



INSTRUCTIONS

GEK-86106
Supersedes GEK-26478D

TYPE IAC66T
TIME OVERCURRENT RELAY

GENERAL  ELECTRIC

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TYPE IAC66T

TIME OVERCURRENT RELAY

DESCRIPTION

The Type IAC66T is a single-phase overcurrent relay specifically designed for industrial and power plant applications to protect circuits that supply motor circuits or low-voltage load centers. The multiple time overcurrent characteristics provide these relays with the ability to coordinate closely with the motor-starting current or static overcurrent trips normally applied with the low voltage circuit breakers used in load centers. The relay contains five units: a long time induction 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 that does not have an upper contact block. Three IAC66T relays are required for complete three-phase protection.

APPLICATION

Circuits Supplying Low Voltage Load Centers

Industrial and power plant distribution circuits are often served from load center substations with secondary voltages of up to 600 volts. The low voltage power circuit breakers at the secondary side of the load center generally have trip devices that may include long time, short time, and instantaneous trip characteristics. These trip devices provide protection against overloads and faults on the circuits served by the load center substation.

The IAC66T relay is applied to provide protection for the primary circuit supplying a load center substation. At the same time, it should be set to maintain selectivity with the low voltage side circuit breakers. A representative one-line diagram of a load center substation and typical time current coordination curves illustrating coordination between the IAC66T and the low voltage circuit breaker are shown in Figure 1A.

In Figure 1A, the time overcurrent unit (51/TOC) of the IAC66T is set to coordinate with the long-time overcurrent trip of the low-voltage circuit breaker. The high dropout instantaneous unit (50/IOC-B) and the static timer unit (50/TIMER) of the IAC66T are set to coordinate with the short time trip of the low-voltage circuit breaker. When the 50/IOC-B unit operates, it starts the static timer unit. After a set time delay, the 50/TIMER provides a trip output. A high seismic instantaneous overcurrent unit (50/IOC-A) is also provided with the IAC66T for tripping at high values of fault current.

Typical external connections for three IAC66T relays are shown in Figure 12. Settings for each IAC66T relay are necessary as described below.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

The current-pickup value and the appropriate time dial must be set for the time overcurrent unit (51/TOC). These should be chosen to provide overcurrent protection of the primary circuit and to coordinate with the maximum total clearing time for the long time overcurrent trip of the low-voltage circuit breaker.

The high dropout instantaneous overcurrent unit (50/IOC-B) pickup value and the static timer (50/TIMER) setting must be set to coordinate with the maximum total clearing time for the short time trip characteristic of the low voltage circuit breaker. The pickup value for the 50/IOC-B unit should be set greater than the short-time pickup of the low voltage breaker trip device. The 50/TIMER setting should be set greater than the maximum total clearing time of the low voltage breaker in order to allow for coordination.

The pickup value of the 50/IOC-A instantaneous overcurrent unit is set to provide short circuit protection for the primary circuit. It is usually set higher than the pickup of the 50/IOC-B unit and delivers a trip output without intentional time delay.

Circuits Supplying Motors

The IAC66T relay is also used to protect a motor against three abnormal conditions. The time overcurrent unit (51/TOC) protects against motor overloads. The unit has a long-time inverse characteristic which is designed to coordinate with the motor heating characteristic. The instantaneous overcurrent unit (50/IOC-A) provides fault protection. This unit must be set high enough so that it does not operate on motor inrush current. The high dropout instantaneous unit (50/IOC-B) and the 50/TIMER provide protection against locked rotor current. When 50/IOC-B operates, it energizes the 50/TIMER which in turn trips the circuit breaker after the settable delay of the timer. The timer setting should be sufficiently long to ensure that the 50/IOC-B unit drops out as motor-inrush current decreases during a normal motor start.

A typical time current coordination curve is shown in Figure 1B. Time delay with the high dropout instantaneous allows for the decay of the motor-starting current dc component.

