UNDERFREQUENCY RELAYS

TYPES: CFF15A
          CFF15B
          CFF15C
          CFF15E

TARGET AND
SEAL-IN UNIT

RESIDUAL
SCREW

B

RESISTOR
FOR PICK-UP
ADJUSTMENT

A

CONTROL
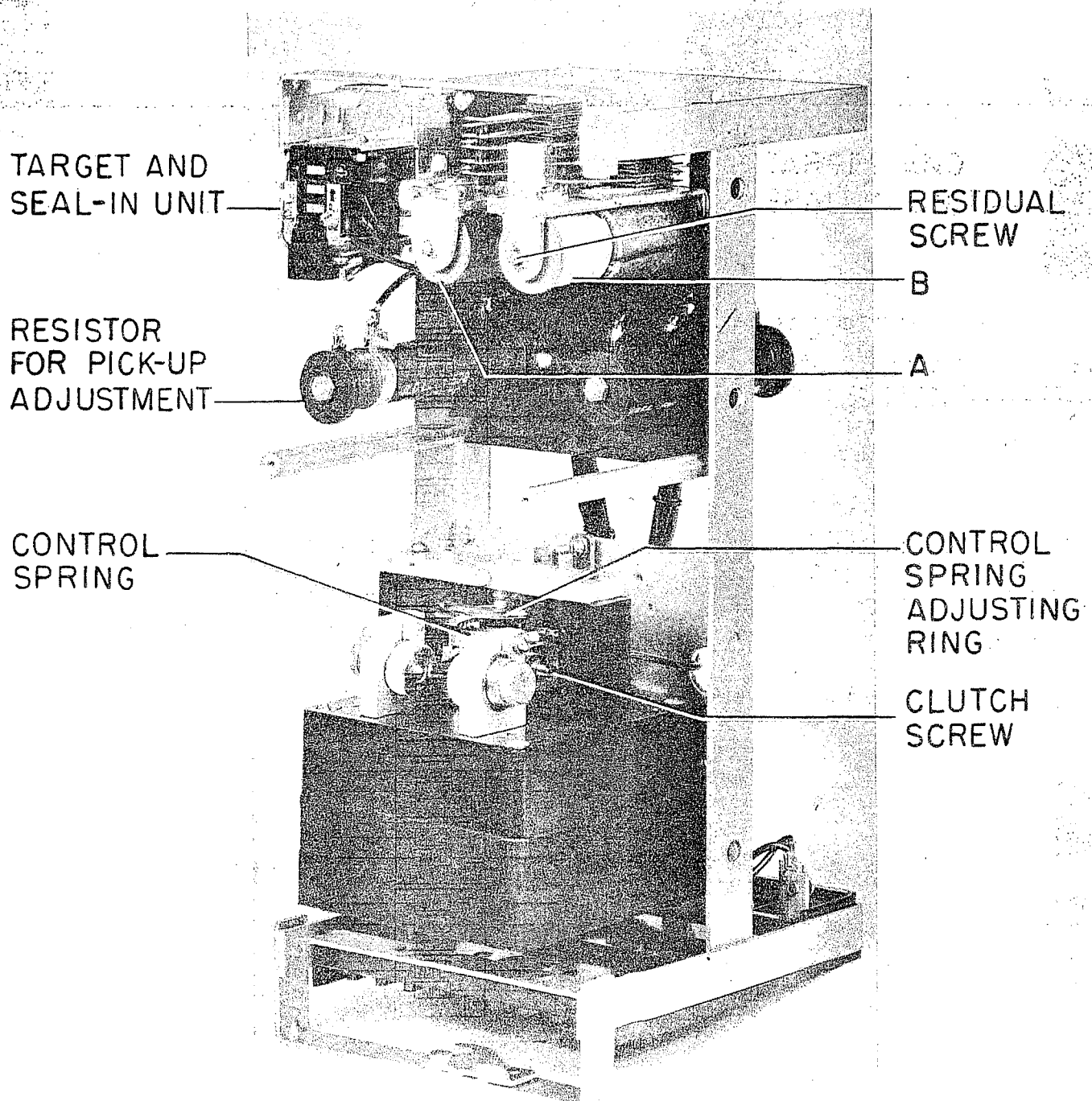SPRING

CONTROL
SPRING
ADJUSTING
RING

CLUTCH
SCREW

FIG. 1 (8024922) TYPE CFF15A RELAY (3/4 FRONT VIEW)

