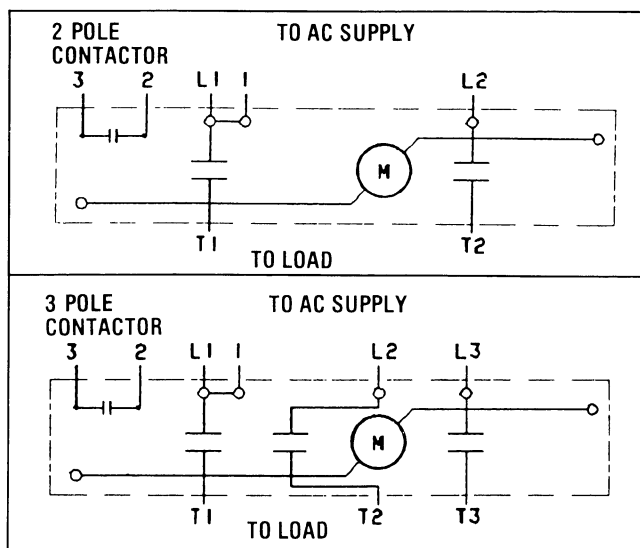


Fig. 7 Connection Diagram

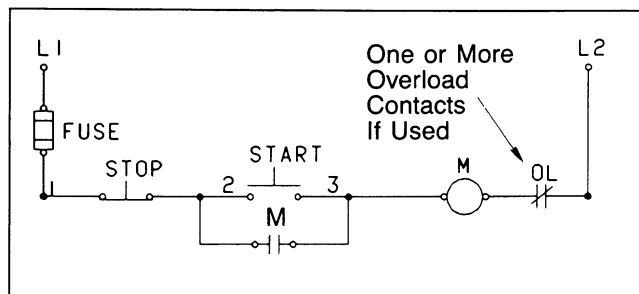


Fig. 8 Nonreversing Control Circuit

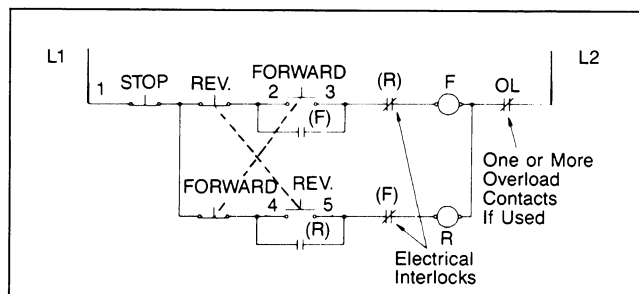


Fig. 9 Reversing Control Circuit

RENEWAL PARTS

Renewal parts for Size 5 contactors are identified in Table IX and Figure 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.

TABLE VIII — ACCESSORIES

| Fuse Block Kits — Meet requirements of NEC concerning common control fusing. | | |
|--|--------------------------------------|---|
| Order Cat No. | Qty. | Description |
| FKR | 1 | Panel mounted Fuse Holder for 2 Class CC (Bussman KTKR) Fuses |
| Order Fuses Separately By Ampere Rating. | | |
| Controller Size | Minimum Wire Size in Control Circuit | Suggested Fuse Size† |
| 5 | #16 AWG | 10 AMP |
| † When using a transformer, select fuse size per the National Electrical Code. | | |

TABLE IX — RENEWAL PARTS

| Item | Fig. 10 Refer. | Part Number |
|-----------------------------|-------------------|--------------|
| Contact Kit 1-Pole* | A | 477B477G05 |
| Operating Coil | B | See Table IV |
| Auxiliary Contact Units | — | See Table II |
| Arc Box Assy. - 2 or 3 Pole | C | 2050A15G45 |
| Arc Cup Kit - 2 or 3 Pole | D | 2050A15G48 |
| Magnet Assy. Kit | E | 2050A15G46 |
| Kickout Spring | F | 2043A68H01 |

* Order 2 or 3 kits to replace all contacts and springs at the same time.

