TYPES KU-1 AND KU-2 DEFINITE TIME RELAYS
INSTRUCTIONS

INTRODUCTION

The KU relay is for use on a-c. circuits only, to obtain a definite time action, with instantaneous reset, and is essentially a contact mechanism actuated through a train of gears by a constant speed induction motor.

MOUNTING

The relay should be mounted as shown in Fig. 1.

GENERAL

1. Make sure that the armature is loose and free to move in its cradle.

2. The latch should move freely.

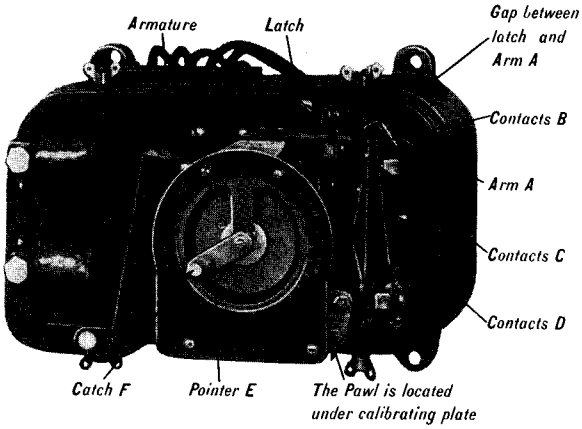

Fig. 1—Definite Time Relay

GAPS

For proper operation of the relay, the gaps should be maintained as given below.

The latch prevents the contact arm from closing the contact B, until a definite time has elapsed. There should be a small gap (1/8") between the latch and the contact arm A. There should be a gap 3/16 inch between contacts B with the armature closed, and with the latch down in its normal position. The contacts C must be in contact when the armature of the relay is energized and the latch down in the normal position. Contact D must make circuit when the armature closes.

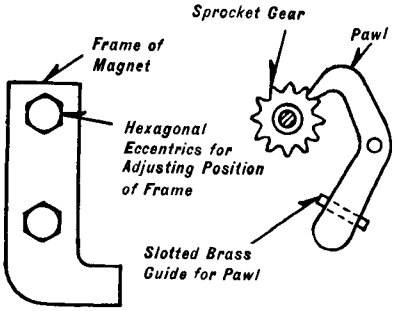

Fig. 2—View Showing Magnet Frame, Eccentrics, Sprocket Gear and Pawl

NOTE—It is necessary to have the pawl mesh correctly in the gears to give satisfactory operation. When the magnet is closed the pawl should just start to move from the slotted brass guide, as shown in Fig. 2. This adjustment is made by moving the magnet frame to right or left by means of the hexagonal eccentrics supporting the frame of the base. The hexagonal headed bolts on the outside of the frame should be slightly loosened before attempting to turn the eccentrics and then again tightened before putting the relay in operation.

GEARS

With the relay in the normal condition (de-energized) the pawl is not in mesh with the train of small gears. The closing of the armature of the magnet meshes the pawl in one of the gears which are rotated by the motor. The armature should move a short distance before meshing the pawl.

TIME

There are two means by which time adjustment is obtained.

The first or coarse adjustment is made by placing the pawl, which is located under the right hand corner of the calibrating plate, in one of the three notches of the KU-1, and in one of the four notches of the KU-2 relay.

The second or fine adjustment is made by pressing catch F, Fig. 1, and rotating the pointer on the calibrating scale to the desired time setting, then releasing catch F, which allows a pin on the under side to enter a hole in the calibrating scale, thus holding the pointer in position. It is preferable to keep the pointer nearer the center and away from the extremes of the calibrating scale. This can be done by shifting the pawl to give approximately the desired time with the pointer in the middle.

For satisfactory operation the relay should not be set for a shorter time interval than 1/2 second.

The maximum time calibration that can be obtained is shown in the table below.