Typical pickup settings for the three overcurrent units are as below:

UNIT		PICKUP SETTING (MULTIPLES OF MOTOR FULL LOAD CURRENT)
Time overcurrent unit	51/TOC	1.15 to 1.4
Normal Dropout Instantaneous Overcurrent Unit	50/IOC-A	8 to 15
High Dropout Instantaneous Overcurrent Unit	50/IOC-B	2 to 6

RATINGS

INDUCTION UNIT

The induction unit coil is available in several ranges of pickup current. Table I lists ranges, tap values, continuous-current ratings and short time current ratings of the induction unit coil.

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

TABLE I
INDUCTION UNIT COIL RATINGS

PICKUP RANGE (AMPS)	TAP VALUES (AMPS)	CONTINUOUS CURRENT (AMPS)	SHORT TIME (ONE SECOND) RATING (AMPS)
0.6/1.8	0.6, 0.8, 1.0, 1.2, 1.4, 1.6 1.8	3	75
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	300
4.0/12	4, 5, 6, 7, 8, 10, 12	10	400

The two taps required for the values shown in Table I are (from the lowest to highest pickup): A/L, B/K, C/F, D/H, D/G, E/G and G/J, respectively, as labelled on the tap block. To obtain a tap value of 4.0 amps on the 2.5/7.5 amp relay, use taps D/H.

TABLE II
RATINGS OF TARGET AND SEAL-IN COIL

CURRENT OPERATED		DUAL-RATED 0.2/2.0 AMP	
		0.2 AMP TAP	2.0 AMP TAP
Carry 30 amps for	(seconds)	0.05	2.2
Carry 10 amps for	(seconds)	0.45	2.0
Carry continuously	(amperes)	0.37	2.3
Minimum operating	(amperes)	0.2	2.0
Minimum dropout	(amperes)	0.05	0.5
DC resistance	(ohms)	8.3	0.24
60 hertz impedance	(ohms)	50	0.65
50 hertz impedance	(ohms)	42	0.54

STATIC TIMER UNIT

The static timer unit is available in DC voltage ratings of 48, 125 or 250 volts. Two timing ranges, 0.03 to 1.0 and 0.05 to 3.0 seconds, can be obtained. Forms 51 and up are triple rated, 48/110-125/220-250 volts DC, and have a time range of 0.03 to 5.0 seconds.

The timer unit contacts will close and carry 30 amperes DC momentarily, at voltages of 250 volts or less. These contacts will carry three amperes continuously, and have interrupting ratings as shown in Table III.

TABLE III
INTERRUPTING RATINGS OF STATIC TIMER UNIT CONTACTS

VOLTS	CURRENT INDUCTIVE** (AMPS)	CURRENT NON-INDUCTIVE (AMPS)
48 DC	1.0	3.0
110-125DC	0.5	1.5
220-250DC	0.25	0.75
115 60 Hertz	0.75	2.0
230 60 Hertz	0.50	1.0

**Inductance of average trip coil.

HIGH SEISMIC INSTANTANEOUS UNIT

The high seismic instantaneous unit is designed to use one of several coils. Table IVa lists the pickup range, continuous 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 IVa
STANDARD INSTANTANEOUS UNIT COIL RATINGS

PICKUP RANGE (AMPS)	CONTINUOUS CURRENT (AMPS)	SHORT TIME (ONE SECOND) RATING (AMPS)
0.5 - 2	0.75	12
1 - 4	1.5	25
2 - 8	3.0	51
4 - 16	6.0	127
10 - 40	15.0	205
20 - 80	30.0	326
40 - 160	60.0	326

For forms 51 and up, the standard instantaneous unit has the following ratings, listed in Table IVb:

TABLE IVb
STANDARD INSTANTANEOUS UNIT COIL RATINGS - FORMS 51 AND UP

RANGE		SERIES OR PARALLEL	RATINGS	
			CONTINUOUS	ONE SECOND**
0.5 - 4.0	0.5 - 2.0	Series	0.75	25.0
	1.0 - 4.00	Parallel	1.5	50.0
2.0 - 16.0	2.0 - 8.0	Series	3.0	130.0
	4.0 - 16.0	Parallel	6.0	260.0
10.0 - 80.0	10.0 - 40.0	Series	15.0	400.0
	20.0 - 80.0	Parallel	25.0	600.0
20.0 - 160.0	20.0 - 80.0	Series	25.0	600.0
	40.0 - 160.0	Parallel	25.0	600.0

