AUTOTRANSFORMER-TYPE STARTERS AND COMPENSATORS GENERAL ELECTRIC COMPANY REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of the following compensators and starters manufactured by the General Electric Company.

COMPENSATORS	STARTERS	
KS-5311	KS-15635	KS-15853
	KS-15663	KS-15854
	KS-15781	KS-15941

It also covers procedures for replacing the CR2820-1099, CR2820-1740A, and CR2820-A111AA time-delay relays with the newer type CR2820-B111AA pneumatic time-delay relay.

1.02 This section is reissued to add information covering the KS-15941 starters, and to include a figure of the KS-15781, List 7 and 8 starters.

1.03 Part 2 of this section covers the various parts which it is practicable to replace in the field in the maintenance of this equipment. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Replacement Parts.

1.04 Part 3 of this section covers the approved procedures for the replacement of the parts covered in Part 2. This information is called Replacement Procedures.

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replacement parts in their proper relation to other parts of the apparatus, together with their corresponding names.

2.02 When ordering replacement parts, give the name of the part as shown in the figures of this section and the complete nameplate data of the compensator or starter, including the manufacturer's name; for example, one movable instantaneous contact for the CR2820-1740A3 time-delay relay, 60 cycles, 220 volts, used in the General Electric Company CR7051AA compensator per KS-5311, List 10. Do not refer to the section number.

2.03 ***CR2820-1099 Time-Delay Relays***

(a) Whenever there is an occasion to replace the CR2820-1099 time-delay relay or any part thereof, the relay shall be replaced by the CR2820-B111AA62F relay. The method of substituting the new relay unit is covered in 3.05. ←

Note: Replacement parts for the CR2820-1099 relay are no longer furnished by the General Electric Company.

2.04 ***CR2820-1740A and CR2820-A111AA Time-Delay Relays***

(a) The supervisor should decide whether replacing parts on the CR2820-1740A or the CR2820-A111AA relay is economically advisable, or whether it would be cheaper to substitute the new CR2820-B111AA62F relay.

(b) In those areas where high voltages are prevalent and coil burnouts have been experienced on the CR2820-1740A or the CR2820-A111AA relay, it is recommended that the relay be replaced by the CR2820-B111AA62F relay. Refer to 3.05 for replacement procedures. ←

2.05 *CR2820-B111AA Time-Delay Relays*

(a) Where coil burnouts have been experienced on the CR2820-B111AA23 (200 volts) or the CR2820-B111AA44 (230 volts) relay, the relay shall be replaced by the CR2820-B111AA62F relay.

Note: The operating coil of the CR2820-B111AA62F relay is rated at 190/253 volts, 60 cycles.

2.06 *CR2820-B110AA Time-Delay Relays*

(a) The CR2820-B110AA relays are used in the KS-15941 starters. The operating coil of the CR2820-B110AA62F relay is rated at 190/253 volts, 60 cycles. The operating coil of the CR2820-B110AA65F relay is rated at 380/500 volts, 60 cycles.

2.07 *Struthers-Dunn Control Relays*

(a) Refer to Section 040-810-801 for replacement parts and procedures.

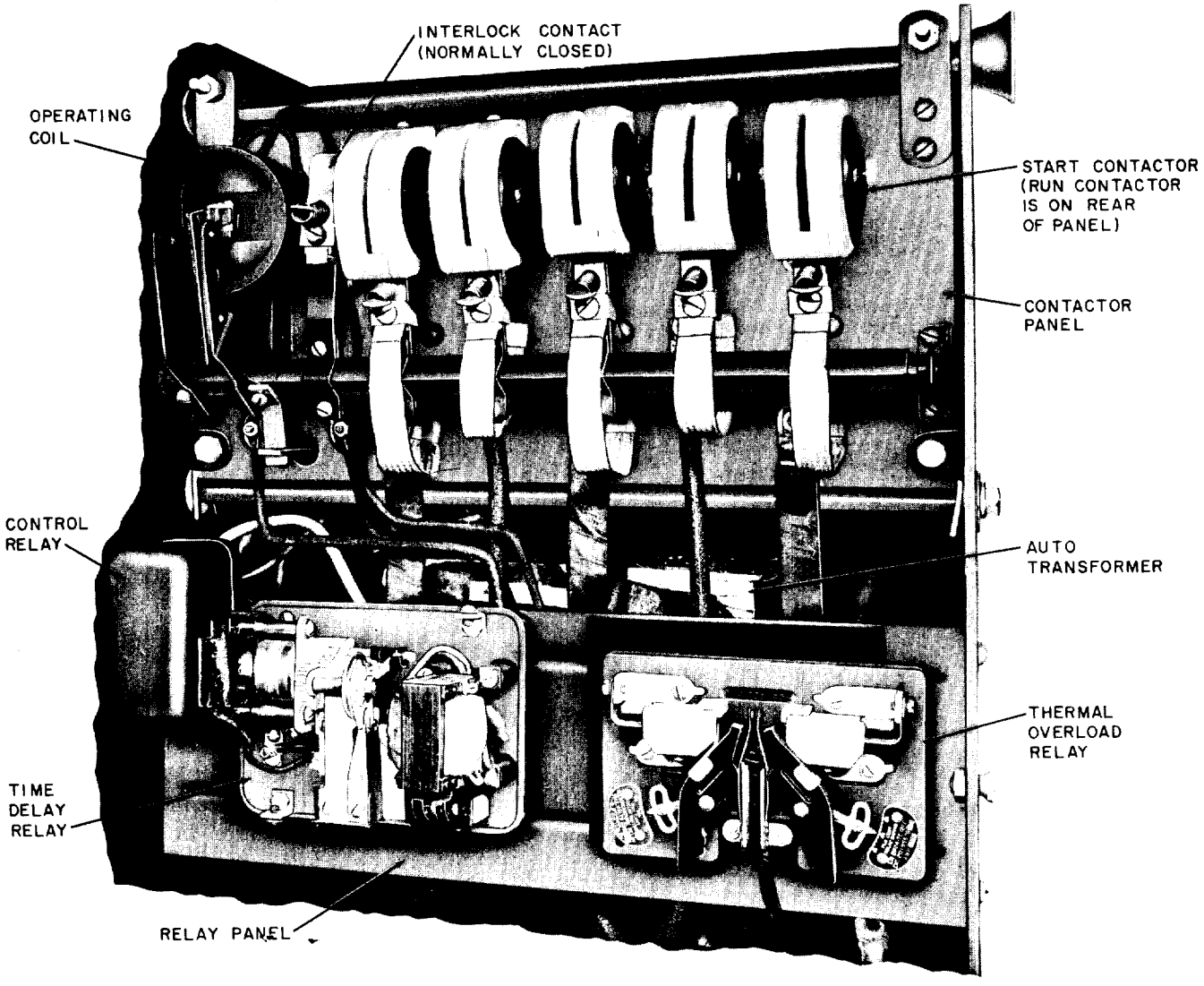

Fig. 1 — KS-5311 Automatic Starting Compensator (small size)