TYPE KU-1 RELAY

Location of Pawl	60 Cycles Min.	60 Cycles Sec.	50 Cycles Min.	50 Cycles Sec.	25 Cycles Min.	25 Cycles Sec.
Inner Notch	—	2	—	3	—	7
Middle Notch	—	8	—	10	—	28
Outer Notch	—	33	—	41	1	58

TYPE KU-2 RELAY

Location of Pawl	60 Cycles Min.	60 Cycles Sec.	50 Cycles Min.	50 Cycles Sec.	25 Cycles Min.	25 Cycles Sec.
Inner Notch	—	29	—	35	1	38
Second Notch	2	14	2	40	8	—
Third Notch	8	48	10	54	32	—
Outer Notch	33	30	43	3	127	—

OPERATION

Fig. 3 shows the connections of the relay when used with a magnetic reduced voltage starter.

When the "start" button of the push button station is pressed, the motor and the magnet coils of the relay are energized. This causes the motor to rotate and the relay armature to pick up meshing the pawl and gears and making electrical contact at "LV", which short circuits the start button station and completes the holding circuit (starting position). After a definite time dependent upon the setting of the relay, the latch is released which allows the contact arm to break the circuit at A and make contact at B, causing the starting contactor to open and the running contactor to close. This also disconnects the relay motor (running position).

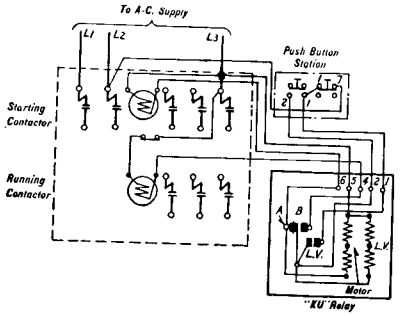

Fig. 3—Diagram of Connections When Used with a Magnetic Reduced Voltage Starter

When the relay is de-energized the pawl is disengaged, and the return spring on the support for the gears returns the mechanism to its normal position. The relay armature with its contacts also returns to the normal position.

*To be filed as an Instruction Leaflet and as Renewal Parts Data; for Renewal Parts, see reverse side of this sheet.