**Higher currents (I) may be applied for shorter lengths of time (T) in accordance with the formula:

$$I = \sqrt{\frac{K}{T}} \quad K = \text{constant}$$

TABLE V
RATINGS OF HIGH DROPOUT INSTANTANEOUS UNITS

PICKUP RANGE (AMPS)	CONTINUOUS RATING (AMPS)	ONE SECOND RATING (AMPS)
1 - 4	1.5	35
2 - 8	2.5	75
4 - 16	6	150
7 - 28	10.5	288
10 - 40	15	288
20 - 80	25	288

CHARACTERISTICS

INDUCTION UNIT

The induction unit consists of a conducting disk that passes through the poles of a permanent magnet and an electromagnet. The disk 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 disk to produce a torque on the disk. When this torque exceeds the restraining force of the spring, the disk begins to rotate at a speed determined by the magnetic dragging action of the permanent magnet. A post attached to the rotating shaft travels a specific distance (set by the time dial), and makes electrical contact with a fixed member.

Figure 2 gives the time for the induction unit to close its contacts for various multiples of pickup 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 listed in Table VIa. The impedance values are for the minimum tap. The impedance for other taps at pickup current (tap rating) varies (approximately) inversely to the square of the current rating. The following equation illustrates this:

$$\frac{\text{Impedance of Any Tap at Tap Amps}}{\text{Tap Amps}} = \left(\frac{\text{Minimum Tap Amps}}{\text{Tap Amps}} \right)^2 \times \left(\frac{\text{Impedance at Minimum Tap}}{\text{Minimum Tap}} \right)$$

TABLE VIa
BURDENS OF INDUCTION UNIT COILS

PICKUP RANGE (AMPS)	FREQ. (Hz)	TAP	VOLT-AMPS AT FIVE AMPS CALCULATED FROM INPUT AT MINIMUM PICKUP (I^2Z)	WATTS	POWER FACTOR
1.0 - 3.0	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
2.5 - 7.5	60	2.5	18.8	2.5	0.13
	50	2.5	15.7	2.1	0.13
4.0 - 12	60	4	7.4	0.95	0.13
	50	4	6.2	0.79	0.13

For forms 51 and up, the burden of the induction unit is as shown in Table VIb:

TABLE VIb
BURDENS OF INDUCTION UNIT COILS - FORMS 51 AND UP

PICKUP RANGE (AMPS)	FREQ. (Hz)	TAP	VOLT-AMPS AT FIVE AMPS CALCULATED FROM INPUT AT MINIMUM PICKUP (I^2Z)	IMP. OHMS	POWER FACTOR
0.6 - 1.8	60	0.6	110.75	4.43	0.32
	50	0.6	48.0	1.92	0.33
1.5 - 4.5	60	1.5	17.75	0.71	0.35
	50	1.5	11.5	0.46	0.37
2.5 - 7.5	60	2.5	6.75	0.27	0.44
	50	2.5	5.75	0.23	0.47
4.0 - 12	60	4.0	4.48	0.18	0.52
	50	4.0	4.05	0.16	0.47

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, operating time will increase four to five percent at 80 percent of rated voltage, and decrease by one to two percent at 120 percent of rated voltage. For time settings greater than 0.1 second, the change in operating time with voltage is typically less than plus or minus one percent from 80 to 120 percent of rated voltage.

Over the range of -30 to +60 degrees Centigrade, the variation in time will be plus or minus five percent. Unit repeatability will occur within one percent of the original setting under identical conditions. The timing unit has practically no overtravel. The complete curve is shown in Figure 3.

The Internal Connections diagram for the static timer is shown in Figure 9.

Table VII presents burden data for the static timer unit.

