INSTRUCTIONS

GEK-45344 A
Supersedes GEK-45344

TIME - OVERCURRENT RELAY

TYPE IAC66S

GENERAL ELECTRIC

CONTENTS

TIME-OVERCURRENT RELAY
TYPE IAC66S

DESCRIPTION

The type IAC66S is a single phase overcurrent relay that was specifically designed for industrial and power plant applications to protect medium voltage circuits that supply low voltage load centers. The multiple time overcurrent characteristics provide these relays with the ability to coordinate very closely with overcurrent trips and Power Sensors normally applied with the low voltage circuit breakers used in load centers. The relay contains five units; a long time overcurrent unit, two instantaneous overcurrent units, a DC operated static timer unit, and a target and seal-in unit. The relay is enclosed in an S2 case with no upper contact block. Three IAC66S relays are required for complete 3 phase protection.

APPLICATION

The type IAC66S relay is used in the protection of industrial and power plant circuits when it is required to coordinate the relay characteristics with the long time, short time and instantaneous overcurrent trip characteristics that are usually provided with 600 volt air circuit breakers. The application of the IAC66S relay with circuit breakers feeding load centers will provide a means of obtaining better primary protection and at the same time maintaining selectivity with downstream air circuit breakers. Typical time-current coordination curves are shown in Fig. 1.

The time overcurrent unit (51/TOC) is set to coordinate with the long time overcurrent trip of the air circuit breaker. The high dropout instantaneous unit (51/IOC-B) and the static timer unit (51/TIMER) combine to coordinate with the short time overcurrent trip. When the 51/IOC-B unit operates it starts the static timer unit and after a set time delay the 51/TIMER provides a trip output. The * HI-SEISMIC instantaneous unit (51/IOC-A) trips directly. Typical external connections are shown in Figure 14.

RATINGS

INDUCTION UNIT

The induction unit coil is available in several ranges of pickup current. These are summarized in Table I, which gives their range, tap valves, continuous current ratings, and short time current ratings.

The induction unit contacts will close 30 ampere for voltages not exceeding 250 volts. The current carrying ratings are affected by the selection of the tap on the target and seal-in coil as indicated in Table II. If the tripping current exceeds 30 amperes, an auxiliary relay should be used, the connections being such that the tripping current does not pass through the contacts or the target and seal-in coils of the protective relay.

TABLE I
INDUCTION UNIT COIL RATINGS

PICKUP RANGE (AMPERES)	TAP VALVES (AMPERES)	CONTINUOUS RATING (AMPERES)	ONE SECOND RATING (AMPERES)
1/3	1,1.2,1.5,1.8, 2.5,3.0	3	110
1.5/4.5	1.5,2,2.5,3, 3.5,4,4.5	5	200
2.5/7.5	2.5,3,3.5,4,5, 6,7.5	5	260
4/12	4,5,6,7,8,10, 12	10	300

* Indicates Revision

TABLE II

TARGET SEAL-IN UNITS	0.2/2.0 UNIT	
	0.2 Amp Tap	2.0 Amp Tap
Maximum to Insure Operation	0.2	2.0
Carry Continuously (Amperes)	0.4	3.5
Carry 30 Amps For (Seconds)	---	4
Carry 10 Amps For (Seconds)	0.1	30
DC Resistance (Ohms)	7	0.13
60 Cycle Impedance (Ohms)	52	0.53

STATIC TIMER UNIT

The static timer unit is available in d-c voltage ratings of 48, 125, and 250 volts. Two timing ranges, 0.03 - 1 and 0.05 - 3 seconds, can be obtained.

The timer unit contacts will close and carry monentarily 30 amperes d-c at voltages of 250 volts or less. These contacts will carry 3 amperes continuously and have an interrupting rating as given in Table III.

TABLE III

INTERRUPTING RATINGS OF STATIC TIMER UNIT CONTACTS		
VOLTS	INDUCTIVE DUTY* (AMPERES)	NON-INDUCTIVE DUTY (AMPERES)
48 D.C.	1.0	3.0
125 D.C.	0.5	1.5
250 D.C.	0.25	0.75
115 60 HZ.	0.75	2.0
230 60 HZ.	0.5	1.0

* Inductance of average trip coil.

* HI-SEISMIC INSTANTANEOUS UNIT

The HI-SEISMIC instantaneous unit is designed to use one of several coils. Table IV gives the pickup range, containouous current ratings, and short time rating of each of these coils.

The current closing rating of the contacts is 30 amperes for voltages not exceeding 250 volts.

TABLE IV

*

HI-SEISMIC INSTANTANEOUS UNIT COIL RATINGS		
PICKUP RANGE (AMPS)	CONTINUOUS RATING (AMPERES)	ONE SECOND RATING (AMPERES)
.5 - 2	.75	12
1 - 4	1.5	25
2 - 8	3	51
4 - 16	6	127
10 - 40	15	205
20 - 80	30	326
40 - 160	60	326

* Indicates Revision

HIGH DROPOUT INSTANTANEOUS UNIT

The high dropout instantaneous unit contacts will close 30 amperes at high voltage less than 250 volts.

TABLE V

HIGH-DROPOUT INSTANTANEOUS UNIT COIL RATINGS		
PICKUP RANGE (AMPS)	CONTINUOUS RATING (AMPERES)	ONE SECOND RATING (AMPERES)
4 - 16	6	80
7 - 28	10	155
10 - 40	10	155

CHARACTERISTICS

INDUCTION UNIT

The induction unit consists of a conducting disc which passes through the poles of a permanent magnet and an electromagnet. The disc is free to rotate with a vertically suspended shaft but is restrained in one direction by a spring. When energized with an alternating current of proper magnitude, (Set by the tap position) the electromagnet produces out-of-phase fluxes at its pole faces. These fluxes interact with induced currents in the disc to produce a torque on the disc. When this torque exceeds the restraining force of the spring, the disc begins to rotate at a speed determined by the magnetic dragging action of the permanent magnet. A post is attached to the rotating shaft and when it has traveled a specific distance (set by the time dial) is makes electrical contact with a fixed member.

Figure 2 gives the time for the induction unit to close its contacts for various multiples of pick-up current and time dial settings.

The time required for this unit to reset from contact closure to the number 10 time dial position is approximately 60 seconds.

Burden data for induction unit coils is given in Table VI. The impedance values given are those for the minimum tap. The impedance for other taps at pickup current (tap rating) varies inversely (approximately) as the square of the current rating. The following equation illustrates this.