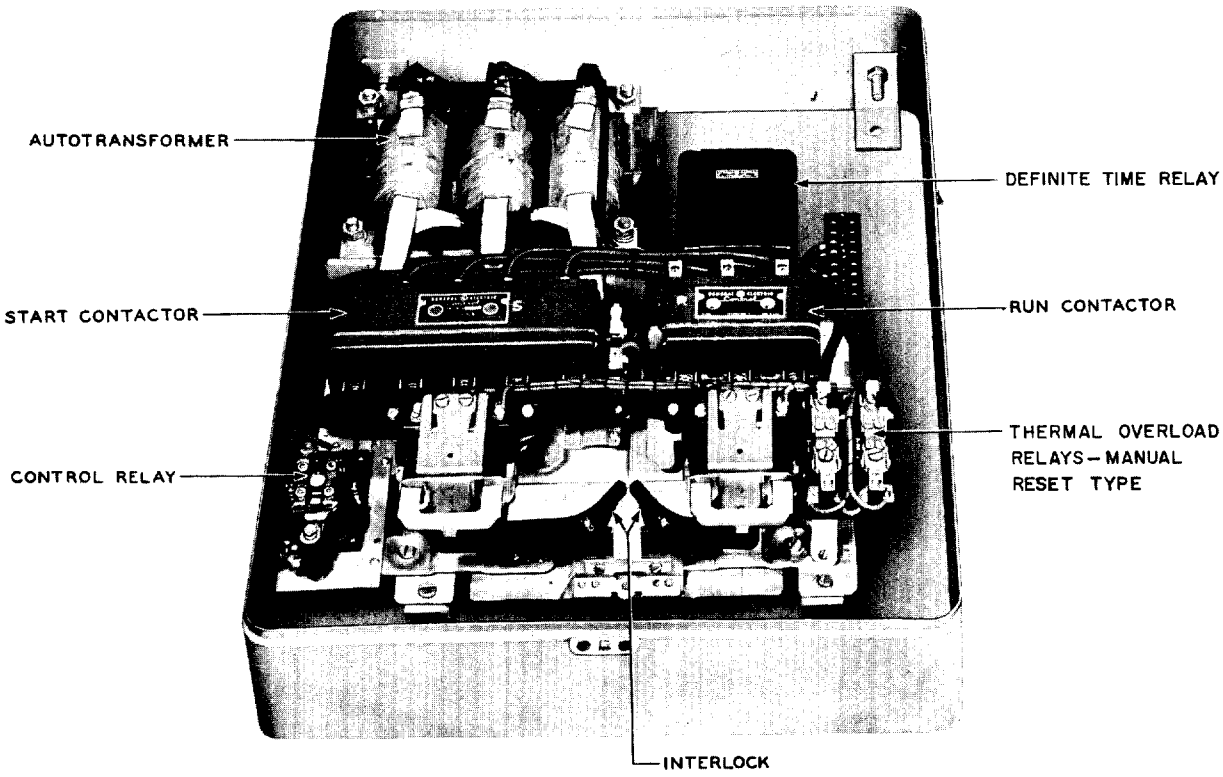

Fig. 2 – KS-15635, List 11 AC Starter

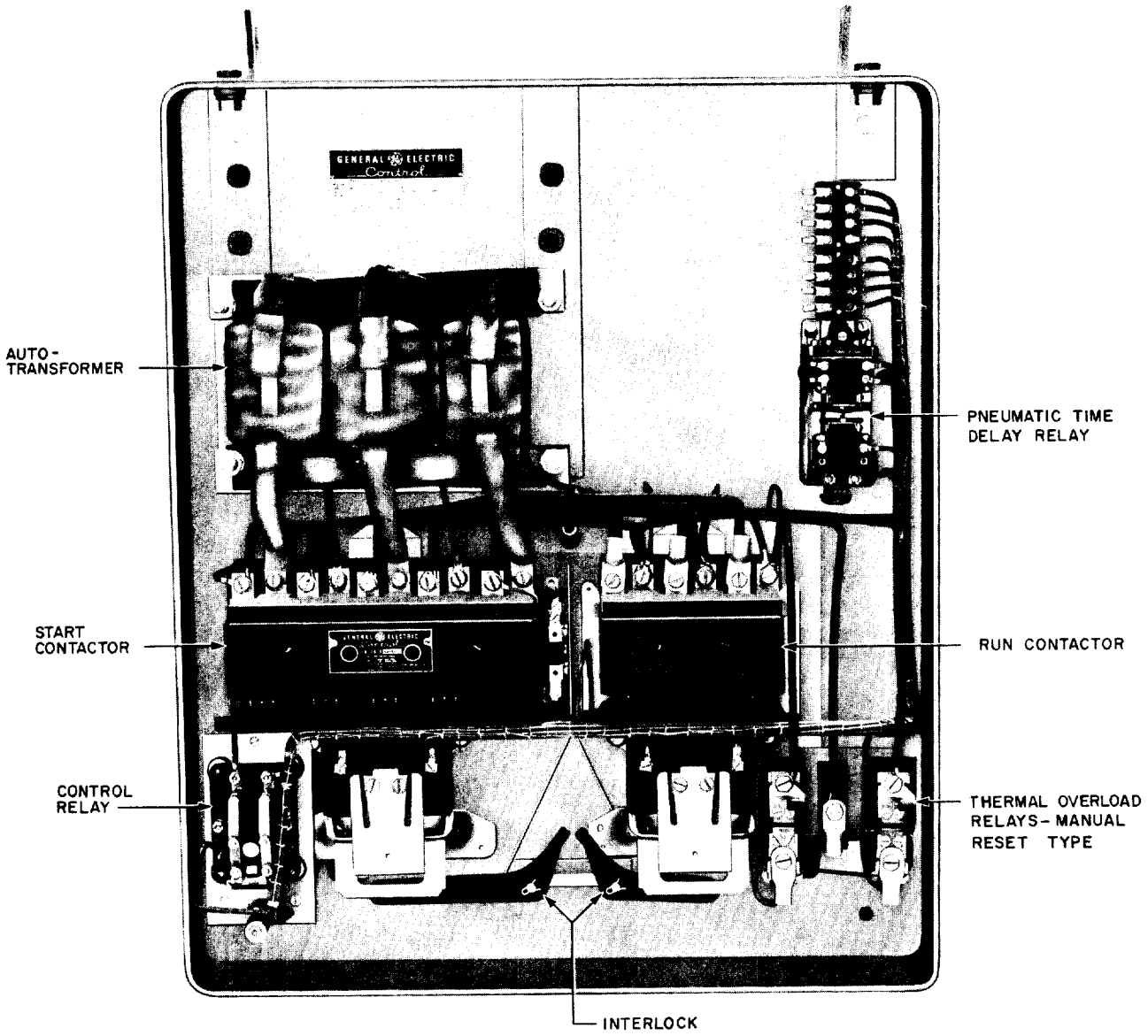

Fig. 3 – KS-15635, List 21 to 26 AC Starters

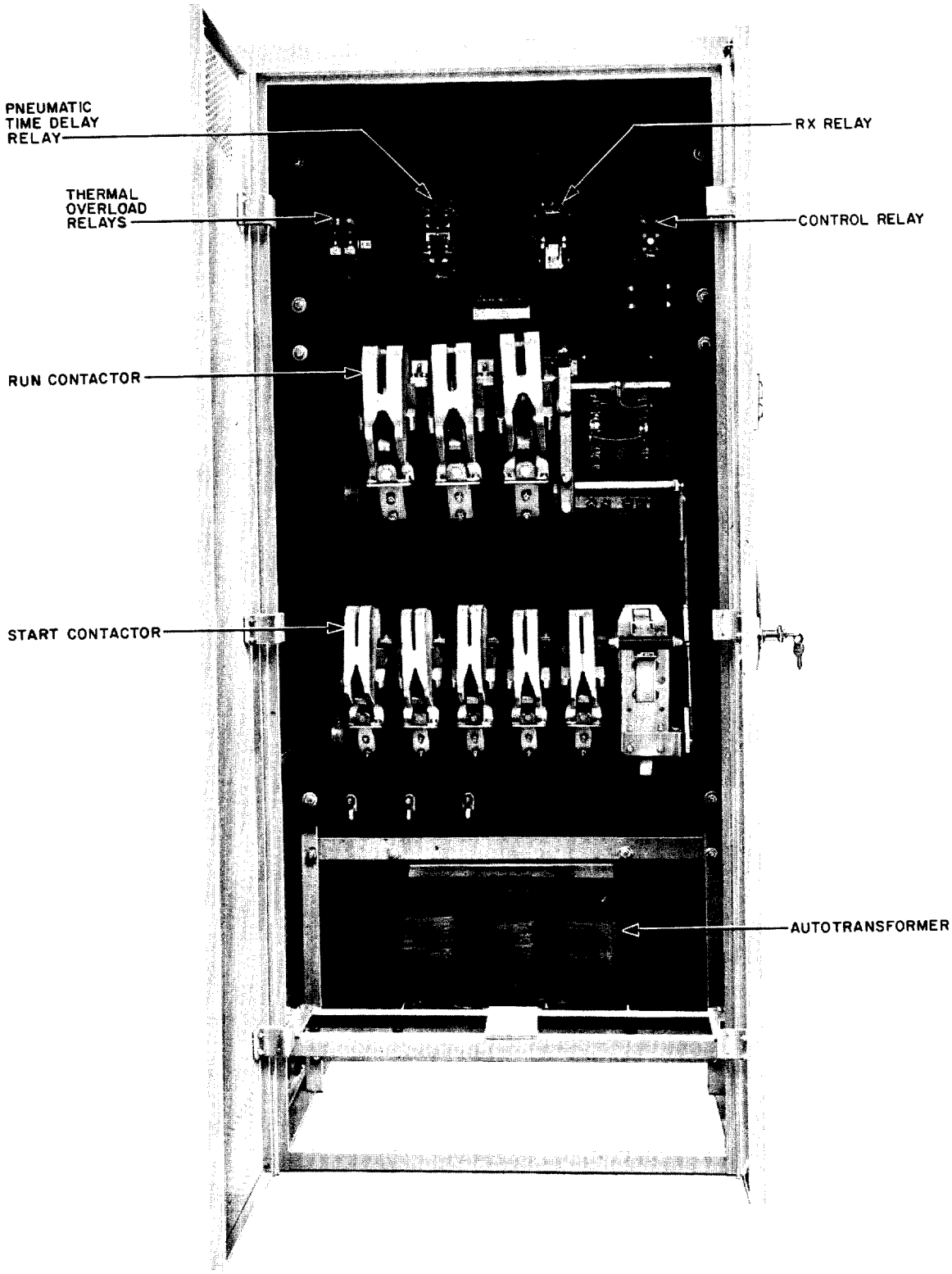

Fig. 4 – KS-15781, List 7 and 8 AC Starters