TABLE VII
BURDEN OF STATIC TIMER UNIT AT RATED VOLTAGE

<u>RATED VOLTAGE</u>	<u>MAXIMUM BURDEN (WATTS)</u>
48	2.5
125	7.5
250	14.0

HIGH SEISMIC INSTANTANEOUS UNIT

The high seismic instantaneous unit is an electromagnet that attracts a hinged armature when sufficient current is applied. The armature carries a "T" shaped moving contact that bridges two stationary contacts when the coil is energized. A target is displayed when the unit operates. Pressing the button in the lower left corner of the relay cover resets the target.

The pickup range can be adjusted continuously over a four to one range by using the adjustable pole piece. When the top of the core is lined up with the calibration stampings, an approximate value of pickup can be determined. Dropout is about 40 to 50 percent of pickup.

Figure 4 shows the variation of operating time with applied current for this unit. Burden data of the high seismic unit is tabulated in Table VIII.

TABLE VIII
BURDEN OF HIGH SEISMIC INSTANTANEOUS UNIT

PICKUP RANGE (AMPS)	FREQ (HZ)	AMPS	VOLT- AMPS**	IMPEDANCE (OHMS)	POWER FACTOR
0.5 - 2	50	5	310	12.4	0.84
	60	5	330	13.2	0.78
1 - 4	50	5	94	3.75	0.77
	60	5	100	4.0	0.71
2 - 8	50	5	23	0.94	0.77
	60	5	25	1.0	0.71
4 - 16	50	5	5.8	0.23	0.77
	60	5	6.2	0.25	0.71
10 - 40	50	5	0.9	0.04	0.77
	60	5	1.0	0.04	0.71
20 - 80	50	5	0.23	0.01	0.77
	60	5	0.25	0.01	0.71
40 - 160	50	5	0.07	0.003	0.71
	60	5	0.07	0.003	0.71

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

HIGH DROPOUT INSTANTANEOUS UNIT

The high dropout instantaneous unit is similar to the high seismic instantaneous unit, except it has no target and dropout current is approximately 80 to 90 percent of the pickup current. Refer to Figure 5, a photograph of the high dropout unit, for the following discussion.

The adjustable core (A) sets the pickup level. Turning the core down (clockwise, top view) lowers the pickup, while turning the core up (counterclockwise, top view) increases the pickup. Before attempting to turn the core, the locknut (B) must be loosened. 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. The locknut must be retightened after adjusting the core. Rotating the shading ring sets the dropout level, thereby determining the quietness of operation when in the picked-up position. The core has been factory set to obtain 80 percent dropout at the minimum setting, and approximately 90 percent dropout at the maximum setting. 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. When shipped from the factory, the whole coil is wired into the current circuit, and the lower half of the calibration range is available. If the upper half of the calibration range is required, the tapped section of the coil should be wired into the current circuit. Do this by taking lead B off stud 6 and lead G off stud 6A. Then put lead G on stud 6 and lead B on stud 6A (see Figure 10).

The unit will pick up at the scale plate marking plus or minus five percent with gradually applied current. Figure 6 shows the transient overreach characteristics. Burden data for the 60 hertz high dropout unit is tabulated in Table IX.

TABLE IX
BURDEN OF 60 HERTZ HIGH DROPOUT INSTANTANEOUS UNIT

RANGE AMPERES	BURDEN AT MINIMUM PICKUP SETTING AND MINIMUM CURRENT			VOLT-AMPERES AT FIVE AMPERES CALCULATED FROM INPUT AT MINIMUM PICKUP (I^2Z)
	R OHMS	X OHMS	Z OHMS	
1 - 4	3.16	3.16	4.48	112.0
2 - 8	0.79	0.79	1.12	28.0
4 - 16	0.2	0.2	0.28	7.0
7 - 28	0.07	0.07	0.1	2.50
10 - 40	0.03	0.03	0.04	1.00
20 - 80	0.007	0.007	0.01	0.25

CONSTRUCTION

The IAC66T relay is mounted in an S2 case that does not have an 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. To be sure that the proper hardware will be provided, panel thickness should be specified on the order for the relay. Outline and panel drilling dimensions are shown in Figure 7.