* $\text{IMPEDANCE OF ANY TAP AT TAP AMPS} = \left(\frac{\text{MIN. TAP AMPS}}{\text{TAP AMPS}}\right)^2 \times \left(\text{IMPEDANCE AT MINIMUM TAP}\right)$

* Indicates Revision

TABLE VI

BURDENS OF INDUCTION UNIT COILS

PICKUP RANGE (AMPERES)	FREQUENCY (HERTZ)	TAP	VOLT-AMPS AT 5 AMPS CALCULATED FROM INPUT AT MIN. PICKUP (I^2Z)	WATTS	POWER FACTOR
1/3	60	1	118.4	15.2	0.13
	50	1	98.6	12.7	0.13
1.5/4.5	60	1.5	52.5	6.7	0.13
	50	1.5	43.7	5.6	0.13
2.7/7.5	60	2.5	18.8	2.5	0.13
	50	2.5	15.7	2.1	0.13
4/12	60	4	7.4	0.95	0.13
	50	4	6.2	0.79	0.13

STATIC TIMER UNIT

The static timer unit measures the time it takes to charge a capacitor through an adjustable resistor after voltage is applied to the unit. Zener diode regulators keep the voltage across the resistor capacitor combination constant to produce a charging time that varies directly with the resistance in the charging circuit. When the capacitor voltage reaches a certain voltage level, it triggers a control rectifier by means of a unijunction transistor. The control rectifier picks up a telephone type unit to terminate the timing period.

For time settings less than 0.1 second the operating time will increase 4 to 5 percent at 80% of rated voltage, and decrease by 1-2 percent at 120% of rated voltage. For time settings greater than 0.1 second the change in operating time with voltage is typically less than $\pm$1% from 80 to 120% of rated voltage.

Figure 3 shows the timing variation as a function of ambient temperature.

Under identical conditions the unit will be repeatable within one percent of the original setting. The timing unit has practically no overtravel.

Burden data is presented in Table VII.

TABLE VII

BURDEN OF STATIC TIMER UNIT AT RATED VOLTAGE	
RATED VOLTAGE	MAXIMUM BURDEN (WATTS)
48	2.5
125	7.5
250	14.0

* HI-SEISMIC INSTANTANEOUS UNIT

The HI-SEISMIC instantaneous unit is an electromagnet which attracts a hinged armature when sufficient current is applied. The armature carries a "T" shaped moving contact which bridges two stationary contacts when the coil is energized. When the unit operates a colored target is displayed. This can be reset by pressing the button in the lower left corner of the relay cover.

The pickup range is continuously adjustable over a 4 to 1 range by means of an adjustable pole piece. When the top of the adjustable core is lined up with the calibration stampings, an approximate value of pickup can be determined. Dropout is about 50 - 50 percent of pickup.

* Indicates Revision

Figure III shows the variation of operating time with applied current for this unit. Burden data is tabulated in Table III.

TABLE VIII

BURDEN OF HI-SEISMIC, INSTANTANEOUS UNITS					
PICKUP RANGE (AMPERES)	FREQUENCY (HERTZ)	AMPERES	*VOLT-AMPERES	IMPEDANCE (OHMS)	POWER FACTOR
.5 - 2	50	5	310	12.4	.84
	60	5	330	13.2	.78
1 - 4	50	5	94	3.75	.77
	60	5	100	4.0	.71
2 - 8	50	5	23	.94	.77
	60	5	25	1.0	.71
4 - 16	50	5	5.8	.23	.77
	60	5	6.2	.25	.71
10 - 40	50	5	.9	.04	.77
	60	5	1	.04	.71
20 - 80	50	5	.23	.01	.77
	60	5	.25	.01	.71

* Volt-amperes at 5 amps calculated from input at minimum pickup (I^2Z).

HIGH-DROPOUT, INSTANTANEOUS UNIT

The high-dropout, instantaneous unit is similar to the standard, instantaneous unit except it has no target; and dropout current is approximately 80 - 90% of the pickup current. Figure 5 is a picture of the high dropout unit.

The adjustable core (A) sets the pickup level. Turning the core down (clockwise, top view) lowers the pickup, while turning the core up (counter clockwise, top view) increases the pickup. Before attempting to turn the core, the locknut (B) must be loosened. After adjusting the core, the locknut must be retightened. When loosening or tightening the locknut, the sleeve (C) to which the shading ring (D) is attached must be held to prevent it from turning. Rotation of the shading ring sets the dropout level and thereby determines the quietness of operation in the picked up position. The core has been factory set to obtain 80% dropout at the minimum setting and approximately 90% dropout at the maximum setting. Should it be necessary to change the dropout setting, the sleeve (C) to which the shading ring (D) is attached must always be turned in the clockwise direction (top view). This will prevent the sleeve and shading ring assembly from being loosened.

The unit will pickup at the scale-plate marking plus or minus 5 percent with gradually applied current. The operating time is shown in Figure 4. Figure 6 shows transient overreach characteristics.

Burden data for 60 Hertz units is shown in Table IX.

TABLE IX

BURDEN OF 60 HERTZ, HIGH-DROPOUT, INSTANTANEOUS UNIT				
PICKUP RANGE (amperes)	TESTING AT MINIMUM PICKUP SETTING MINIMUM CURRENT			VOLT AMPERES AT 5 AMPERES CALCULATED FROM INPUT AT MIN. PICKUP (I^2Z)
	R OHMS	X OHMS	Z OHMS	
1-3	2.9	2.9	3.96	99
2-6	0.7	0.7	0.99	25
4-12	0.2	0.2	0.28	7.0
7-21	0.07	0.07	0.1	2.5
10-40	0.03	0.03	0.04	1.0

* Indicates Revision

CONSTRUCTION

The IAC66S is mounted in an S2 case which has no upper contact block.

The case is suitable for either semi-flush or surface mounting on panels up to two inches thick. Hardware is available for all panel thicknesses up to two inches, but panel thickness must be specified on the order to insure that the proper hardware will be provided. Outline and panel drilling dimensions are shown in Figure 9.

The components of the relay are mounted on a cradle assembly which can be easily removed from the relay case. The cradle is locked in the case by means of latches at the top and bottom. The electrical connections between the case blocks and cradle blocks are completed through removable connection plugs. Separate testing plugs can be inserted in place of the connection plugs to permit testing the relay in its case. The cover is attached to the case from the front and includes an interlock arm which prevents the cover from being replaced until the connection plug has been inserted.

The induction unit is mounted on a metal frame and occupies the largest volume within the relay. It consists of a U-magnet, drag magnet, and a disc assembly. The pick-up of the induction unit is set by a tap block located near the top of the relay. The time delay is adjusted by turning the molded time dial which is just below the tap block.

The static timer unit utilizes a printed circuit card. The timer is assembled as a unit and mounted on a plate in the upper rear of the relay. The time setting of the timer unit is adjusted by means of a rheostat mounted on the top of the relay. The output unit of the timer is mounted vertically with the printed circuit card. A typical output unit is shown in Figure 10.

* The HI-SEISMIC instantaneous unit is mounted just above the drag magnet on the right hand side. It has an adjustable core which can be raised and lowered to change the pick-up of the unit.

The unit just above the drag magnet on the left is a target seal-in unit for the induction unit. This seal-in unit has no adjustable core but pickup may be changed by means of tap screws located on the right side of the unit.