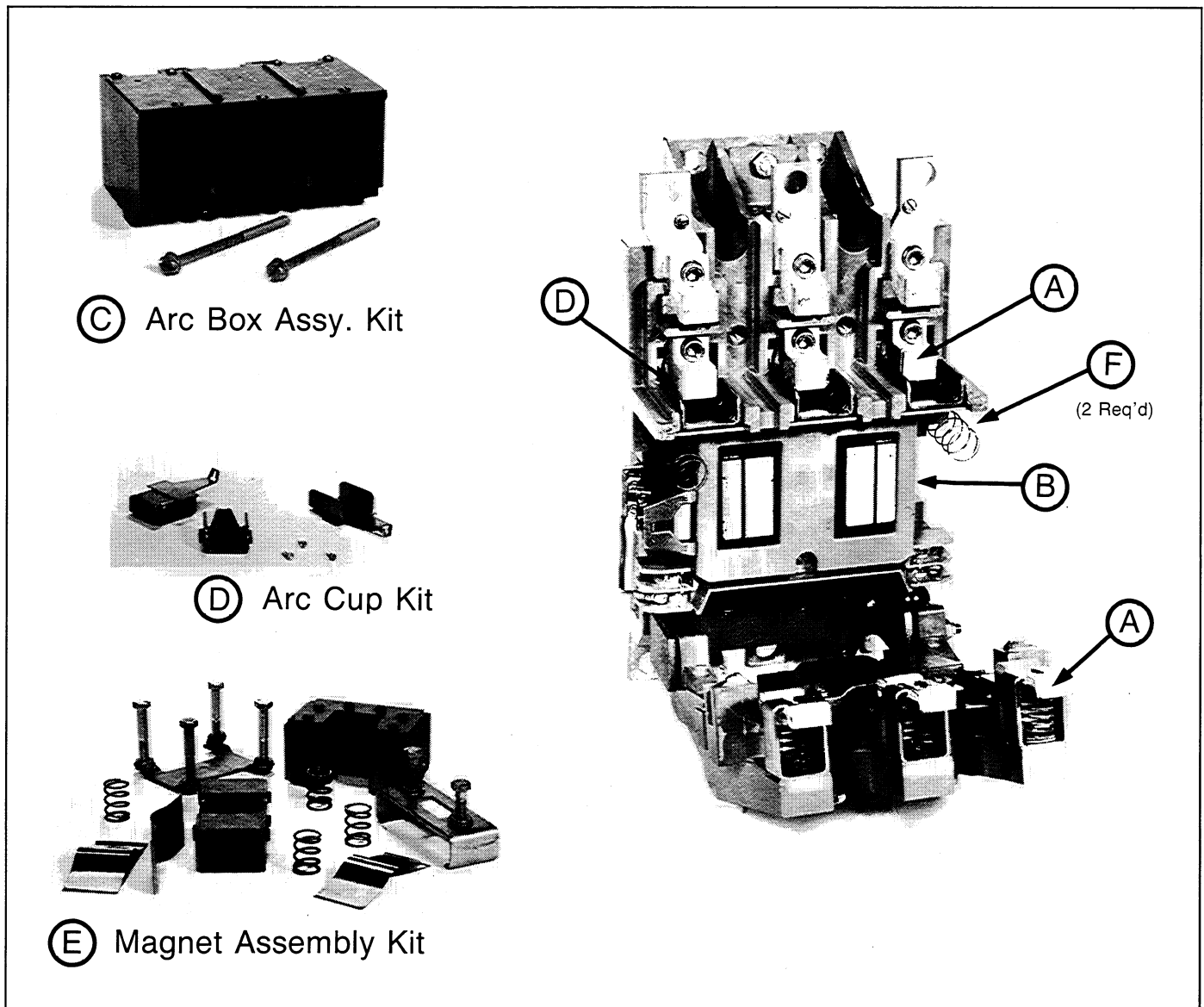


Fig. 10 Renewal Parts Identification