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

The induction unit, consisting of a U-magnet, drag magnet and a disk assembly, is mounted on a metal frame. The pickup 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, located just below the tap block.

The static timer utilizes a printed circuit card. It is assembled as a unit, and mounted on a plate in the upper rear of the relay. The time setting is adjusted by a rheostat mounted on top of the relay. The output unit of the static timer is mounted vertically with the printed circuit card. A typical output unit is shown in Figure 8.

The high seismic instantaneous unit is mounted just above the drag magnet on the right hand side. The adjustable core can be raised or lowered to change the pickup 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 does not have an adjustable core, but tap screws located on the right side of the unit can be used to change pickup.

The high dropout instantaneous unit faces the back of the relay on the side opposite the U magnet. This unit does not have a target, but pickup adjustment is made with the adjustable core. There are three coil leads on units that have a four-to-one range of pickup adjustment. One of these coil leads is secured to an insulating bracket mounted on one of the relay terminals. By interchanging the lead on the bracket with the lead on the terminal, either the high range or the low range of the unit can be selected as required (see page 10).

Internal connections for the IAC66T are shown in Figure 11. Relay construction is illustrated in Figures 7 and 8.

For IAC66T forms 51 and up, Figure 11A depicts internal connections, and Figures 7A and 8A illustrate relay construction.

RECEIVING, HANDLING AND STORAGE

This relay, when not included as part of a control panel, will be shipped in a carton designed to protect it against damage. Upon receipt, immediately examine the relay for any damage sustained in transit. If damage 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.

If the equipment is not to be installed immediately, it should be stored indoors in a location that is dry and protected from dust, metallic chips and severe atmospheric contaminants.

ACCEPTANCE TESTS

An inspection and acceptance test should be made when the relay is received to determine if damage has occurred in shipment, or if relay calibrations have been disturbed.

VISUAL INSPECTION

Check the relay nameplate to see that the model number, rating and calibration range of the relay agree with the requisition.

Remove the relay from its case and check that there are no broken or cracked molded parts or other signs of physical damage. All screws should be tight. The drag magnet should be securely fastened in position on its mounting shelf. No metallic particles or any other foreign matter should be 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 diagram. The shorting bars should be in their proper locations on the case block, and the long and short brushes on the cradle block

should agree with the internal connections diagram. Figure 12 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 plug is inserted, it engages the auxiliary brush before striking the main brush. An improper adjustment of the auxiliary brush could result in a CT secondary circuit being momentarily open-circuited in a current circuit.

MECHANICAL INSPECTION

The following mechanical adjustments should be checked:

Induction Unit

The moving contact should just touch the stationary contact when the time dial is at the zero position. There should be sufficient clearance between the stationary contact brush and its backing strip to allow for a least 1/32 inch wipe. Set the dial at the approximate setting that will be used when the relay is installed.

The disk and shaft assembly should have a vertical end play of 1/64 to 1/32 inch. The set screws for the upper pivot and lower jewel screw must be tight. The disk should be centered (approximately) in the air gap of both the drive magnet assembly and the drag magnet. The disk and shaft assembly should turn freely without noticeable friction.

The stop arm assembly, located near the top of the disk shaft, should be checked for approximately 1/64 inch deflection of the leaf spring.

Timer Unit

Each normally open contact should have a gap of 0.010 to 0.020 inch with the relay de-energized. Deflect the stationary contact member towards the frame and observe approximately 0.005 inch minimum wipe on each normally closed contact.

The wipe on each normally open contact should be a minimum of 0.005 inch. This can be checked by inserting a 0.005 inch shim between the residual screw and the pole piece, and then operating the armature by hand. The normally open contacts should make before the residual screw strikes the shim.