The high-dropout instantaneous unit is mounted facing the back of the relay on the side opposite from the U-magnet. This unit has no target but the pick-up adjustment is made with an adjustable core. On units with a 4 to 1 range of pick-up adjustment there are three coil leads, one of which is secured to an insulating bracket mounted on one of the relay terminals. The unit may be changed between the high and low ranges by interchanging the lead on the bracket with the lead on the terminal.

The internal connections for the IAC66S are given in Figure 11. The construction of the relay is illustrated in Figures 7 and 8.

RECEIVING, HANDLING AND STORAGE

This relay, when not included as a part of a control panel, will be shipped in a carton designed to protect it against damage. Immediately upon receipt of a relay, examine it for any damage sustained in transit. If injury or damage resulting from rough handling is evident, file a damage claim at once with the transportation company and promptly notify the nearest General Electric Apparatus Sales Office.

Reasonable care should be exercised in unpacking the relay. If the relay is not to be installed immediately, it should be stored in its original carton in a place that is free from moisture, dust and metallic chips. Foreign matter collected on the outside of the case may find its way inside when the cover is removed and cause trouble in the operation of the relay.

ACCEPTANCE TESTS

Immediately upon receipt of the relay an inspection and acceptance test should be made to insure that no damage has been sustained in shipment and that the relay calibrations have not been disturbed.

VISUAL INSPECTION

Check the nemaplate stamping to insure that the model number, rating and calibration range of the relay received agree with the requisition.

Remove the relay from its case and check by visual inspection that there are no broken or cracked

molded parts or other signs of physical damage, and that all screws are tight. The drag magnet should be fastened securely in position on its mounting shelf. There must not be any metallic particles or other foreign matter in the air gap of either the drive magnet or the drag magnet.

Check the location of the contact brushes on the cradle and case blocks against the internal connections for the relay. Be sure that the shorting bars in the proper locations on the case block and that the long and short brushes on the cradle block agree with the internal connection diagram. Figure 13 is a sectional view of the case and cradle blocks with the connection plug in place. Note that there is an auxiliary brush in each position on the case block. This brush should be formed high enough so that when the connection plus is inserted it engages the auxiliary brush before striking the main brush. This is especially important in current circuits and other circuits with shorting bars since an improper adjustment of the auxiliary brush could result in a CT secondary circuit being momentarily open circuited.

MECHANICAL INSPECTION

It is recommended that the following mechanical adjustments be checked.

INDUCTION UNIT

With the time dial at the zero position the moving contact should just touch the stationary contact. There should be sufficient clearance between the stationary contact brush and its backing strip to allow for at least 1/32" wipe. Then set the dial at the approximate setting which will be used when the relay is installed.

The disk and shaft assembly should have a vertical end play of from 1/64" to 1/32". The set screws for the upper pivot and lower jewel screw must be tight. The disk should be approximately centered in the air gap of both the driving magnet assembly and the drag magnet. The minimum permissible clearance between the disk and either the driving or drag magnet is .008". The disk and shaft assembly should turn freely without noticeable friction.

Check the stop arm assembly located near the top of the disk shaft. There should be approximately 1/64" deflection of the leaf spring.

TIMER UNIT

With the relay de-energized each normally open contact should have a gap of .010" - .015". Observe the wipe on each normally closed contact by deflecting the stationary contact member towards the frame. Wipe should be approximately .005".

The wipe on each normally open contact should be approximately .005". This can be checked by inserting a .005" shim between the residual screw and the pole piece and operating the armature by hand. The normally open contacts should make before the residual screw strikes the shim.

ACCEPTANCE TESTS

ELECTRICAL TESTS

It is recommended that the following electrical checks be made immediately upon receipt of the relay. Note that all tests should be made with the relay in its case and in a level position.

All alternating current operated devices are affected by frequency. Since non-sinusoidal waveforms can be analyzed as a fundamental frequency plus harmonics of the fundamental frequency, it follows that alternating current devices (relays) will be affected by the applied waveform.

Therefore, in order to properly test alternating current relays it is essential to use a sine wave of current and/or voltage. The purity of the sine wave (i.e. its freedom from harmonics) cannot be expressed as a finite number for any particular relay, however, any relay using tuned circuit, R-L or RC networks, or saturating electromagnets (such as time overcurrent relays) would be especially affected by non-sinusoidal wave forms.

Similarly, relays requiring dc control power should be tested using dc and not full wave rectified power. Unless the rectified supply is well filtered, many relays will not operate properly due to the dips in the rectified power. Zener diodes, for example, can turn off during these dips. As a general rule the d-c source should not contain more than 5% ripple.

Since all drawout relays in service operate in their case, it is recommended that they be tested in their case or an equivalent steel case. In this way any magnetic effects of the enclosure will be accurately dupli ated during testing. A relay may be tested without removing it from the panel by using a 12XLA13A test plug. This plug makes connections only with the relay and does not disturb any shorting bars in the case. Of course, the 12XLA12A test plug may also be used. Although this test plug allows greater testing flexibility, it also requires C.T. shorting jumpers and the exercise of greater care since connections are made to both the relay and the external circuitry.

INDUCTION UNIT

With the tap plug in the minimum position and the time dial set in the No. 1/2 position, check the current required to just close the contact. It should be within ±5 percent of the minimum pickup shown on the tap block.

The operating time from the Number 5 time dial setting at 5 times minimum pickup setting should be within 7 percent of the value shown in Figure 1.

TIMER UNIT

An electronic timer should be used in adjusting this unit. The timing should be within 10 percent of the value shown on the scaleplate for each calibration point. Note that the high dropout instantaneous unit must be blocked closed in order to test this unit.

INSTANTANEOUS UNITS AND TARGET SEAL-IN

The minimum pickup value should be attainable without turning the core to its absolute minimum position. The dropout of the high drop-out unit should be 80 percent of pickup when the current is gradually reduced. The target seal-in unit should pick-up with adequate wipe at rated current. The mechanical target should latch up when the unit is energized and should drop down when the reset arm is depressed and the unit is de-energized. The induction unit contacts must be closed for the seal-in unit to operate.

INSTALLATION PROCEDURE

When making settings on the induction unit use a test source of 120 volts or greater with good wave form and constant frequency. Step down transformers or "phantom loads" should not be employed in testing induction units since their use may cause a distorted wave form. In most instances a setting obtainable by one of the tap positions will be satisfactory and no further adjustment will be required. In some cases, however, it may be desirable to have a pickup setting which falls between available tap positions. Such intermediate settings may be obtained by placing the tap screw in the tap position nearest to the required pickup and adjusting the control spring until the required pickup is obtained. Refer to the section on SERVICING for a more detailed description of pickup adjustment.

PERIODIC CHECKS AND ROUTINE MAINTENANCE

In view of the vital role of protective relays in the operation of a power system it is important that a periodic test program be followed. It is recognized that the interval between periodic checks will vary depending upon environment, type of relay, and the user's experience with periodic testing. Until the user has accumulated enough experience to select the test interval best suited to his individual requirements it is suggested that the following points be checked at an interval of from one to two years.

