INSTRUCTIONS

TIME-DELAY UNDERVOLTAGE SYSTEM USING IC2820-C100C, D, OR E RELAY

Before any adjustments, servicing, parts replacement or any other act is performed requiring physical contact with the electrical working components or wiring of this equipment the POWER SUPPLY MUST BE DISCONNECTED.

INTRODUCTION

This instruction covers a circuit and circuit components for use on an a-c system to give adjustable time-delay dropout on voltage failure and to give instantaneous pickup and dropout from a START-STOP control switch. This circuit is available for 110-volt and for 208/230-volt control sources.

The IC2820-C100 is a self-contained, front-connected, d-c operated relay that can be mounted on a steel or insulation base. Auxiliary interlocks are available as shown in Table 1. It should be noted that 1 NO and 1 NC interlock are required in the circuit, Fig. 1.

TABLE I: Auxiliary Interlocks

IC2820-C100	NO	NC
Form C	1	1
Form D	2	2
Form E	1	3

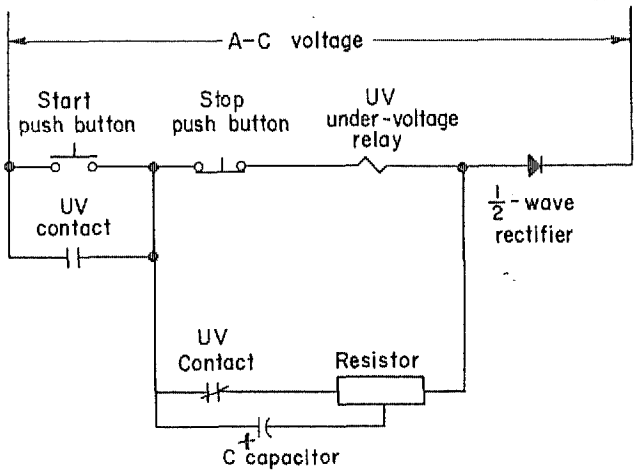

Fig. 1. Elementary wiring diagram for time-delay undervoltage using an IC2820-C100C relay

Metalic rectifiers are used to supply direct current to the relay.

Time delay on voltage failure is obtained by capacitor timing. The type of relay, rectifier and resistor used in the circuit, shown in Fig. 1, is the same in each case regardless of the time delay required.

For a 110-volt, a-c control circuit, relay coil 22D-11G25 and a 200-mf, 300-volt capacitor are used.

For a 208/230-volt, a-c control circuit, relay coil 22D11G168 and a 50-mf, 450-volt capacitor are used.

OPERATION

Figure 1 shows the elementary connection of the circuit.

Closure of START contact will apply pulsations of half-wave rectified power to the relay to pick it up and close its seal circuit and will charge the capacitor. During the blocked-out half-waves of a-c, the capacitor will supply voltage to the relay to prevent its dropping out.

On failure of the a-c control voltage, the capacitor will discharge through the relay coil. The time required for this voltage to decay to a value which will allow the relay to dropout is determined by the RC time constants of the circuit.

When the STOP contact is opened, the relay coil will be de-energized and the device will drop out instantaneously. Its normally closed contact will allow the capacitor to discharge through the resistor. The ohmic value of the resistor must be so chosen that the RC time constant of this discharge circuit is low enough to prevent reclosure of the relay upon release of the STOP contact.

MOUNTING

The relay should be mounted with the armature knife edge at the top and the contact tips in the down position, Fig. 2. The knife edge (E) of the armature should be kept free from dust, as any accumulation will affect the timing.

When mounting the relay, the proper NEMA standard for electrical clearance and creepage to conducting parts and to ground must be maintained.

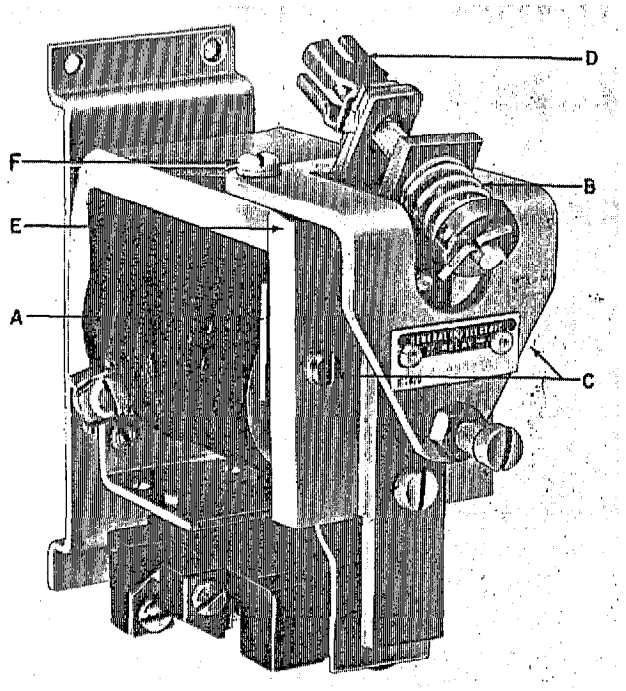

Fig. 2. IC2820-C100C relay

To obtain maximum interruption rating of the electrical interlocks, an air gap of ¾-inch must be maintained between the open face of the interlock and any conducting part or ground.