UNDERFREQUENCY RELAYS
TYPES CFF15A, CFF15B,
CFF15C, CFF15E

INTRODUCTION

The type CFF15A, 15B, and 15E are similar to the CFF12A relays. The type CFF15C is similar to the CFF12C, that is both have AC auxiliary circuits for use where DC is not available. The instructions for the CFF12A and CFF12C relays are covered by the included book GEI-30916. The combination of the two books supply the instructions for the subject relays.

The basic difference between the type CFF12 and CFF15 is in the length of time delay supplied by auxiliary telephone relays. The CFF12 relays provide for a 6 cycle time delay (60 cycle basis) via one telephone relay. The CFF15 relays by the use of two telephone relays provide for a 21 cycle time delay. Fig. 1 shows the two relays called A and B.

With respect to the controls for calibrating the cup unit for the desired operating frequency, all the relays use adjustable resistors. Some of the CFF15's use only one slide band type of resistor, others use slide band resistors in combination with a rheostat. These differences are shown in their internal connection diagrams. Fig. 1 shows the relay with the slide band resistor.

In order to provide for the rated adjustable frequency range in the models CFF15B3 and up, CFF15C2 and up and the CFF15E relays, a fixed resistor of 3700 ohms with a tap at 1200 ohms is added to the circuit to provide the necessary additional resistance to reach the lower end of the frequency range.

CONNECTIONS

Fig. 2 shows the internal connection diagram for the CFF15A relays. The model CFF15A1A uses a slide band resistor; the models CFF15A2 and up use a rheostat

The internal connection diagram for the other types of the CFF15 relays and the means to control the calibration are shown in the following tabulation:

FIG.	MODEL	CONTROL OF CALIBRATION
2	CFF15A1 and A2	(A1) 1400 SB - (A2) 5000 R
3	CFF15B1 and B2	250 R and 1400 SB
4	CFF15B3 and up	250 R, 1400 SB and 3700 FT
5	CFF15C1	250 R and 1400 SB
6	CFF15C2	1500 R and 3700 FT
7	CFF15C3 and up	1500 R and 3700 FT plus Zener*
8	CFF15E1 and up	1500 R and 3700 FT

R = Rheostat, SB = slide band, FT = fixed resistor with tap

Figs. 9 and 10 show typical external connection diagrams for the types CFF15A and 15C.

* The use of the zener in this model provides for a flatter frequency vs. voltage characteristic. Instructions for obtaining this type of characteristic is as follows:

1. Make a preliminary setting of the calibration after a 15 minute warm-up at rated voltage and frequency.
2. Permit the relay to self-heat for at least 1 hour. Then set the calibration at the required frequency at rated voltage.
3. Reduce the supply to 60 volts and by control spring adjustment, set the operating value near the 115 volt setting. Then check the operating values from 60 to 120 volts to determine the operation frequency vs. voltage characteristic.

4. By control spring and rheostat adjustment, a characteristic should be obtainable whose change in operating value from any voltage between 50 to 120 will be between +.05 to -.10 Hz.

PRECAUTIONARY NOTE:
SINCE THE SHAPE OF THE VOLTAGE CHARACTERISTIC IS NOW UNDER THE CONTROL OF THE ZENERS AS WELL AS THE CONTROL SPRING, ANY NEW FREQUENCY SETTINGS WILL REQUIRE A RECHECK OF THE CHARACTERISTIC AND POSSIBLE MODIFICATION OF THE CONTROL SPRING ADJUSTMENT.