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RENEWAL PARTS DATA

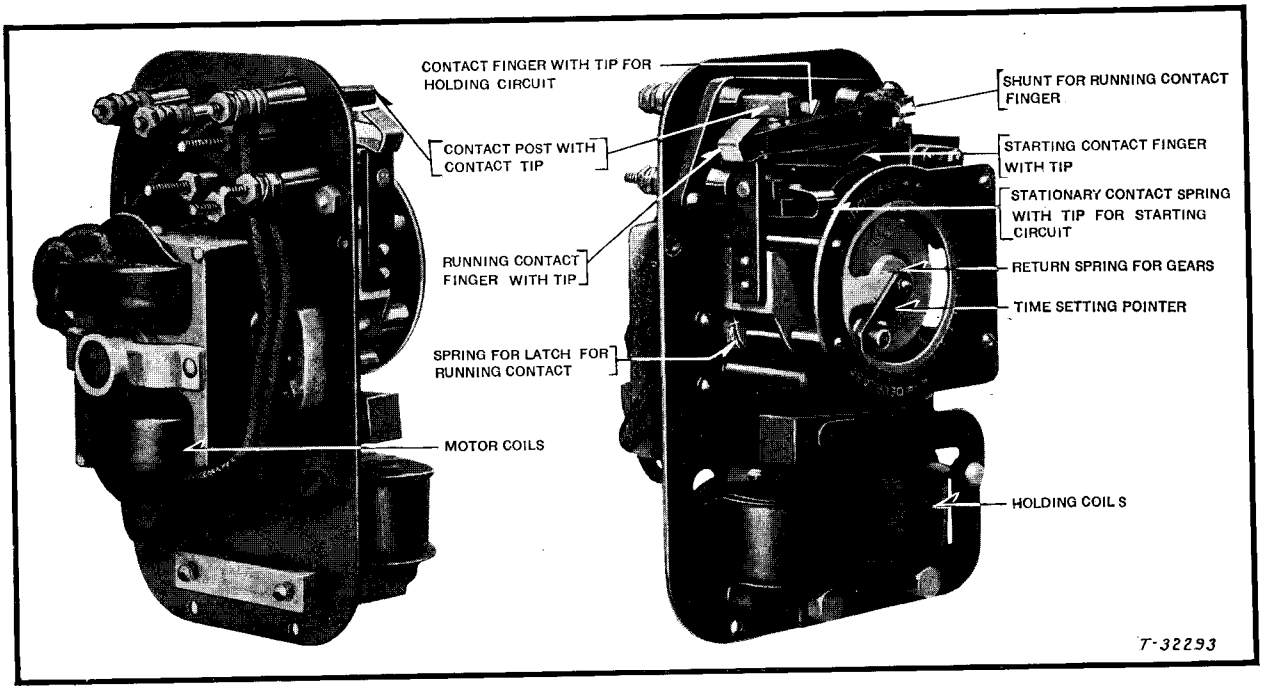

Fig. 4—Renewal Parts for KU-1 and KU-2 Relays

Table of Operating Coils

Volts	Cycles	Holding Coil Style No.	Motor Coil Style No.
110	60	712461	712460
†220	60	553242	553247
‡440	60	553242	553247
550	60	553243	553248
110	50	760321	760323
†220	50	553243	553248
‡440	50	553243	553248
550	50	553244	553249
110	25	760322	760324
†220	25	553245	553250
‡440	25	553245	553250
550	25	553246	553251

†Connect in Parallel
‡Connect in Series

See Table above for commonly used operating coils.

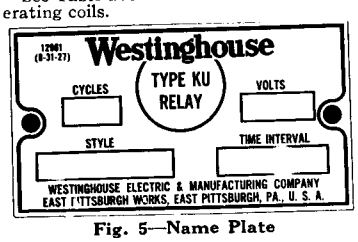

Fig. 5—Name Plate

Recommended Stock of Renewal Parts

For Relays in use up to and including		1	5	15
Name of Part	No. Per Relay	Recommended for Stock		
Torsion spring for time setting pawl	1	0	1	2
Starting contact finger with tip	1	1	1	2
Running contact finger with tip	1	1	1	2
Shunt for running contact finger	1	0	1	2
Spring for latch for running contact	1	0	1	2
Stationary contact spring with tip for starting circuit	1	1	1	2
Contact finger with tip for holding circuit	1	1	1	2
Contact post with contact tip for running or holding circuit	2	1	1	2
Return spring for gears	1	0	1	2
Torsion spring for stop lever	1	0	1	2
*Time setting pointer with latch plate, spring and push button	1	0	1	2
**Motor coil	2	1	2	4
**Holding coil	2	1	2	4

*Not listed on illustration.
**When ordering Motor or Holding Coil specify voltage, frequency, and identification number stamped on coil.

This is a list of the Renewal Parts and the quantities of each that we recommend should be stocked by the user of this apparatus to minimize service interruptions caused by breakdowns. The parts recommended are those most subject to wear in normal operation, or to damage or breakage due to possible abnormal conditions.

This list of Renewal Parts is given only as a guide. When continuous operation is a primary consideration, additional insurance against shutdowns is desirable. Under such conditions more renewal parts stock should be carried, considering the severity of service and the time required to secure replacements.

Ordering Instructions

Name the part, using the name shown in the illustration. Give the complete name plate reading. State whether shipment is desired by express, freight or by parcel post. Send all orders or correspondence to nearest Sales Office of the company. Small orders should be combined so as to amount to a value of at least one dollar, as order-handling and shipping expenses prevent us from billing a smaller amount.

*To be filed as Renewal Parts Data and as an Instruction Leaflet; for Instructions, see reverse side of this sheet.

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