Operate the disk and shaft assembly by hand and check that the contacts are making with the proper wipe. Allow the disk to reset and check that there is no sign of excessive friction or tendency to bind. If there are signs of friction, first check for obstructions to the disk travel. Dirt or metallic particles in the wattmetric or drag magnet gaps can interfere with the motion of the disk.

Examine the contact surfaces for signs of tarnishing or corrosion. Fine silver contacts should be cleaned with a burnishing tool, which consists of a flexible strip of metal with an etched, roughened surface. Burnishing tools designed especially for cleaning relay contacts can be obtained from the factory. Do not use knives, files or abrasive paper or cloth of any kind to clean relay contacts.

SERVICING

The pickup of the induction unit for any current tap is adjusted by means of a spring-adjusting ring. The ring may be turned by inserting a screw driver in the notches around the edge. By turning the ring, the operating current of the unit may be brought into agreement with the tap setting employed, if for some reason this adjustment has been disturbed. This adjustment also makes it possible any desired setting between the various tap settings.

When pickup has been changed in this manner the relay is operating at a different torque level and the published time curves will not apply.

The unit is adjusted at the factory to close its contacts from any time-dial position at a minimum current within five percent of the tap-plug setting. If the pickup time for a particular time dial setting and pickup multiple is found to be outside the limits mentioned in ACCEPTANCE TESTS, it can be restored by changing the position of the drag magnet on its supporting shelf. Moving the magnet towards the shaft decreases the time while moving it away from the shaft increases the time. If the drag magnet is moved towards the shaft be sure that in its final position it clears the counter weight on the disk for all positions of the disk and shaft assembly. If the magnet is moved away from the shaft its outer edge must be at least 1/8" from the edge of the disk at the smallest radius of the disk.

Pickup and time tests should always be made with the relay in its case. The magnetic effect of the case is thereby the same as when the relay is in service.

RENEWAL PARTS

It is recommended that sufficient quantities of renewal parts be carried in stock to enable the prompt replacement of any that are worn, broken, or damaged.

When ordering renewal parts, address the nearest Sales Office of the General Electric Company, specify quantity required, name of part wanted, and give complete nameplate data. If possible, give the General Electric Company requisition number on which the relay was furnished.