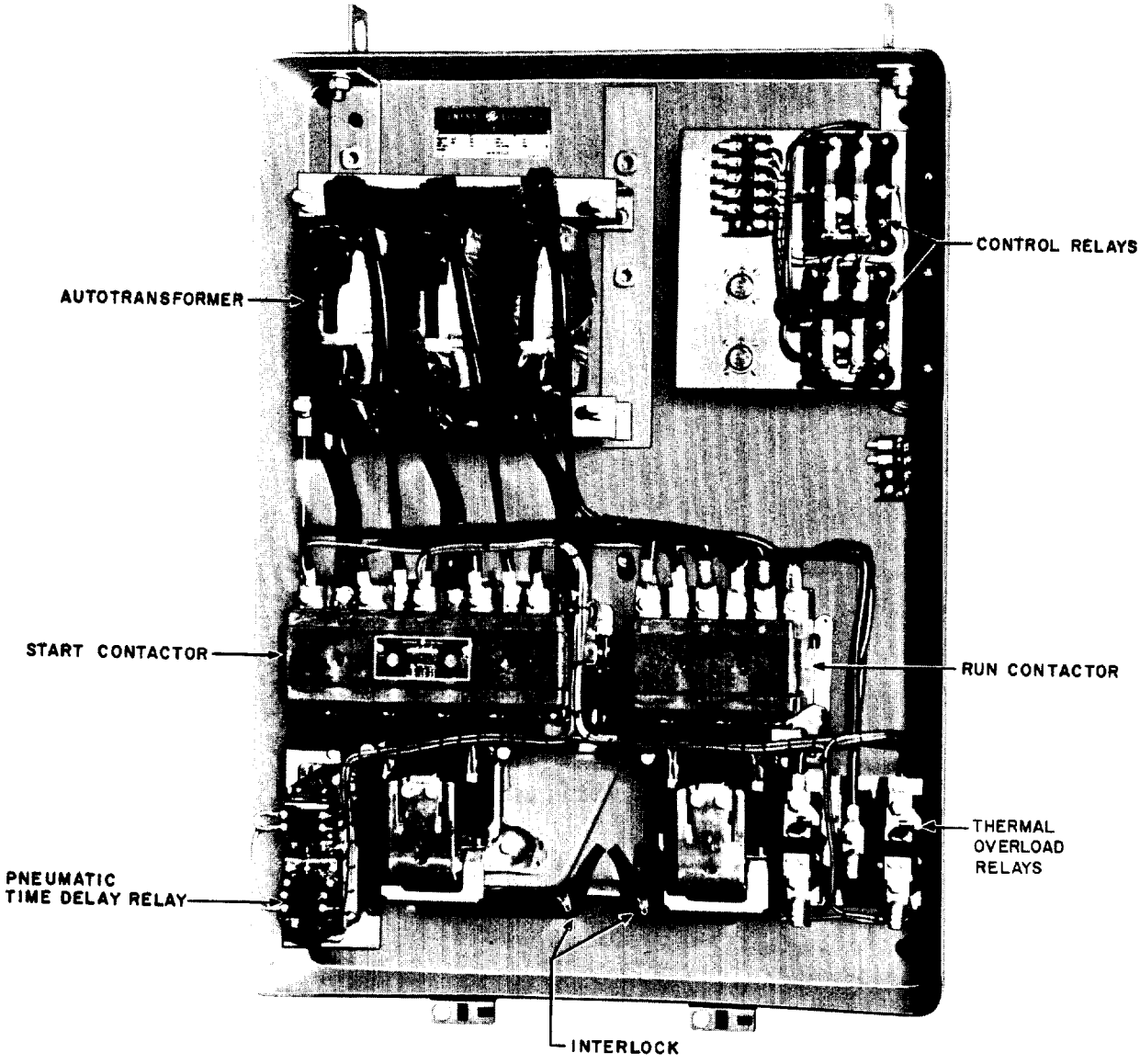

Fig. 5 – KS-15853, List 1 to 6 Starters

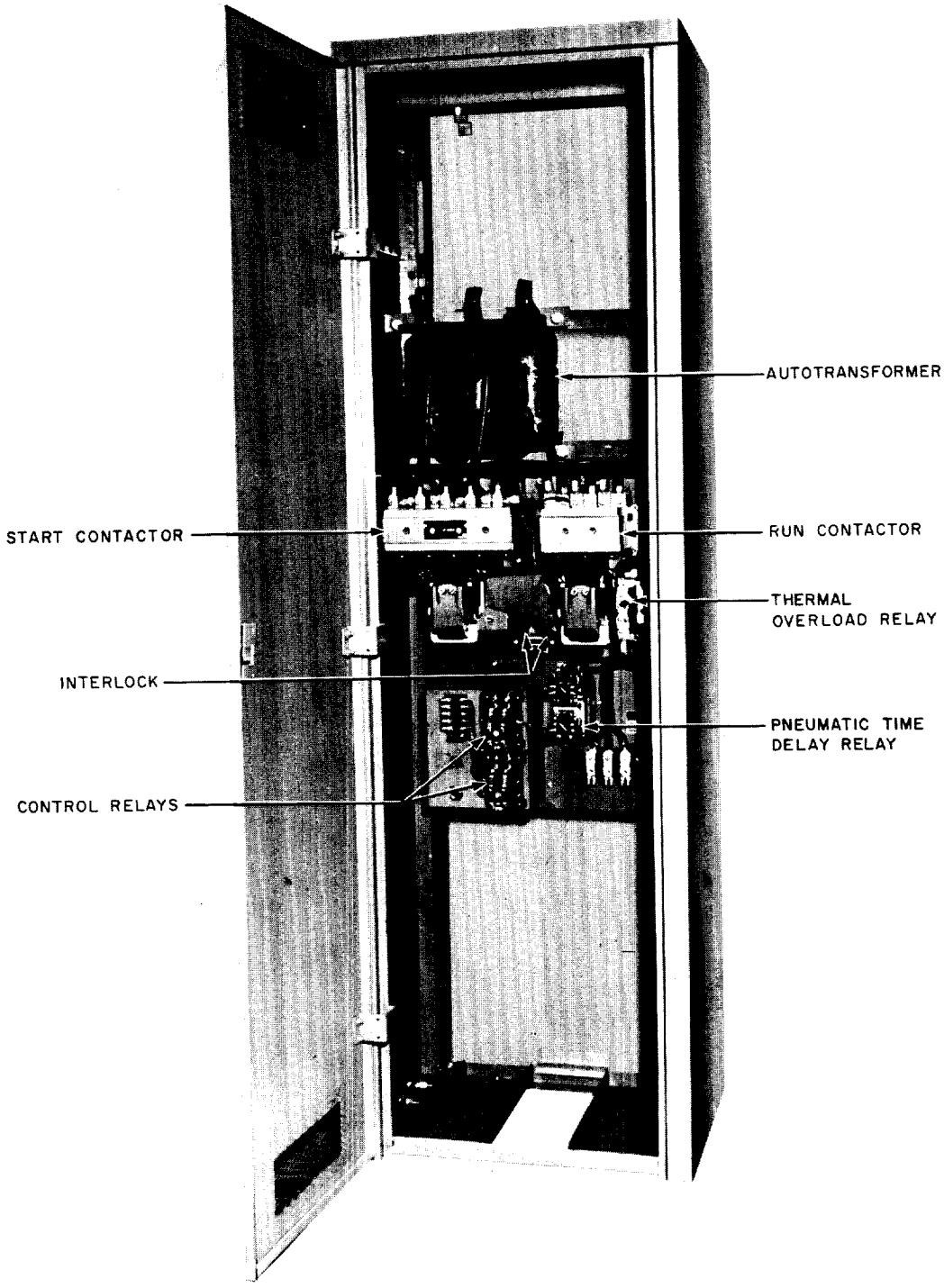

Fig. 6 – KS-15854, List 1 to 4 Starters

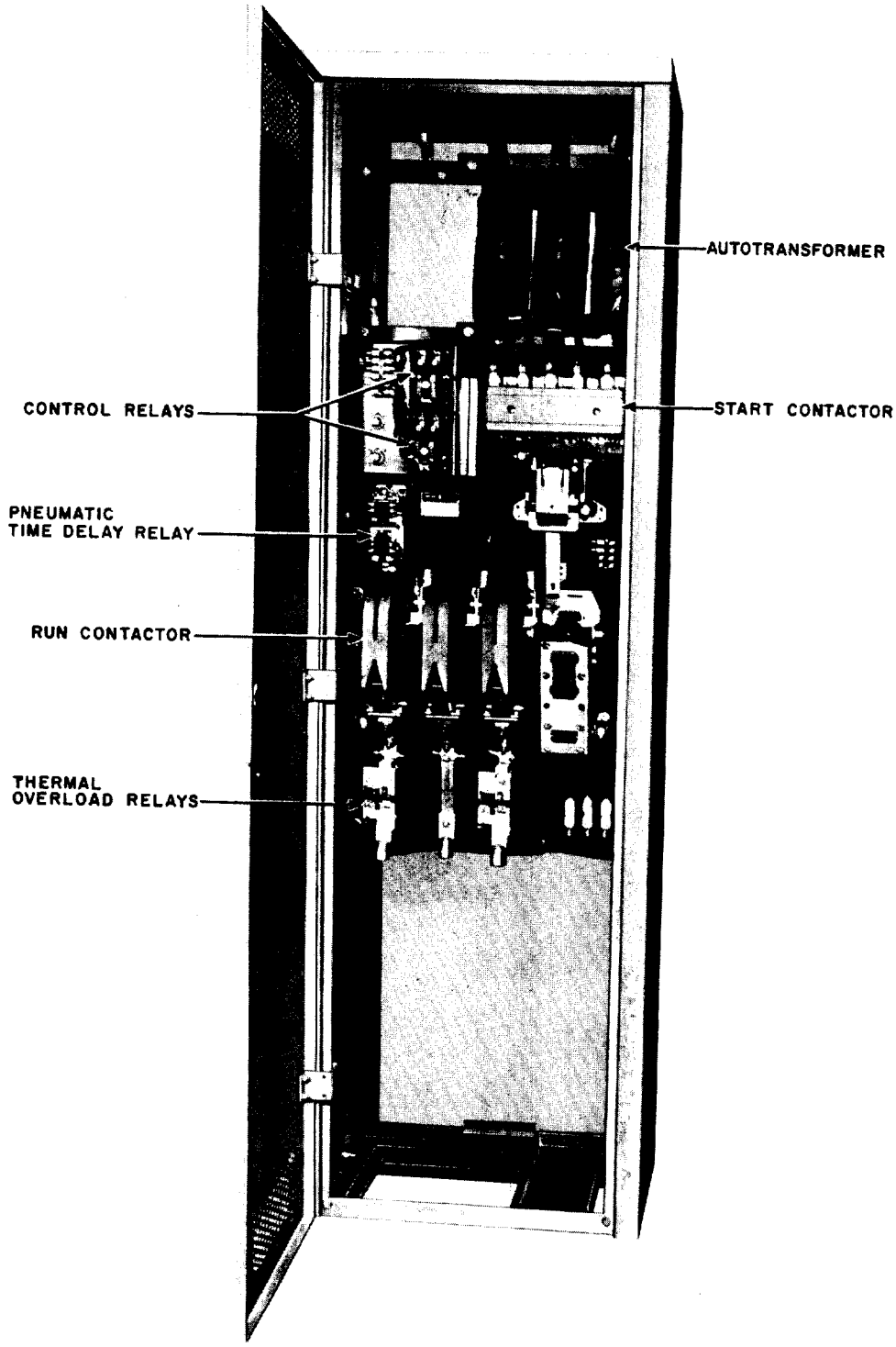