ADJUSTMENT

GENERAL

The adjustment of time-delay dropout should be made by means of the sliding bimetal shim (A), Fig. 2. The bimetal shim is composed of a steel magnetic portion and a nonmagnetic portion, Fig. 3.

The bimetal sliding shim should always be assembled to the relay armature with the steel magnetic portion in the up position or nearest the armature knife edge. The notched corner of the shim, Fig. 3, indicates the steel portion. To shift the position of the shim, loosen the two screws (C), Fig. 2, in the armature of the relay and slide the shim either up or down depending upon the change in time required, then tighten the screws. By moving the shim down, more steel is introduced between the armature and the core. This reduces the air gap in the magnetic circuit and permits a higher flux density. Then, on voltage failure, the coil current will decay to a smaller value before the relay drops out. Thus, sliding the shim down increases the time required to drop out, while sliding the shim up decreases the time required to drop out.

GAP SETTING

The armature back-stop screw should allow 0.08- to 0.095-inch travel of armature away from this stop.

SPRING PRESSURE

Spring pressure should be measured at a point on the centerline of the relay arm ⅛th of an inch from the end of the arm. Measure pressure sufficient to cause armature to break contact with its back-stop.

The spring pressure varies with voltages and times required. The adjustment of the tension spring (B), Fig. 2, is made by adjusting the nut (D), Fig. 2. Discretion must be used in adjusting the spring. The magnitude of the spring tension must be such as to hold the armature positively against the back-stop but not of such magnitude as to prevent the armature from closing when the relay coil is energized at its maximum operating temperature.

The spring pressures should be as follows:

8–12 ounces when the relay is used in a 220- or 230-volt a-c circuit.

TESTING

Check tip gap setting and set spring pressure.

Set the time-delay dropout, by means of the sliding shim, to give 1.5–2.0 seconds after application of power for one minute. Dropout with the push-button operation should be instantaneous.

Check the pickup after the above adjustments have been made. Pickup should be between 60–80 percent as measured across the complete control voltage source. If this value is not obtained with the initial

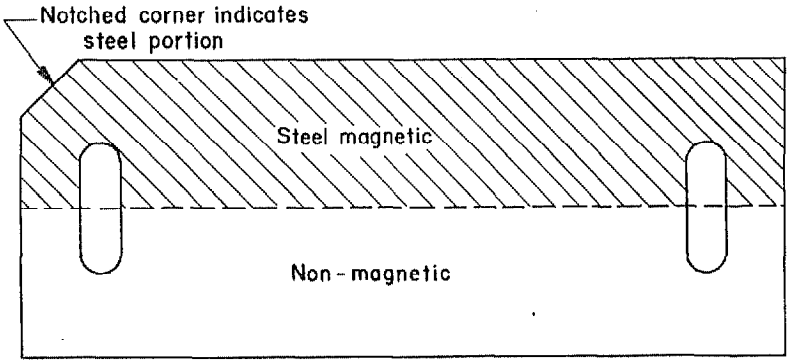

Fig. 3. Bimetal sliding shim used on IC2820-C100C relay

adjustment, change the spring pressure and shim setting, and recheck the pickup.

To obtain longer time delays, additional capacitors may be added in parallel with the existing one. Pick-up and adjustment must then be checked in the manner described above.

MAINTENANCE

COILS

To replace coils, first remove the armature assembly as a unit by removing the two screws (F), Fig. 2. This eliminates the possibility of disturbing any ad justments. Then remove coil retainer. After replacing the coil and armature assembly, perform the necessary checks under adjustments.

SHIMS

To replace a shim, remove screws (C), Fig. 2, which will allow removal of the shim clamp located under the armature. It should be noted that a 2-mil stationary shim is mounted between the sliding shim and the armature. Replace the shim being careful to mount it with the beveled corner towards the armature knife edge and to replace the 2-mil shim. Position the tapped holes in the shim clamp with the slots in the shim and the through holes in the armature. Insert screws (C) and tighten to engage the shim clamp. Readjust the shim to obtain proper timing. Then tighten screws securely to maintain the shim setting.

ELECTRICAL INTERLOCKS

Replace contact tips when the wipe as specified in Table II decreases to one-half of the minimum specified.

To replace removable contacts on interlock blocks illustrated in Figs. 4, 5, and 6, lift the spring seat with the thumb and forefinger and remove the operating plunger which supports the movable contacts. Snap off the U-shaped keys and the movable contacts can be removed and replaced. Care should be taken not to lose any parts or pieces during this operation.