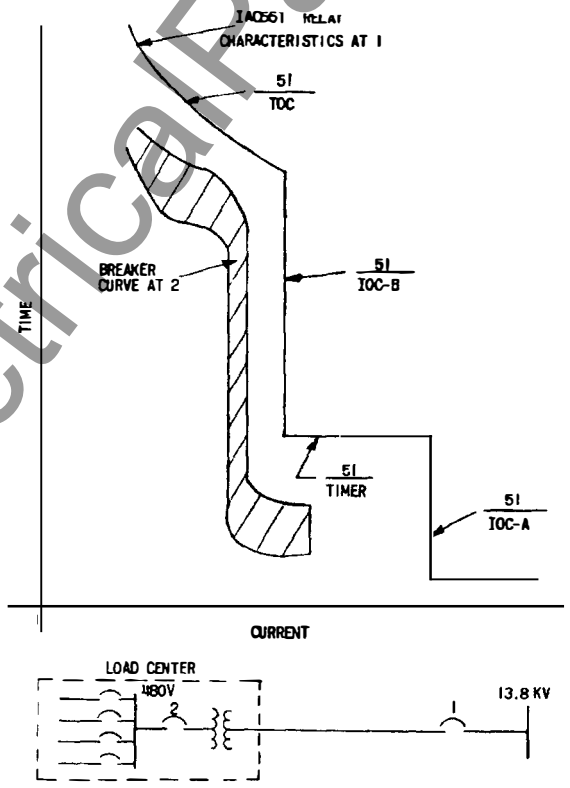


FIG. 1 (0246A2160-Q) TYPICAL TIME-CURRENT COORDINATION CURVES FOR THE IAC66S RELAY, SAME AS FOR IAC66T

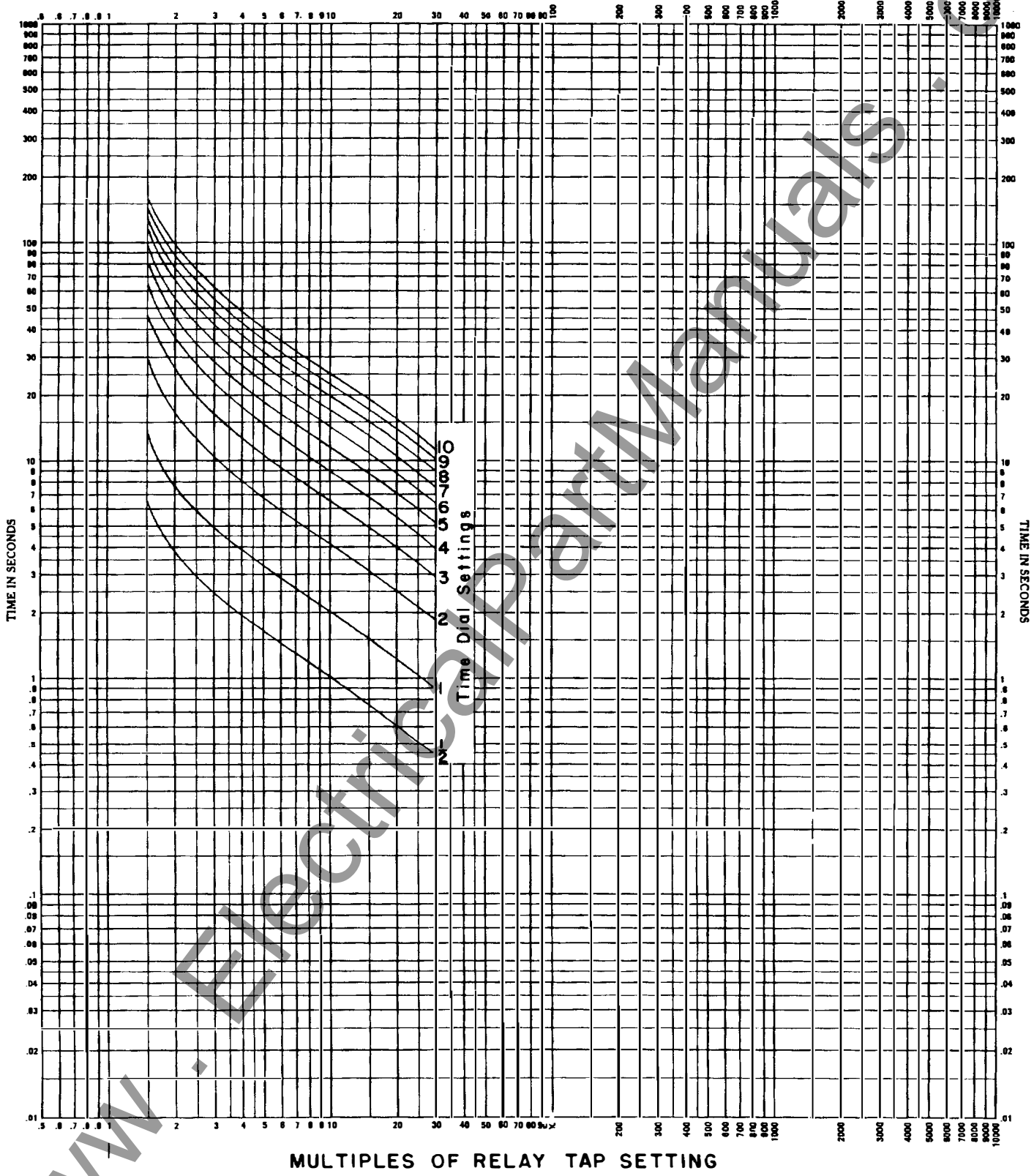


FIG. 2 (088B0273-0) TIME-CURRENT CURVE FOR THE TIME-OVERCURRENT UNIT OF THE IAC66S RELAY

FIG. 3 (0246A2598-0) TYPICAL OPERATING-TIME-VERSUS-TEMPERATURE CURVES FOR THE STATIC TIMER UNIT