Fig. 7 – KS-15854, List 5 and 6 Starters

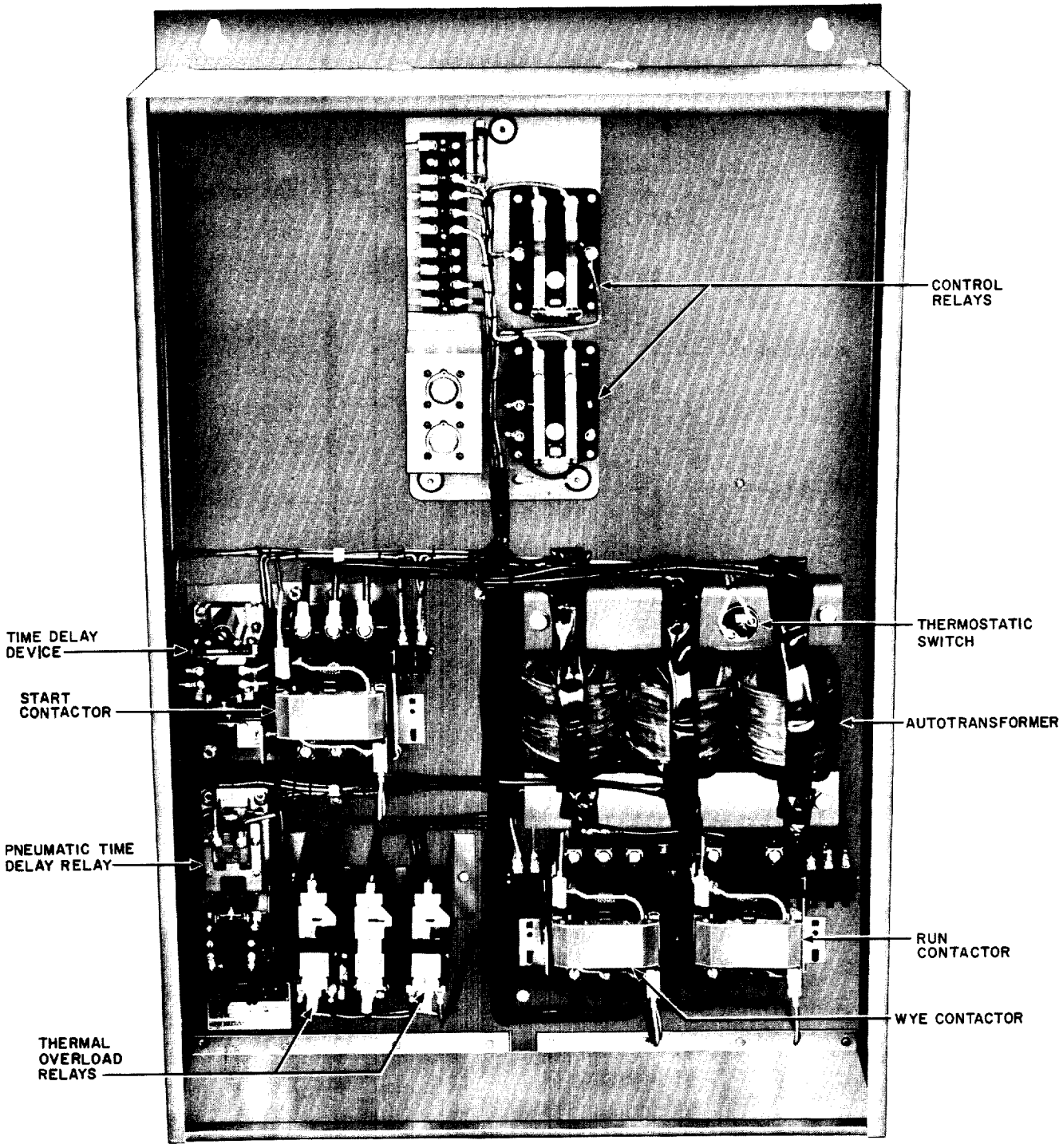

Fig. 8 – KS-15941, List 11 and 12 AC Starters (size 2)

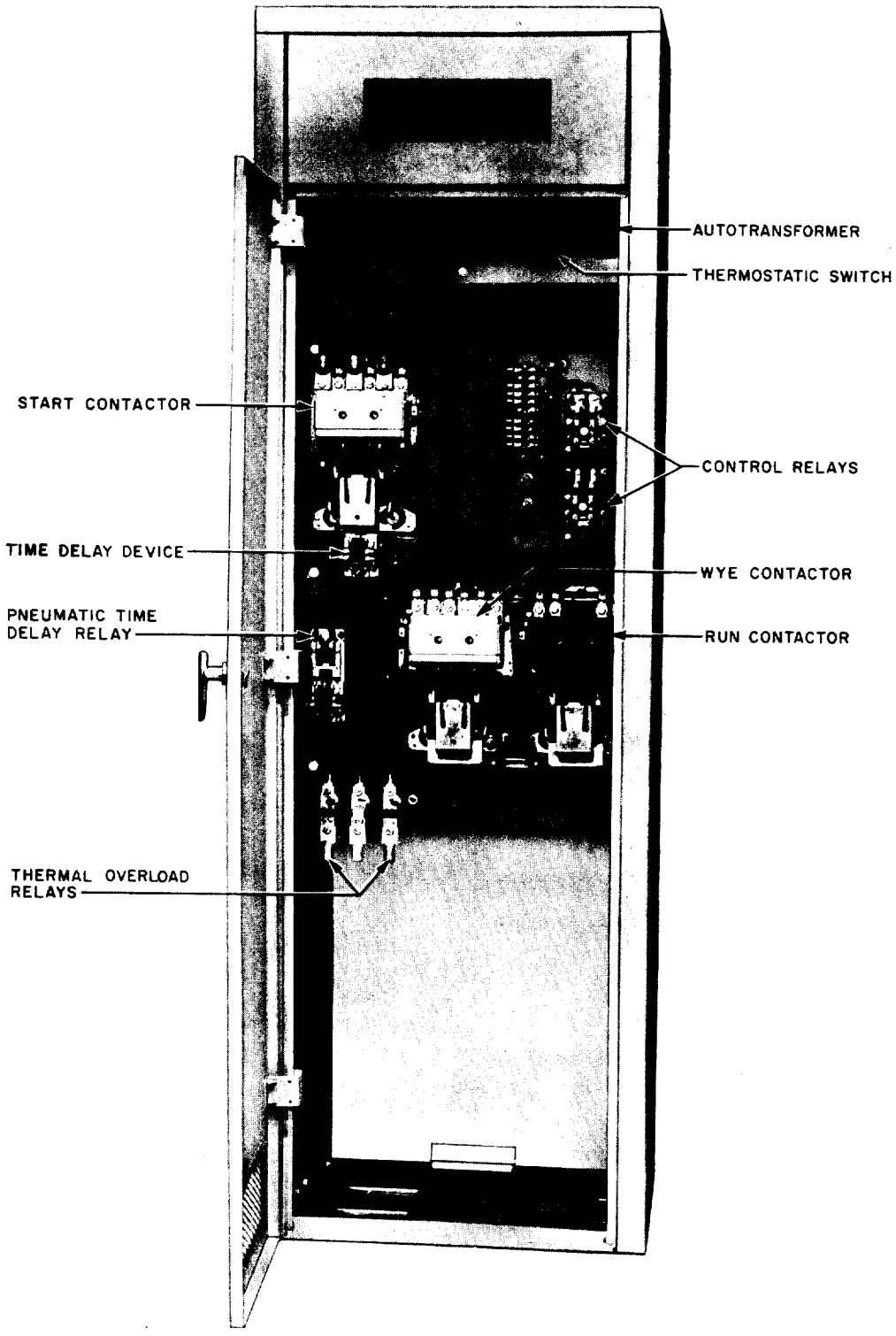

Fig. 9 – KS-15941, List 4, 5, 16, and 17 AC Starters (size 4)