AUXILIARY CIRCUIT OPERATION

The CFF15's employ two auxiliary telephone relays called "A" and "B".

The function of relay "A" is to supply a pickup time delay in the order of 6 cycles.

Relay "B" provides a dropout time delay in the order of 15 cycles.

The combination of the two provides for the 21 cycle delay.

Under normal conditions, the right contact of the CFF relay is closed, which will energize "B". When the underfrequency conditions occur, the CFF will open its right contact starting "B" to dropout and closing its left contact to energize relay "A" (when "B" ultimately drops out). The pickup of "A" energizes the trip coil circuit.

To modify the total time, adjustments should be made on relay "B" since it contributes the major portion of the time. The time may be altered by adjusting the residual screw that projects through its armature. The screw must project through the armature by at least 0.003" in any final setting for the purpose of preventing it from holding up on residual magnetism.
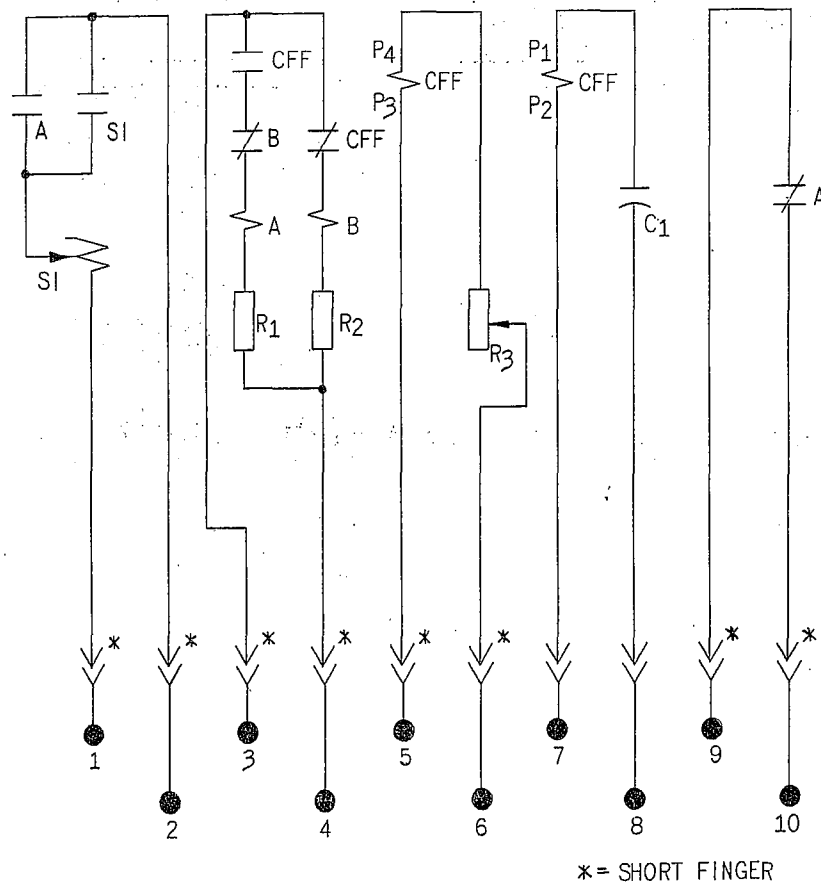