ELECTRICAL TESTS

The following electrical checks should be made upon receipt of the relay. Note that all tests are to 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 a sine wave current and/or voltage must be used. 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 circuits, RL or RC networks, or saturating electromagnets (such as time overcurrent relays), would be essentially affected by non-sinusoidal waveforms.

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 dips in the rectified power. Zener diodes, for example, can turn off during dips. As a general rule, the DC source should not contain more than five percent ripple.

Since drawout relays in service operate in their cases, they should be tested in their cases or an equivalent steel case. This way, any magnetic effects of the enclosure will be accurately duplicated during testing. A relay may be tested without removing it from the panel by using a 12XLA13A test plug. This plug makes connection only with the relay and does not disturb the shorting bars in the case. The 12XLA12A test plug may also be used. Although this test plug allows greater testing flexibility, it also requires CT shorting jumpers and greater care in testing, 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 in the Number 1/2 position, check that the current required to just close the contact is within plus or minus five percent of the minimum pickup shown on the tap block.

The operating time from the Number 5 time dial setting at five times minimum pickup setting should be within seven percent of the value shown in Figure 2.

Static Timer Unit

Use an electronic timer to adjust this unit. The timing should be within ten percent of the value shown on the scale plate for each calibration point. **Note that the high dropout instantaneous unit must be blocked closed to test the timer unit.**

Instantaneous Units and Target Seal-in

It should be possible to attain the minimum pickup value without turning the core to its absolute minimum position. The high-dropout unit should drop out at 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 drop down when the reset arm is depressed and the unit de-energized. **Note that the induction unit contacts must be closed for the seal-in unit to operate.**

INSTALLATION

Use a test source of 120 volts or greater with good wave form and constant frequency when making settings on the induction unit. Step-down transformers or "phantom loads" should not be used in testing induction units, since they may cause a distorted wave form. A setting that can be obtained by one of the tap positions will be satisfactory, and no further adjustment will be required. However, sometimes a pickup setting might fall between available tap positions. Such intermediate settings can be obtained by placing the tap screw in the tap position nearest the required pickup, and adjusting the control spring until the required pickup is obtained. Refer to **SERVICING** for a more detailed description of pickup adjustment.

PERIODIC CHECKS AND ROUTINE MAINTENANCE

Protective relays play a vital role in the operation of a power system, and it is important to follow a periodic test program. 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, the points listed in the **ACCEPTANCE TESTS** section should be checked at an interval of from one to two years.

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

Examine contact surfaces for tarnishing or corrosion. Fine silver contacts should not be cleaned with knives, files, or abrasive paper or cloth. Knives or files may leave scratches which increase arcing and deterioration of the contacts. Abrasive paper or cloth may leave minute particles of insulating abrasive material in the contacts and thus prevent closing. Use a burnishing tool specifically designed for this purpose.

SERVICING

Induction unit pickup for any current tap is adjusted by a spring adjusting ring. If the adjustment has been disturbed, turn the ring by inserting a screw driver in the notches around the edge; turning the ring brings the operating current of the unit into agreement with the tap setting. This adjustment also makes any setting between the various tap settings possible. Note, however, that if pickup is changed by turning the spring adjusting ring, then the relay will be operating at a different torque level, and the published time curves will not apply for this setting.

The unit has been factory adjusted to close its contacts from any time dial position at minimum current within five percent of the tap plug setting. If a pickup time for a particular time dial setting and pickup multiple is outside the

limits mentioned in the acceptance tests, changing the position of the drag magnet on its supporting shelf will restore the pickup time. Moving the magnet towards the shaft decreases the pickup time, while moving it away from the shaft increases the pickup time. If the drag magnet is moved towards the shaft, be sure that it clears the counterweight on the disk for all positions of the disk and shaft assembly in its final position. When the magnet is moved away from the shaft, its outer edge must be at least one-eighth inch from the edge of the disk at the disk's smallest radius.

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

RENEWAL PARTS

Sufficient quantities of renewal parts should be kept in stock for 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 the name of the part wanted, quantity required, and complete nameplate data, including the serial number, of the relay.