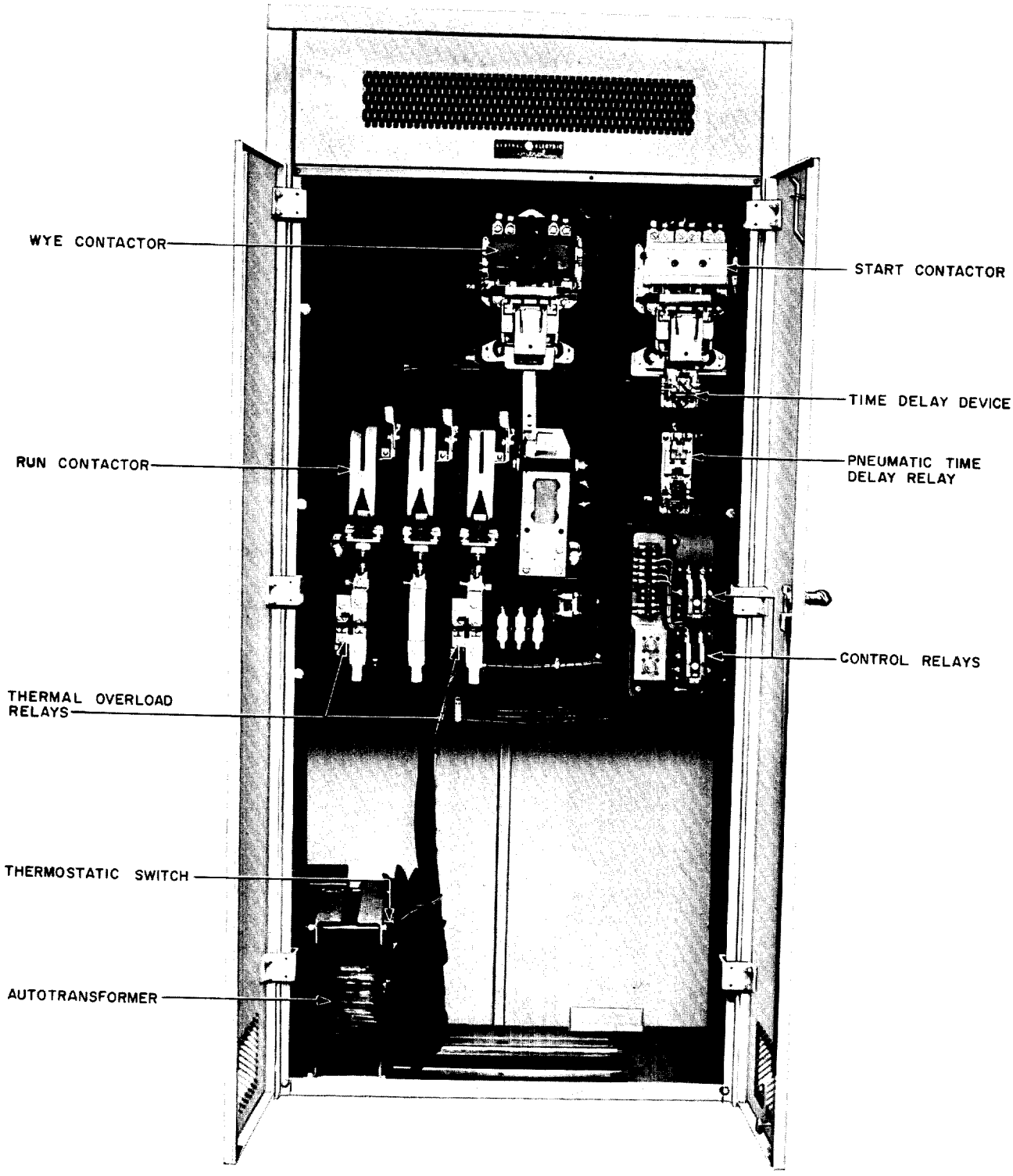

Fig. 10– KS-15941, List 6 and 7 AC Starters (size 5)

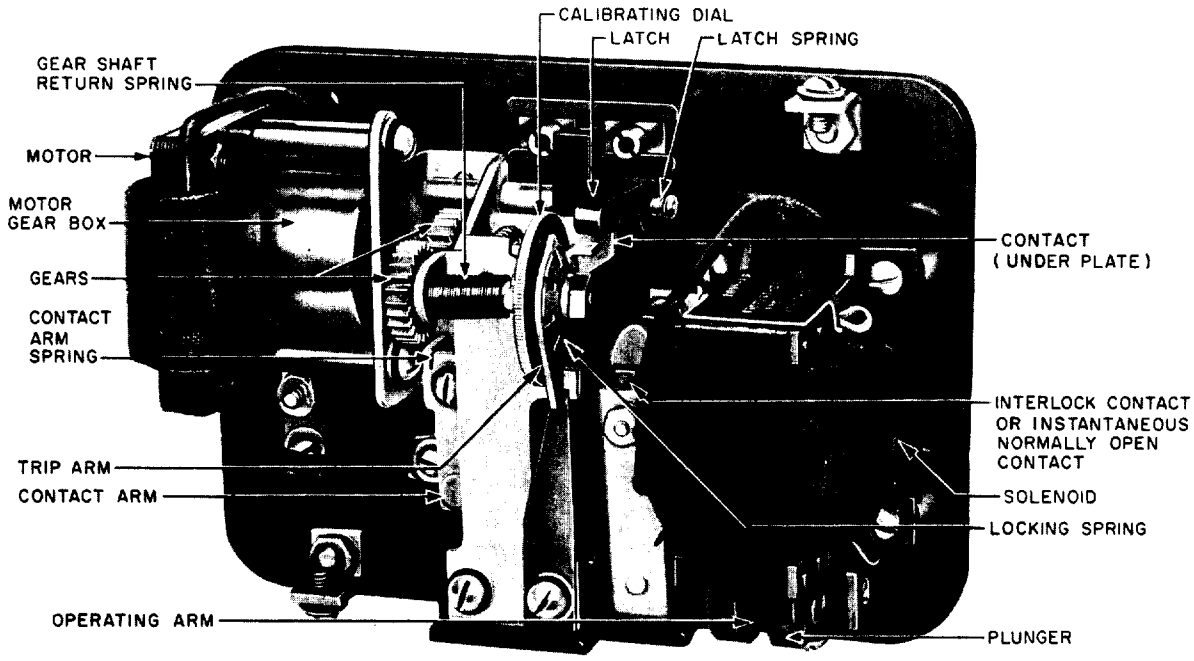

Fig. 11 – CR2820-1099 Time-Delay Relay (parts identified for information only)

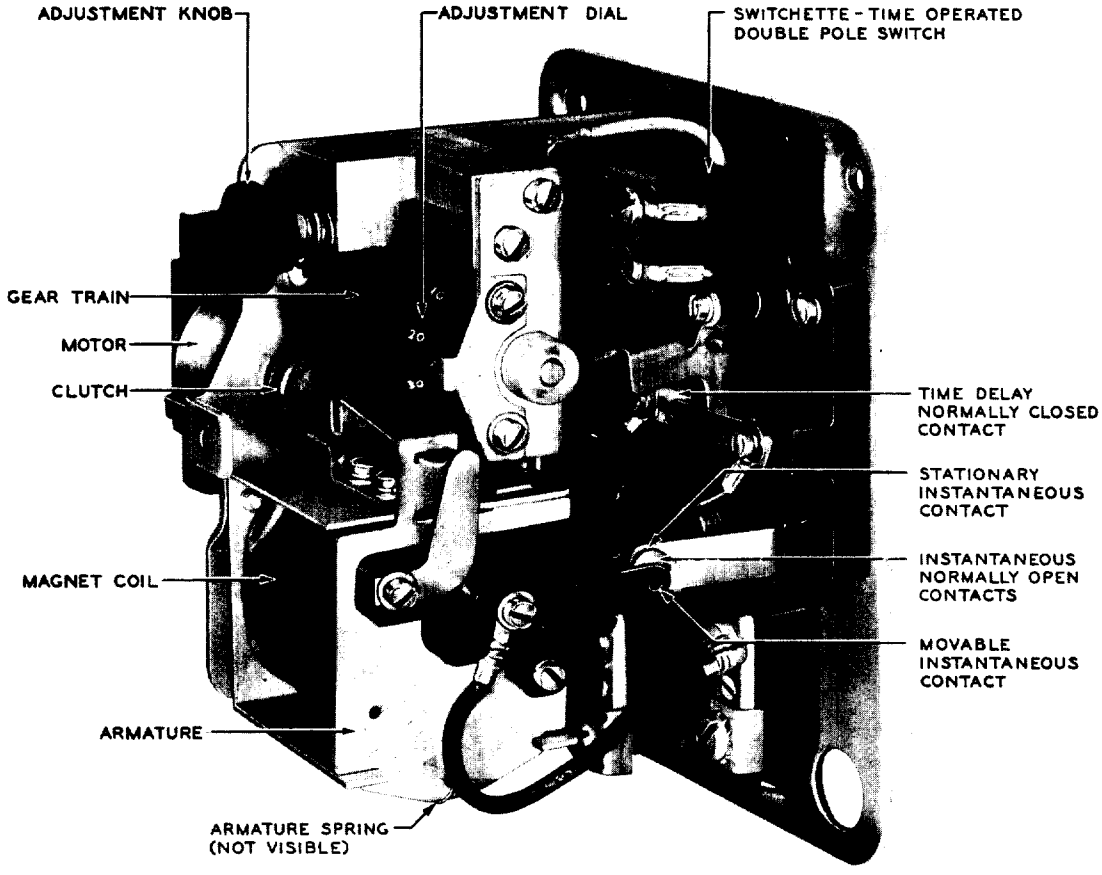

Fig. 12 – CR2820-1740A Time-Delay Relay (cover removed)