*= SHORT FINGER

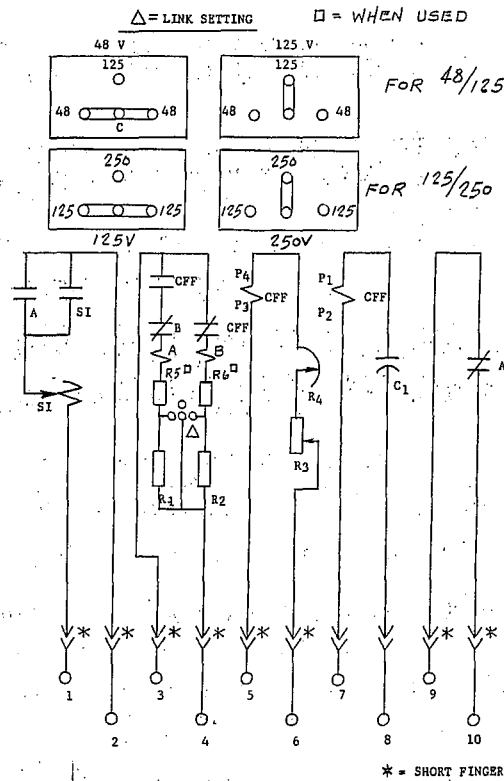FIG. 2 (459A256-0) Internal Connections Diagram For The CFF15A Relay (Front View)

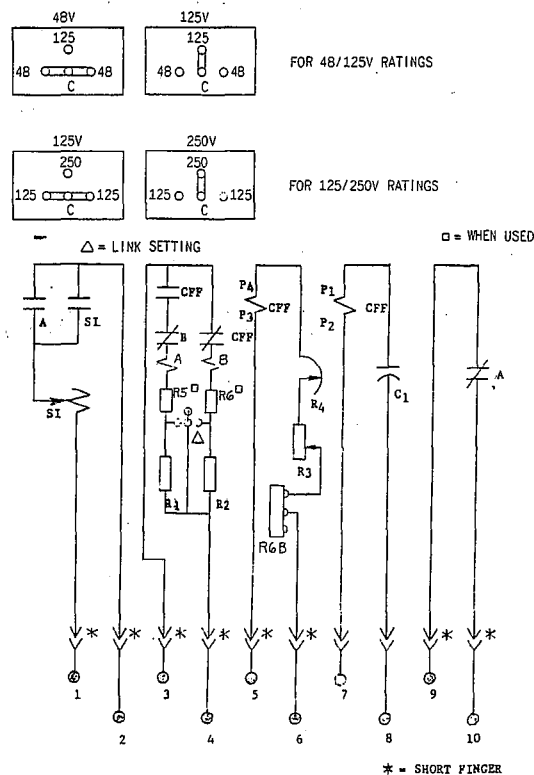FIG. 3 (0195A9124-1) Internal Connections Diagram For The CFF15B Relay (Front View)

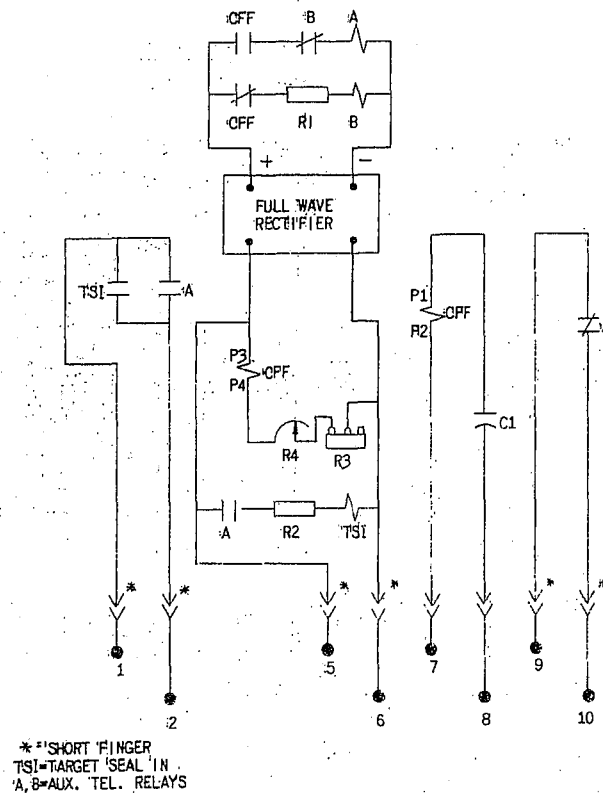FIG. 4 (0203A8668-0) Internal Connections Diagram For The CFF15B (Form 3 & up) Relays (Front View)