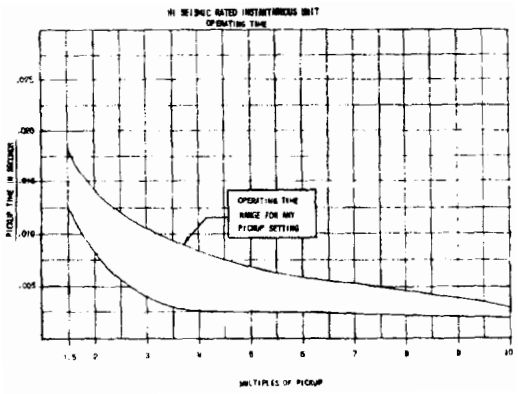


FIG. 4 (0208A8695-1) OPERATING-TIME-VERSUS-CURRENT CURVES FOR THE HI-SEISMIC INSTANTANEOUS UNIT

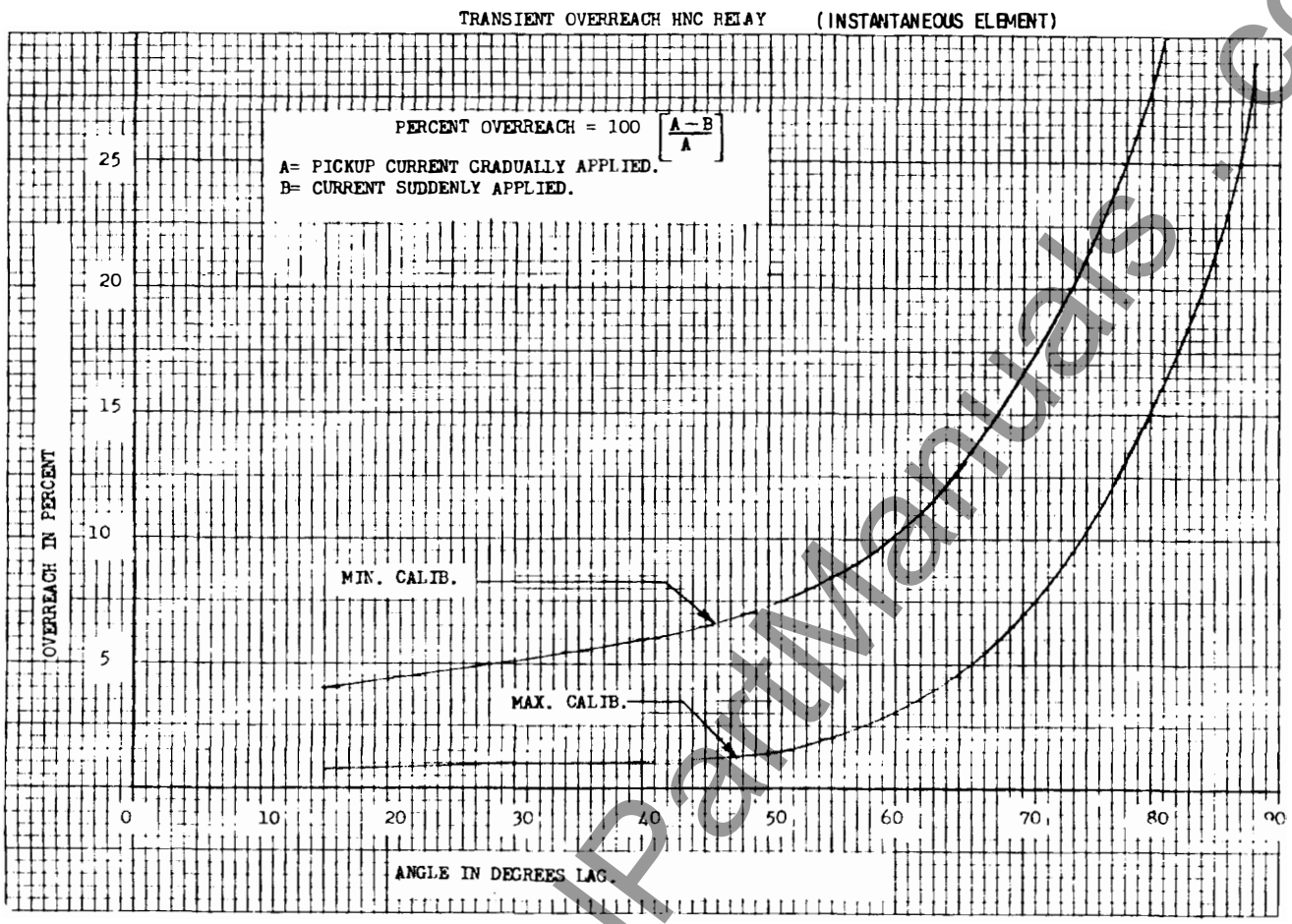


FIG. 5 (8036365) CONSTRUCTION OF THE HIGH-DROPOUT-INSTANTANEOUS UNIT

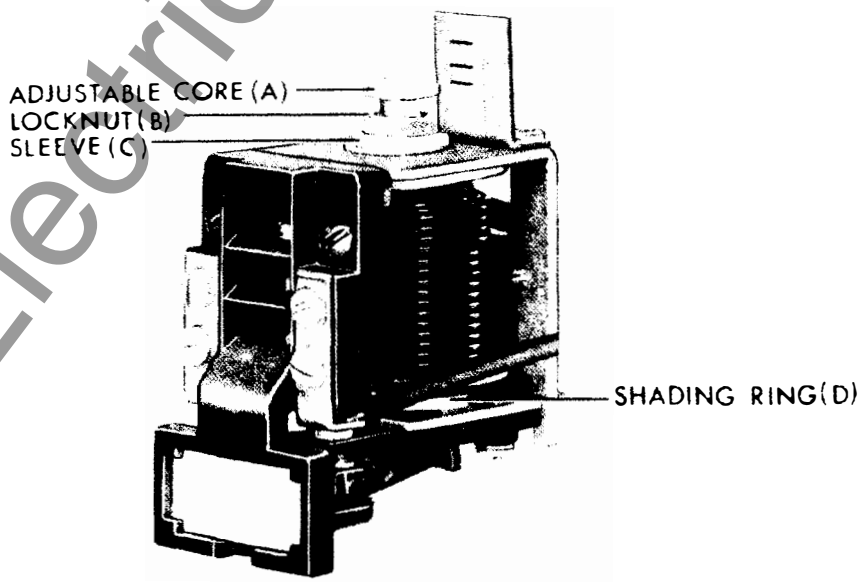


FIG. 6 (0195A4950-1) TRANSIENT OVERREACH OF THE HIGH-DROPOUT-INSTANTANEOUS UNIT

(PHOTO NOT AVAILABLE)