To replace a stationary contact, remove the terminal screw and lift the contact assembly off the housing. Replace by pressing the new contact assembly into the molded insert and run the terminal screw to its seal position. Care should be taken to avoid changing the shape of this contact assembly in handling. Also, the shape should not change during operation.

The complete electrical interlock block can be replaced with a new one by removing it and its bracket from the contactor base. Remove the interlock block from the bracket, then assemble the new interlock block on the bracket, maintaining the same position on the bracket. Assemble the interlock bracket to the contactor base and check the tip gaps and wipes as given in Table II.

TABLE II: Contact Tip and Wipe

Contacts		Maximum	Minimum
Not Operated	(NO) Tip Gap (NC) Tip Wipe	$\frac{7}{64}$" $\frac{5}{64}$"	$\frac{5}{64}$" $\frac{3}{64}$"
Operated	(NO) Tip Wipe (NC) Tip Gap	$\frac{5}{64}$" $\frac{7}{64}$"	$\frac{3}{64}$" $\frac{5}{64}$"

Contact Rating

Number of Contacts	Carry	Make	Interrupt						
			D-c Inductive*			A-c**			
			125V	250V	600V	110V	220V	440V	600V
One Set	10	60	1.8	0.5	0.2	6	3	1.5	1.2
Two Sets in Series	10	60	4.0	1.2	0.35				

* Non-inductive d-c interrupting rating is 1.5 times inductive.
**Capable of interrupting inrush current of 60 amperes at 110 volts, 30 amperes at 220 volts, 15 amperes at 440 volts, and 12 amperes at 600 volts a limited number of times.

The electrical interlock block has internal parts which can be rearranged to give different contact arrangements. Should this be necessary the parts should be reassembled in accordance with Figs. 4, 5, or 6.

Spring ends must not protrude into holes (A), slots (B), or keys (C), which serve as guides for operating arm. See Fig. 4.

Contact blocks with two normally closed circuits require a spring spacer (D) as shown in Fig. 4 to assure that the center spring is properly in place.

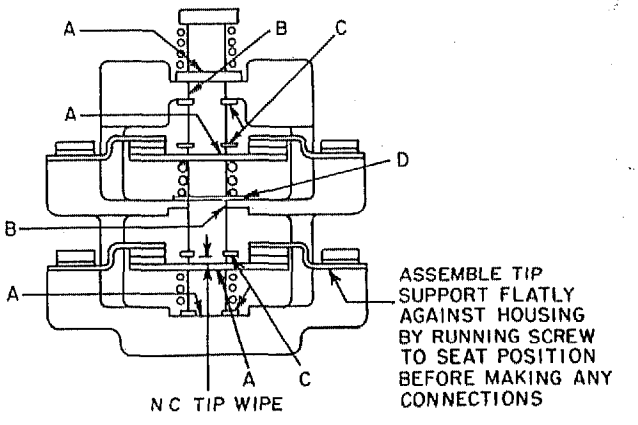

Fig. 4. Contact block with normally closed contacts in unoperated position

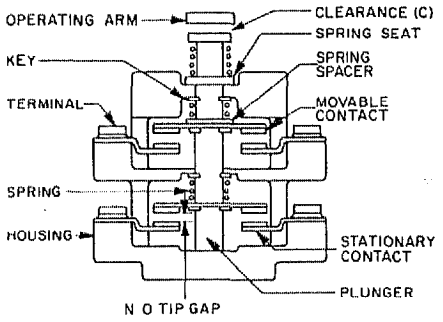

Fig. 5. Contact block with normally open contacts in unoperated position

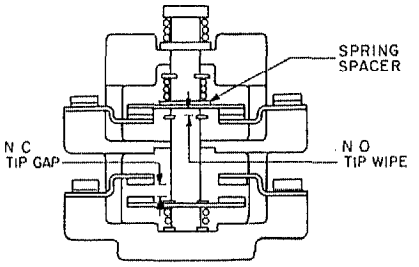

Fig. 6. Contact block with one set of normally open contacts and one set of normally closed contacts in operated position

Because of the circuit rearrangement feature, a spring spacer is supplied with all other two-circuit contact blocks, as shown in Fig. 5 and 6.

When circuits are rearranged to obtain one normally open and one normally closed circuit, the normally closed circuit must be located at the bottom as shown in Fig. 6.

The interlock should be positioned on its bracket so that with the relay in its energized position, the interlock plunger, Fig. 5, should not bottom, and with the contactor in its de-energized position, there should be some clearance (C) between the interlock plunger and the interlock operating arm, Fig. 5.

Tip gaps and wipes, when new, should be as shown in Table II, page 3. Replace contact tips when wipe reaches one half of minimum specified.

RENEWAL PARTS

Renewal parts information is contained in renewal parts bulletin GEF-4152. When ordering renewal parts, specify the quantity required and give catalog number or describe the parts in detail. Also, give the complete nameplate rating of the equipment.

INDUSTRY CONTROL DEPARTMENT
GENERAL ELECTRIC
SALEM, VA. 24153