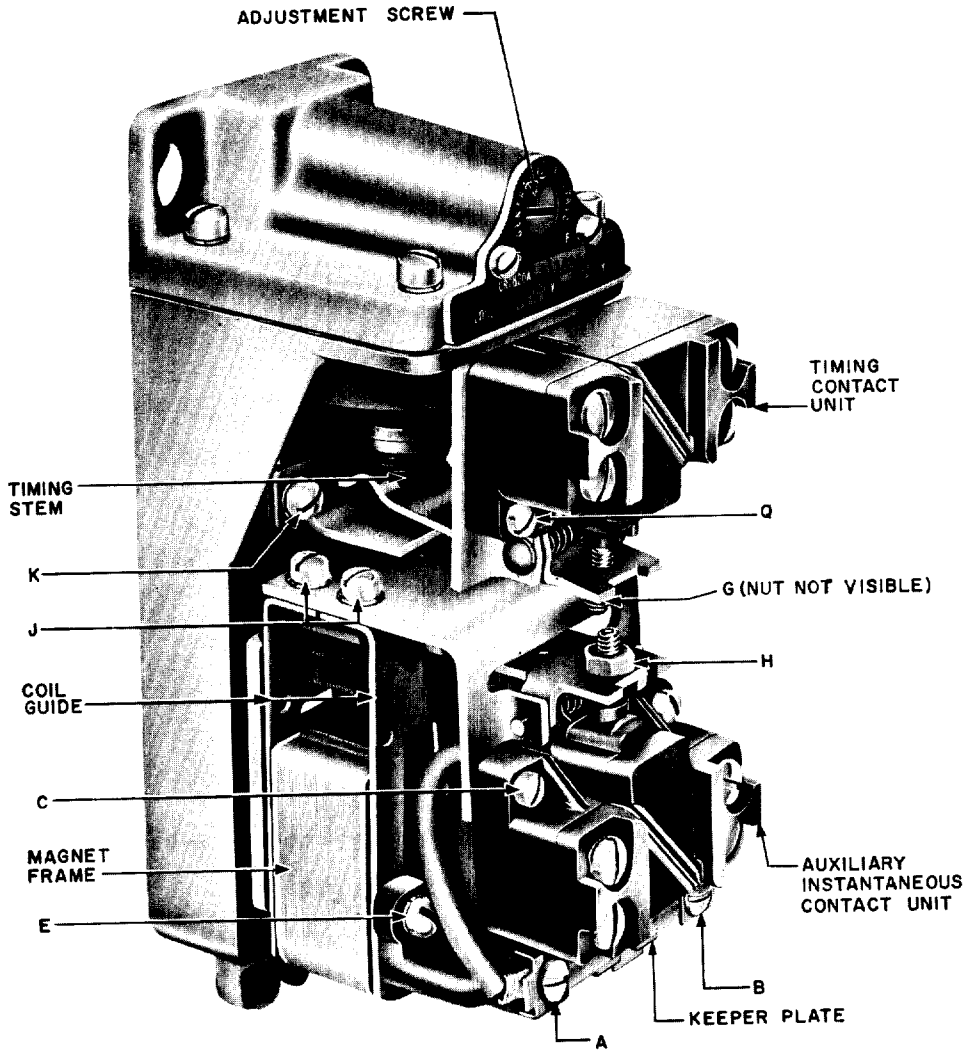

Fig. 13 – CR2820-A111AA Pneumatic Time-Delay Relay

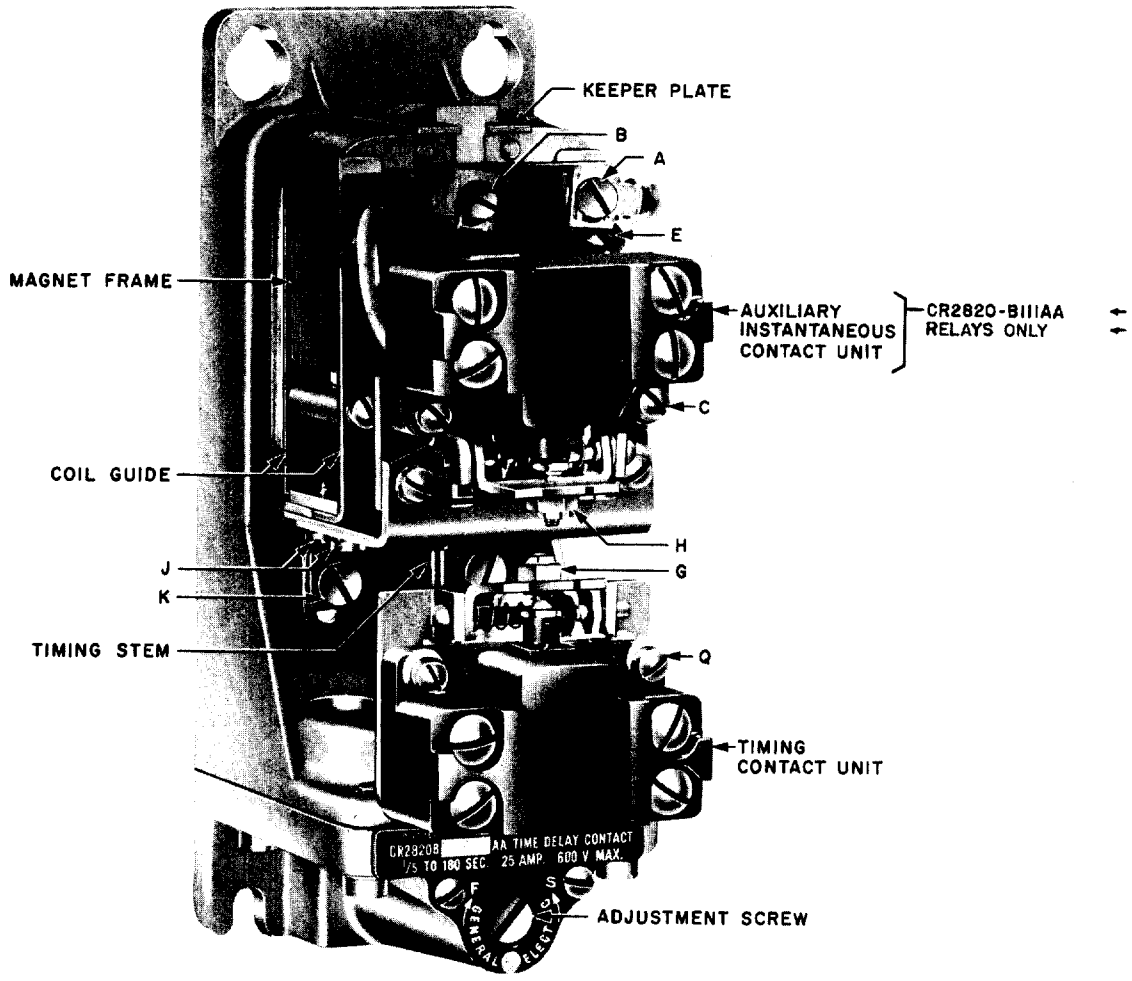

Fig. 14 – CR2820-B110AA and CR2820-B111AA Pneumatic Time-Delay Relays (CR2820-B111AA shown)

3. REPLACEMENT PROCEDURES

3.01 *List of Tools and Materials*

CODE OR SPEC. NO.	DESCRIPTION
TOOLS	
KS-6015	Duck-Bill Pliers
KS-8740	Electric Soldering Copper
R-1274	Round, H-Type File
R-1542	6-Inch Adjustable Single-End Wrench
R-1640	Center Punch
—	Breast or Electric Drill, 1/2-Inch Capacity
—	Twist Drill, 7/32 Inch and 1/2 Inch
—	Diagonal 5-Inch Pliers
—	Long-Nose Pliers
—	3-Inch C Screwdriver
—	6-Inch C Screwdriver
MATERIALS	
KS-2423	Cotton Twill Cloth
KS-14090	Gray Plastic Adhesive Tape
—	Solderless Wire Connectors, Ideal

3.02 ***CR2820-1740A Time-Delay Relay*** (see Fig. 12)

(a) ***Magnet Coil:*** To replace the magnet coil, remove the center screw on the left end of the coil assembly. The coil and armature may then be removed. When replacing the coil, the color-coded leads should be connected as shown in Fig. 17.

(b) ***Switchette:*** To replace the switchette, first remove the two screws that fasten the large molded base to the steel base plate. Then, slide the molded base out until the screws which attach the switchette to it are accessible.