FIG. 7 ( ) IAC66S RELAY FRONT VIEW WITHOUT THE DRAWOUT CASE

(PHOTO NOT AVAILABLE)

FIG. 8 ( ) IAC66S RELAY REAR VIEW WITHOUT THE DRAWOUT CASE

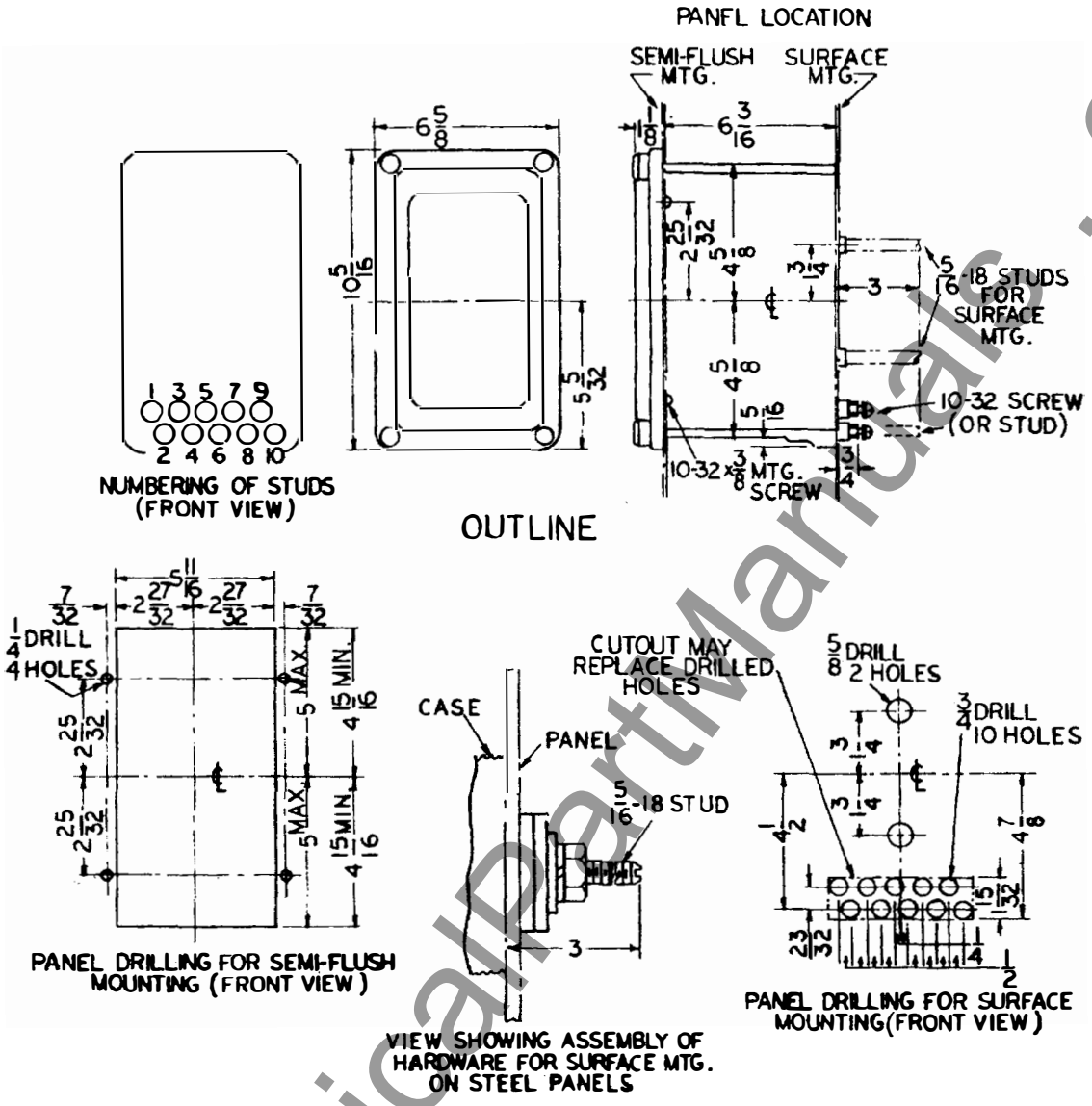


FIG. 9 (0227A8541-0) OUTLINE AND PANEL DRILLING DIMENSIONS FOR THE IAC66S RELAY

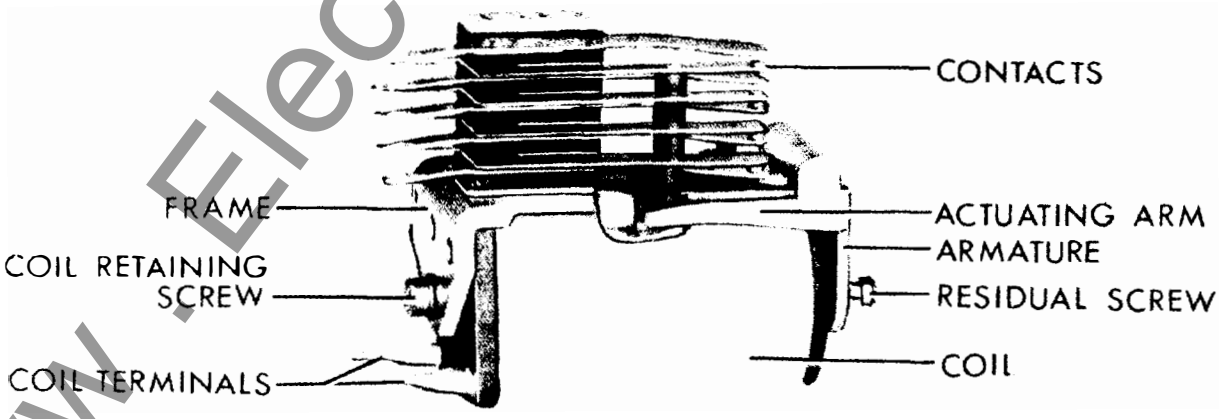
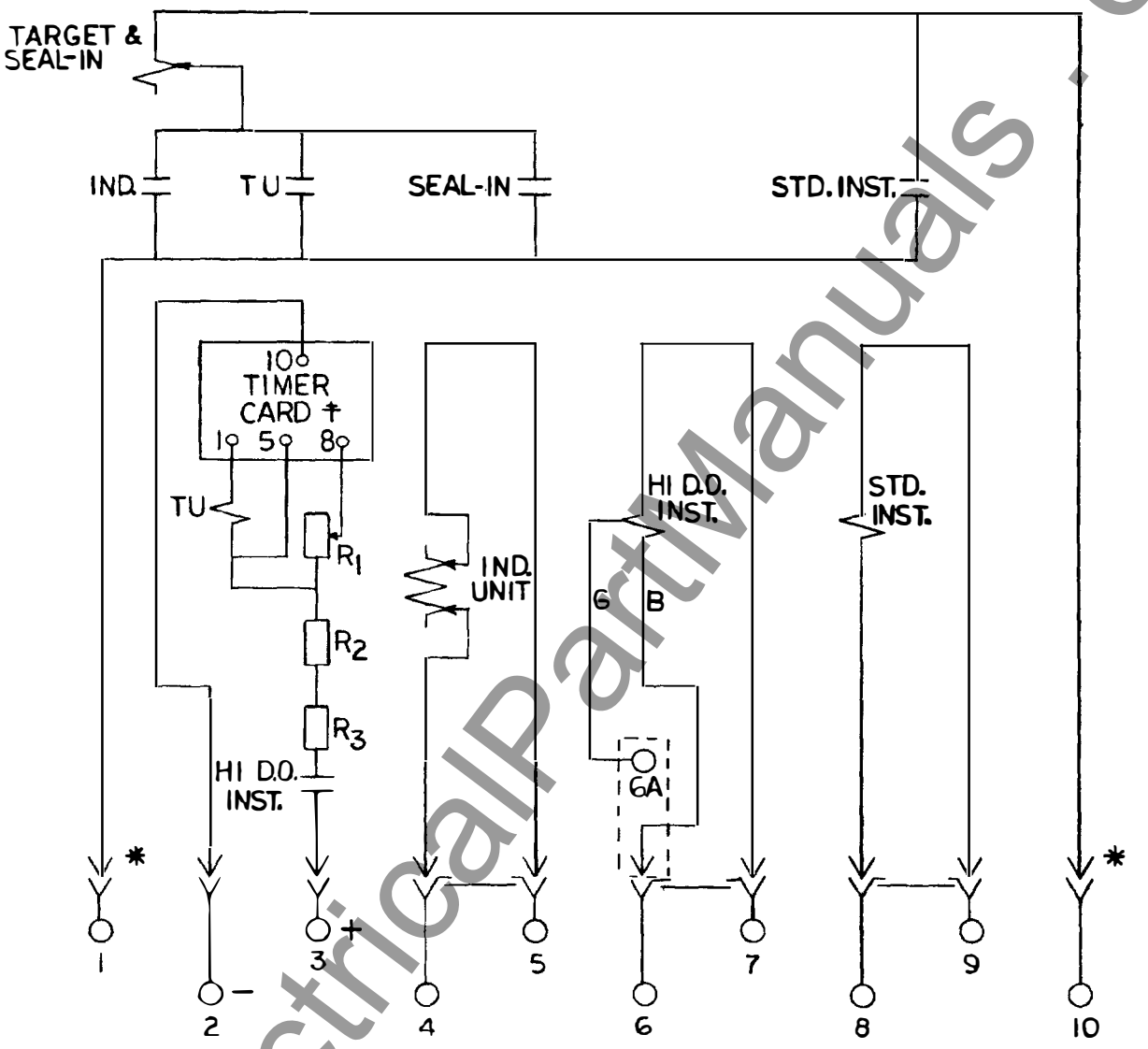
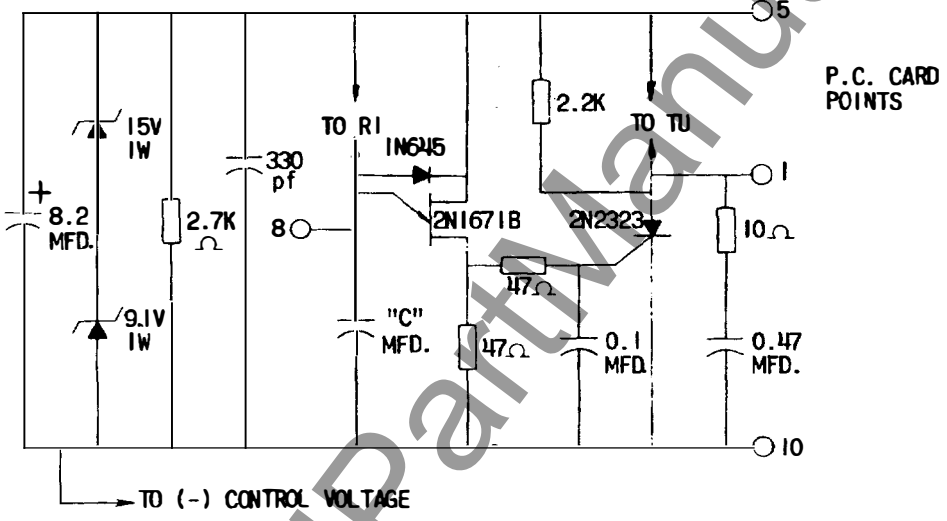


FIG. 10 (8040228) CONSTRUCTION OF STATIC-TIMER-OUTPUT UNIT



* = SHORT FINGER
** = UPPER STUDS UNAVAILABLE DUE TO SPACE LIMITATIONS
G = GREEN LEAD } POSITION SHOWN IS FOR LOW RANGE. INTERCHANGE
B = BLACK LEAD } G & B LEADS FOR HIGH RANGE.
5o = PIN NO. ON TIMER P.C. CARD
† = FOR INT. CONNS. OF TIMER CARD, SEE 0227A2505

FIG. 11 (0257A5091-0) INTERNAL CONNECTIONS DIAGRAM FOR THE IAC66S RELAY (FRONT VIEW)