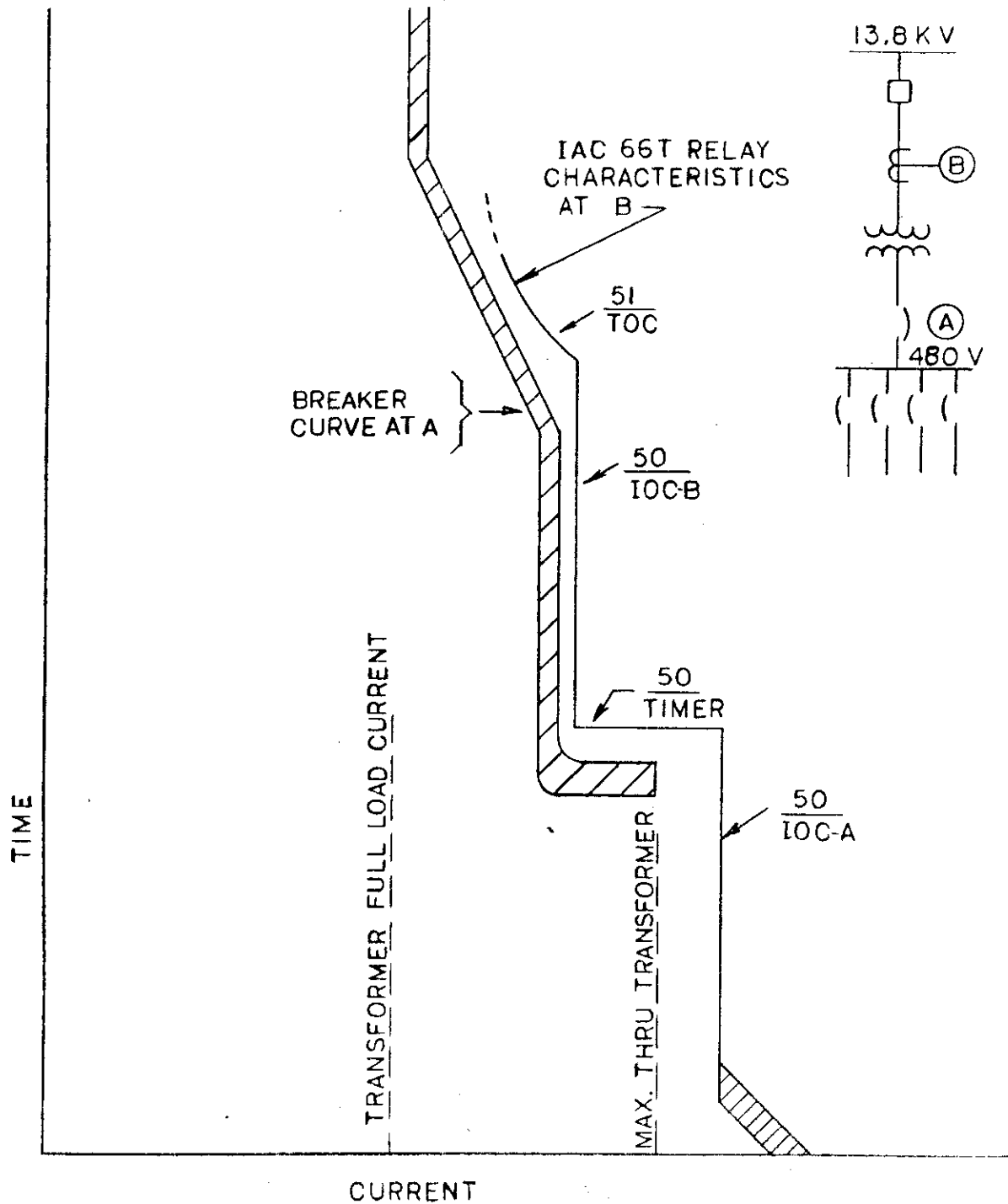


Figure 1A (0246A2160-2) Typical Time-Current Coordination Curves for Type IAC66T Relays