FIG. 5 (0203A8503-2) Internal Connections Diagram For The CFF15C (form 1 only) Relay (Front View)
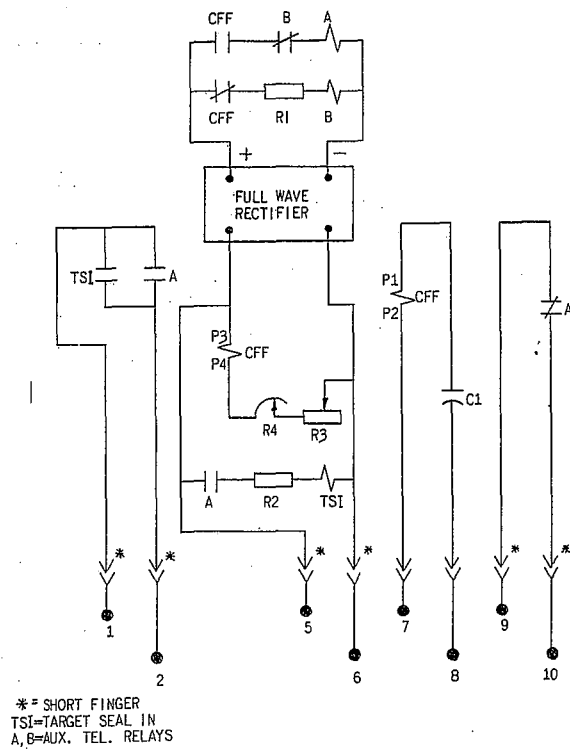

FIG. 6 (0203A8683-1) Internal Connecitons Diagram For The CFF15C (form 2 only) Relay (Front View)
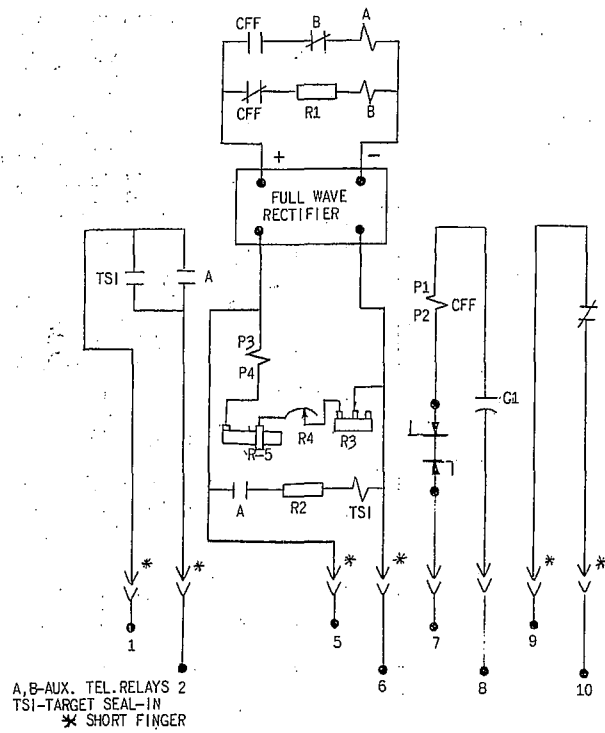
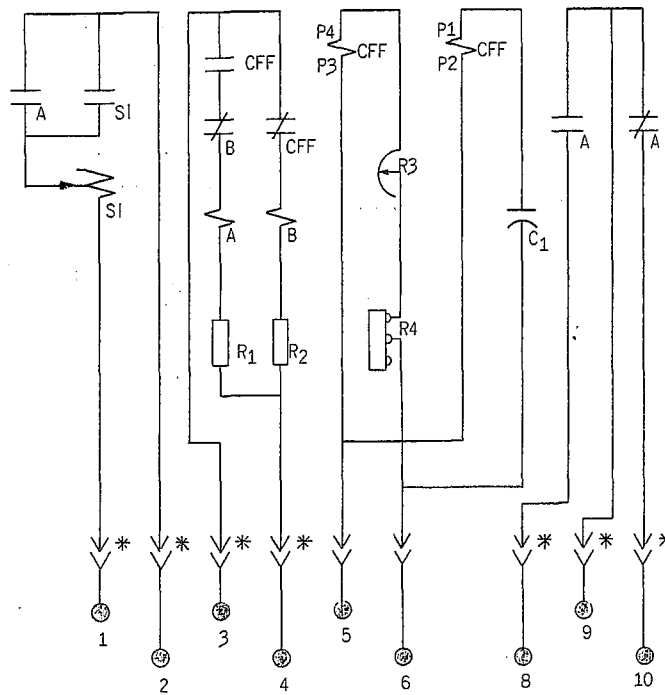FIG. 7 (0208A2499-0) Internal Connections Diagram For The CFF15C (form 3 & up) Relays (Front View)