P.C. CARD ASM.	"C"
0165B2022 G-2	5.0
0165B1987 G-7	
0165B1987 G-8	10.0

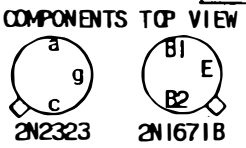
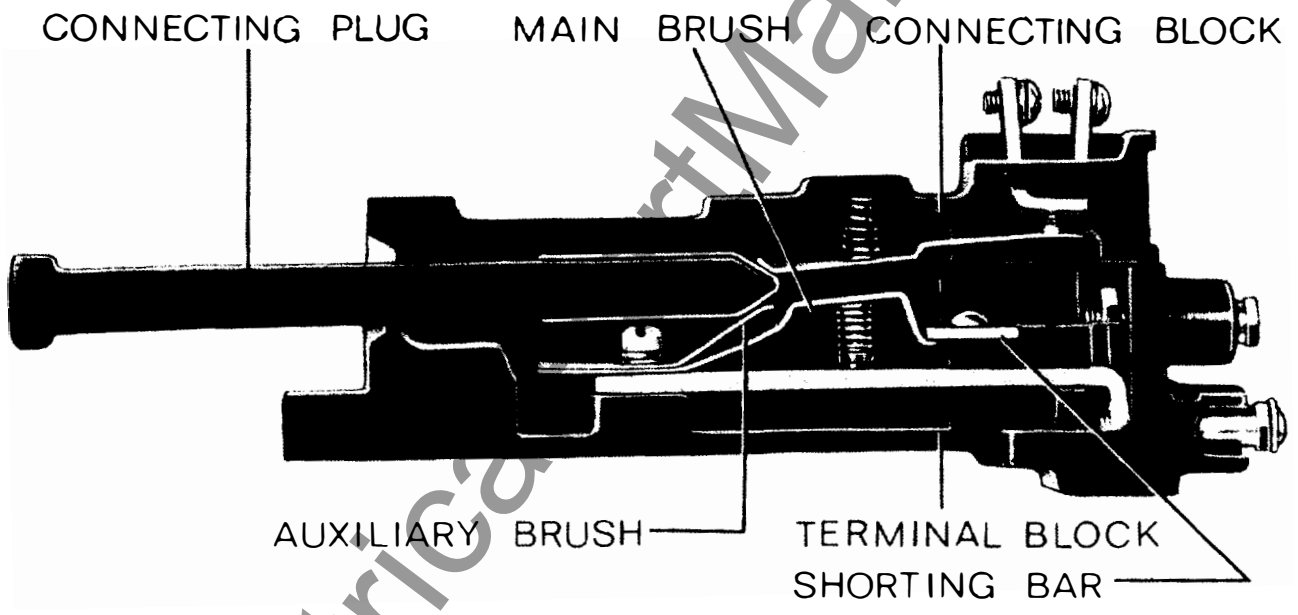
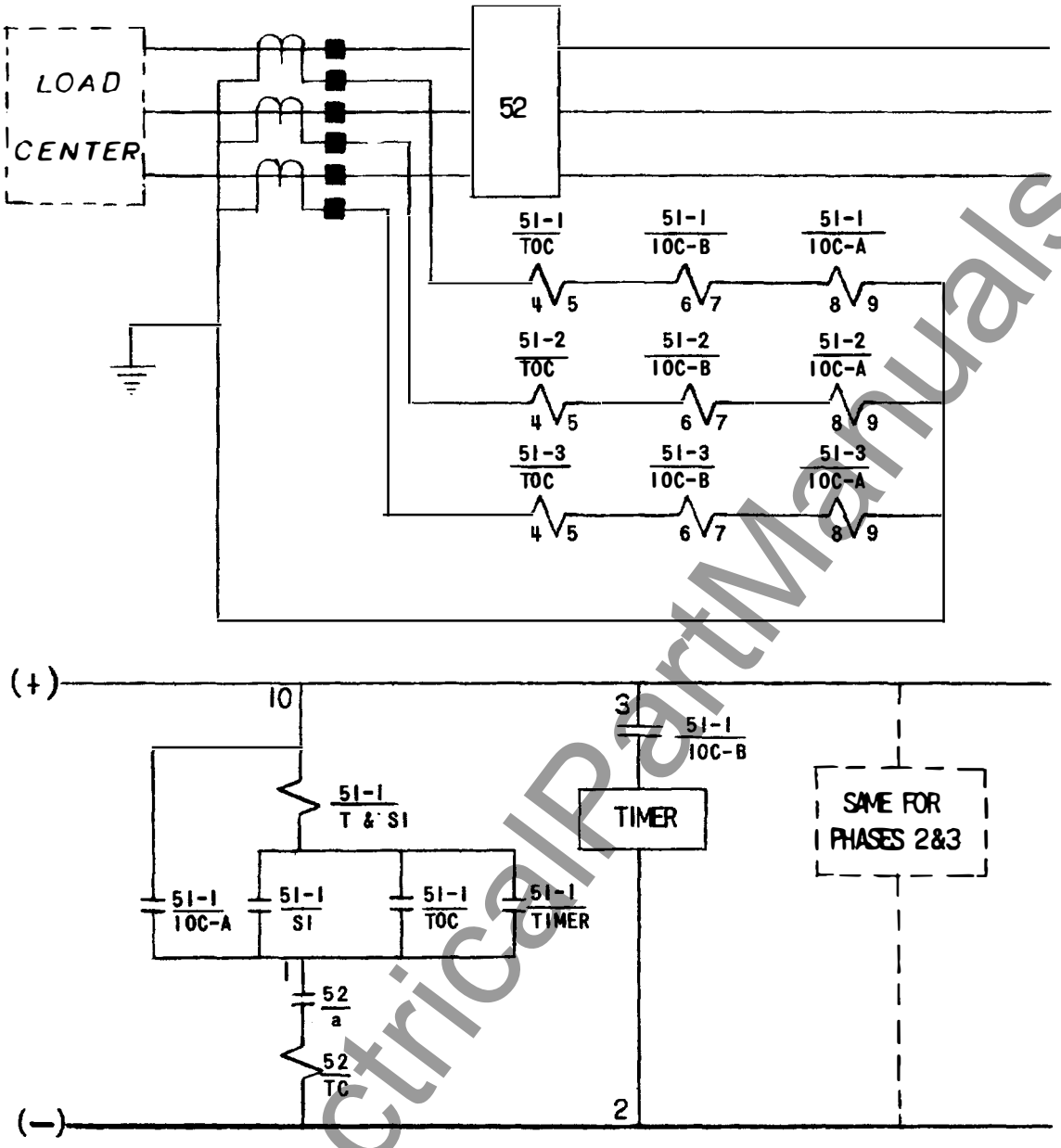


FIG. 12 (0227A2505-2) INTERNAL CONNECTIONS DIAGRAM FOR THE STATIC TIMER UNIT IN THE IAC66S RELAY



NOTE: AFTER ENGAGING AUXILIARY BRUSH, CONNECTING PLUG TRAVELS 1/4 INCH BEFORE ENGAGING THE MAIN BRUSH ON THE TERMINAL BLOCK

FIG. 13 (8025039) CROSS SECTION OF DRAWOUT CASE CONTACT ASSEMBLY



51 TOC	TIME OVERCURRENT UNIT
51 IOC-A	STANDARD INSTANTANEOUS OVERCURRENT UNIT
51 IOC-B	HIGH DROP-OUT INSTANTANEOUS OVERCURRENT UNIT
52	CIRCUIT BREAKER

FIG. 14 (208A5596-3) TYPICAL EXTERNAL CONNECTIONS DIAGRAM FOR IAC66S RELAY