(c) ***Motor:*** Replacement of the motor should not be necessary during the normal life of the relay. In the event that replacement is necessary, first remove two screws which are fastened to the left end of the magnet coil assembly. Both screws that attach the motor to the motor support plate may then be made accessible by swinging the magnet assembly down out of the way.

3.03 ***CR2820-A111AA, -B110AA, and -B111AA Time-Delay Relays*** (see Fig. 13 and 14)

(a) ***Magnet Coil:*** To replace the magnet coil, the coil and solenoid assembly must be removed from the timer.

(1) First remove screws (C) releasing auxiliary contact unit, if provided, and then disconnect the coil leads from terminal block screws (A and B). Remove screws (E) and lift the magnet assembly out and down for the CR2820-A111AA relay, and out and up for the CR2820-B110AA and CR2820-B111AA relays.

(2) To replace the coil, push the magnet frame up into the coil guide, remove the keeper plate and spring, pull the magnet frame out of the coil guide, and remove the coil. Insert the new coil and reassemble, reversing procedure. After replacing the coil, connect the coil leads to terminals (A and B), and readjust screw (H) as indicated in (c).

(b) ***Timing Contact Unit:*** To replace the timing contact unit, remove screws (Q) which will release the contact unit from its mounting bracket. Reassemble the new contact unit with screws (Q) and adjust screw (G) as indicated in (c).

(c) The timing contacts should operate when the timing stem is approximately 1/16 inch from the end of its stroke. If not, screw (G) should be readjusted until 1/16-inch operation point is obtained. The operation point of the auxiliary instantaneous contact unit is adjusted in the same manner by means of screw (H).

(d) Do not loosen or remove screws (J) or (K) at any time as this adjustment is preset at the factory. The timing head should at no time be disassembled.

3.04 ***CR2820-B130AA Pneumatic Time-Delay Auxiliary Contact*** ↰

(a) The pneumatic time-delay auxiliary contact is similar to the lower half of the relay shown in Fig. 14. It consists of a timing stem, timing contact unit, and pneumatic head and frame. The pneumatic time-delay auxiliary contact is a component part of a start contactor by which it is actuated.

(b) ***Timing Contact Unit*** (see Fig. 14): To replace the timing contact unit, remove screws (Q) which will release the contact unit from its mounting bracket. Reassemble the new contact unit with screws (Q) and adjust screw (G) as indicated in step (c).

(c) The timing contacts should operate when the timing stem is approximately 1/16 inch from the end of its stroke. If not, screw (G) should be readjusted until 1/16-inch operation point is obtained. The timing head should at no time be disassembled. ↲

3.05 ***Replacing CR2820-1099, CR2820-1740A, or CR2820-A111AA Relay With CR2820-B111AA Relay***

(a) ***General***

(1) The smaller KS-5311 starting compensators are mounted in cabinets which open from the front and top only. The larger

KS-5311 starting compensators have removable front and back covers. Also, the relay may be mounted on a metal plate or on an asbestos fiber backboard. When mounted on a metal plate, the supporting bolts and spacers must be removed prior to identifying the leads as described in (b). Where the six terminal studs fasten the relay to the asbestos fiber backboard, the leads must be identified as described in (b), prior to unfastening the relay.

(2) If the CR2820-1740A relay is equipped with a plastic cover, the cover must be removed for identification of leads as described in (b), prior to unfastening the relay.

(b) ***Identification of Leads***

(1) Prepare four small tags with the identifying letters W, X, Y, and Z. A fifth tag with the identifying letter V will be required for the CR2820-1740A or CR2820-A111AA relay mounted in the following starters:

KS-15663, Lists 7 and 8

KS-15781, Lists 7 and 8

KS-15854, Lists 7 and 8

(2) Remove the leads from each terminal of the old relay and identify them as shown in the appropriate Fig. 15, 17, or 19. For example, in Fig. 15, the lead connected to the TA terminal will be tagged W. Straps between terminals of the old relay can be removed.

(3) If the leads are not located on terminals as shown in Fig. 15, 17, or 19, check the schematic of the particular compensator or starter in question, as shown in Section 026-305-701, and rearrange the tags in accordance with the schematic figure.

(c) ***Mounting of the CR2820-B111AA Relay***

After removing the old relay, place the new relay over the old location in such a manner that the new holes will not overlap the old holes. Drill four 7/32-inch holes, and mount the relay with suitable bolts. See Fig. 23 for mounting dimensions.

Note: If the two upper mounting holes of the CR2820-A111AA relay can be utilized, it will be necessary to drill only for the two lower mounting holes.

(d) ***Method of Wiring New Relay***

(1) In most cases, front wiring or rear wiring through wire entrance holes will be the same as that used to wire the old relay. If any doubt arises as to which method should be employed, consult the supervisor.

(2) If rear of panel wiring is used, drill 1/2-inch holes as shown in Fig. 24, utilizing any existing wire entrance holes associated with the old relay.

(e) ***Splicing of Leads***

(1) If the existing leads are not long enough to reach terminals of the new CR2820-B111AA relay, they must be spliced or otherwise lengthened with flexible or solid wire of the same or larger size.

(2) When the leads are twisted together, they may be connected with solderless connectors or be soldered and taped.

(f) ***Connections to New Relay***

(1) Connections to the terminals of the CR2820-B111AA relay should be made by stripping the wires and securing them under the screw heads.

(2) Connect the tagged leads to the new relay as shown in Fig. 22. For example, connect the "Z" lead to the T1 terminal. Strap between the T2, T3, and B1 terminals, and between B2 and W1.

(g) ***Checking Operation:*** Start the motor in the regular manner to check operation of the relay. After satisfactory operation is noted, dress up the leads and install the cover.