FIG. 8 (0208A2328-0) Internal Connections Diagram For The CFF15C Relay (Front View)
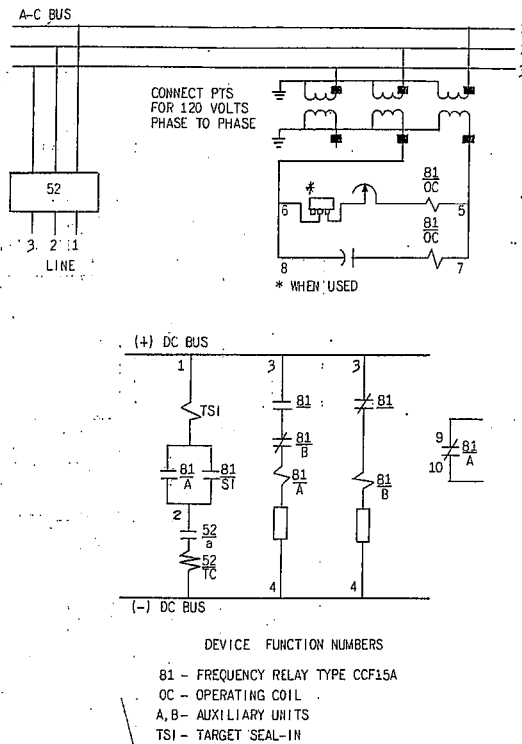
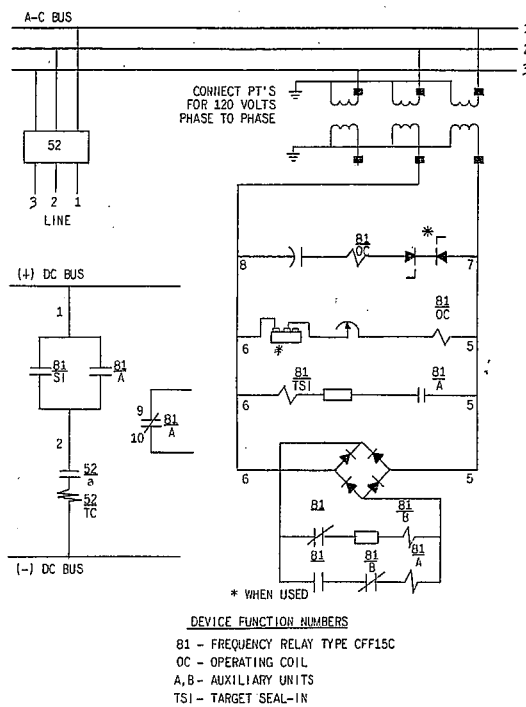FIG. 9 (0208A5512-0) External Connections Diagram For The CFF15A Relay

FIG. 10 (0208A5513-0) External Connections Diagram For The CFF15C Relay