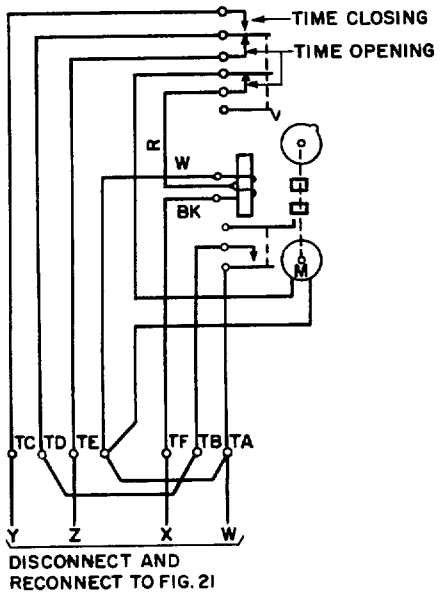

Fig. 15 – Schematic Diagram of CR2820-1099 Time-Delay Relay

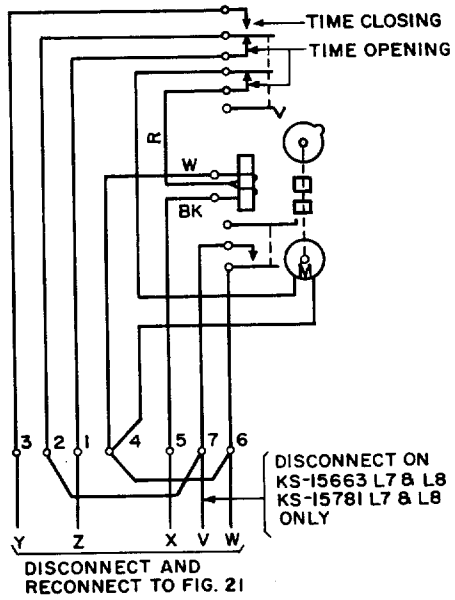

Fig. 17 – Schematic Diagram of CR2820-1740A Time-Delay Relay

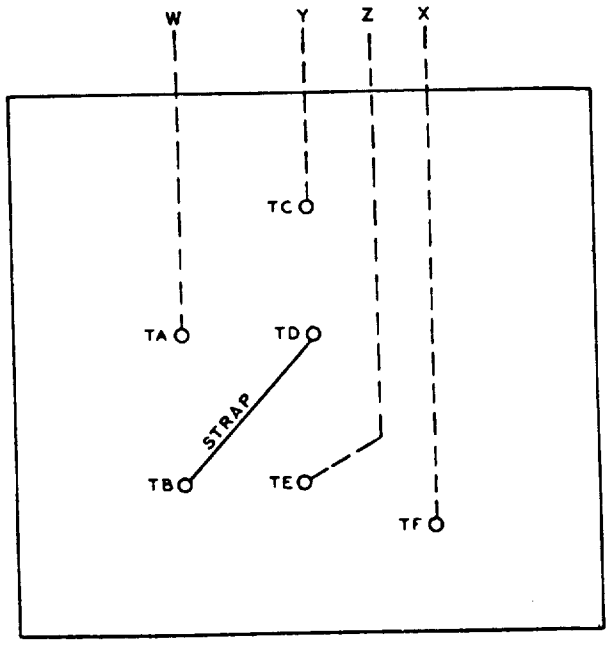

Fig. 16 – Terminals Viewed From Rear of CR2820-1099 Time-Delay Relay

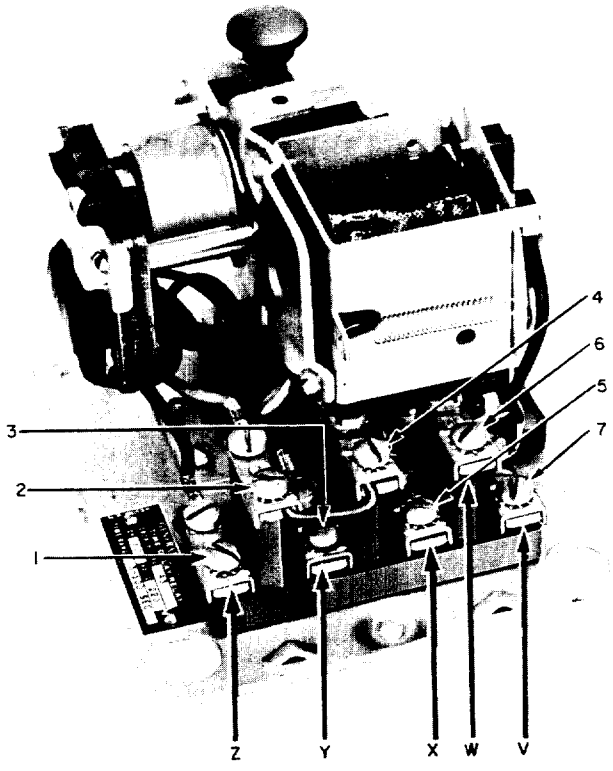

Fig. 18 – Terminals Viewed From Front of CR2820-1740A Time-Delay Relay

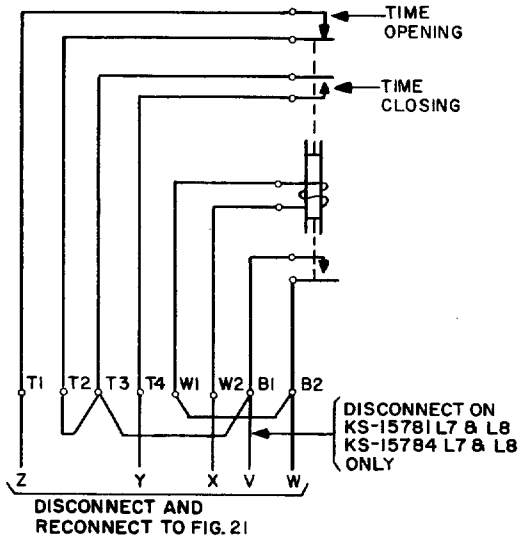

Fig. 19 – Schematic Diagram of CR2820-A111AA Time-Delay Relay

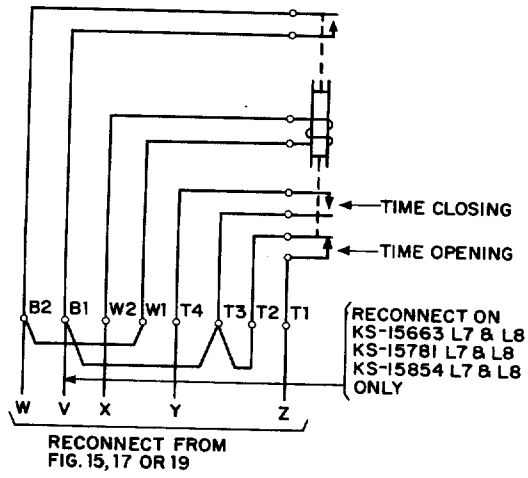

Fig. 21 – Schematic Diagram of CR2820-B111AA Time-Delay Relay

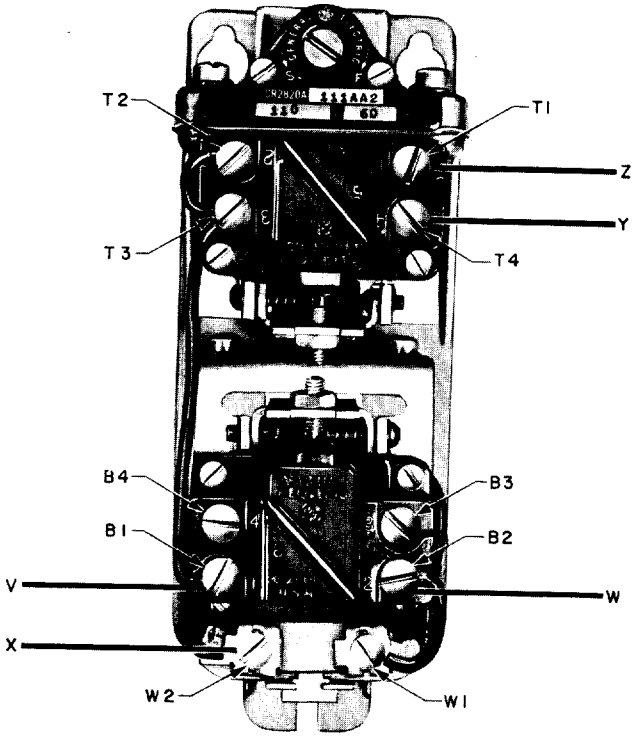

Fig. 20 – Terminals Viewed From Front of CR2820-A111AA Time-Delay Relay

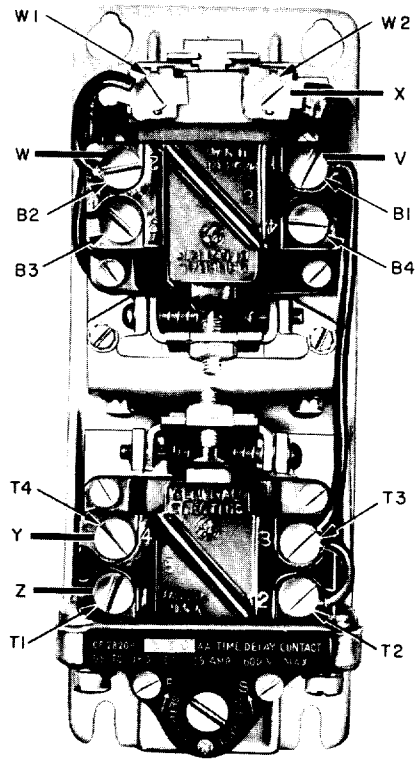

Fig. 22 – Terminals Viewed From Front of CR2820-B111AA Time-Delay Relay

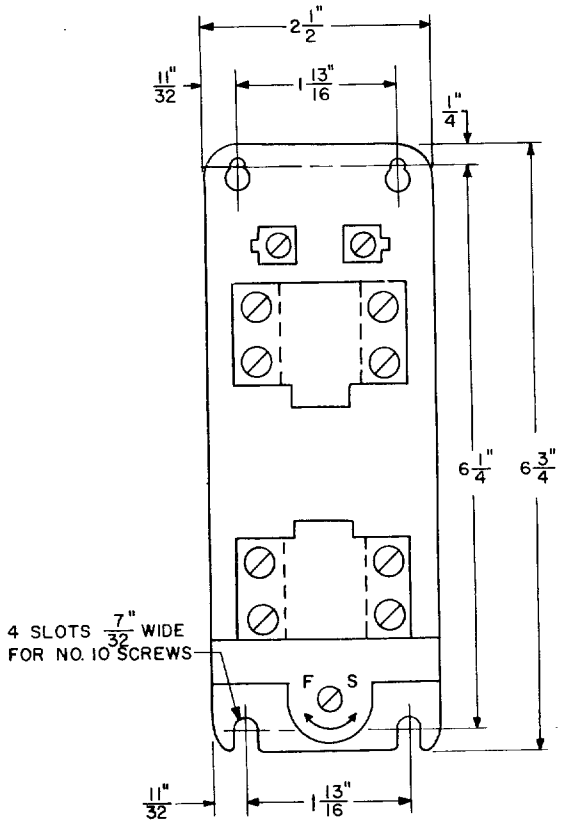

Fig. 23 – Mounting Dimensions for CR2820-B111AA Time-Delay Relay

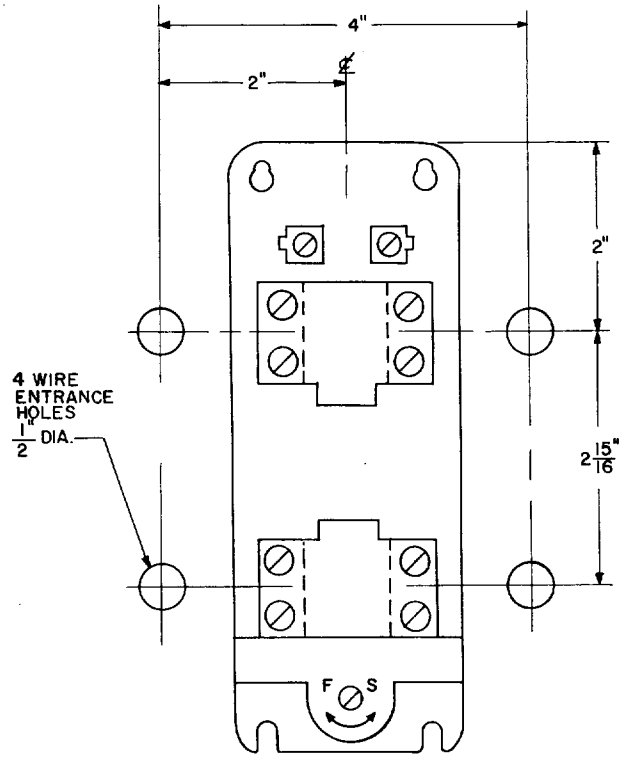

Fig. 24 – Drilling Information for Rear of Panel Wiring — CR2820-B111AA Time-Delay Relay