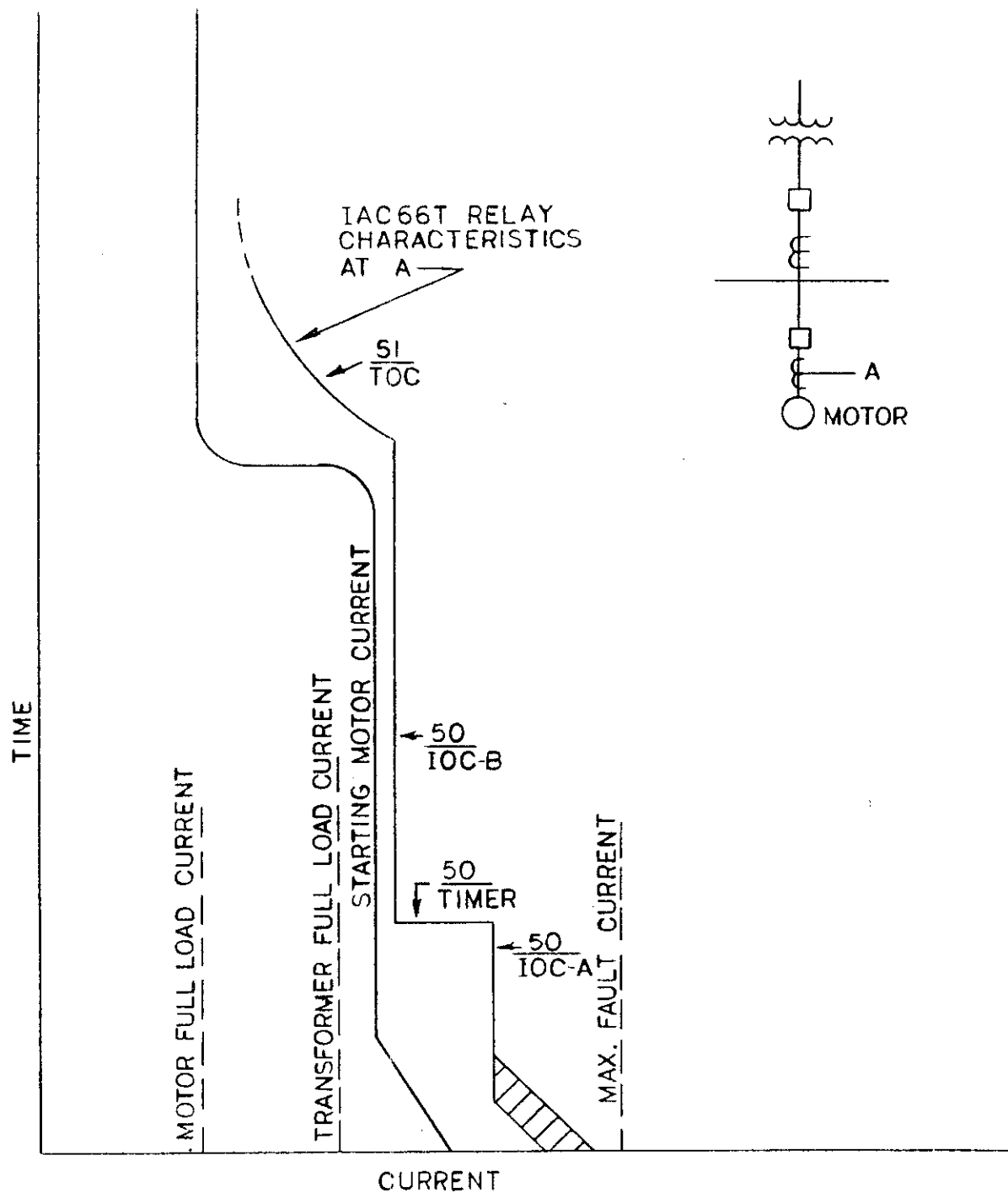


Figure 1B (0246A2160-3) Typical Time-Current Coordination Curves for Type IAC66T Relay Applied for Motor Protection

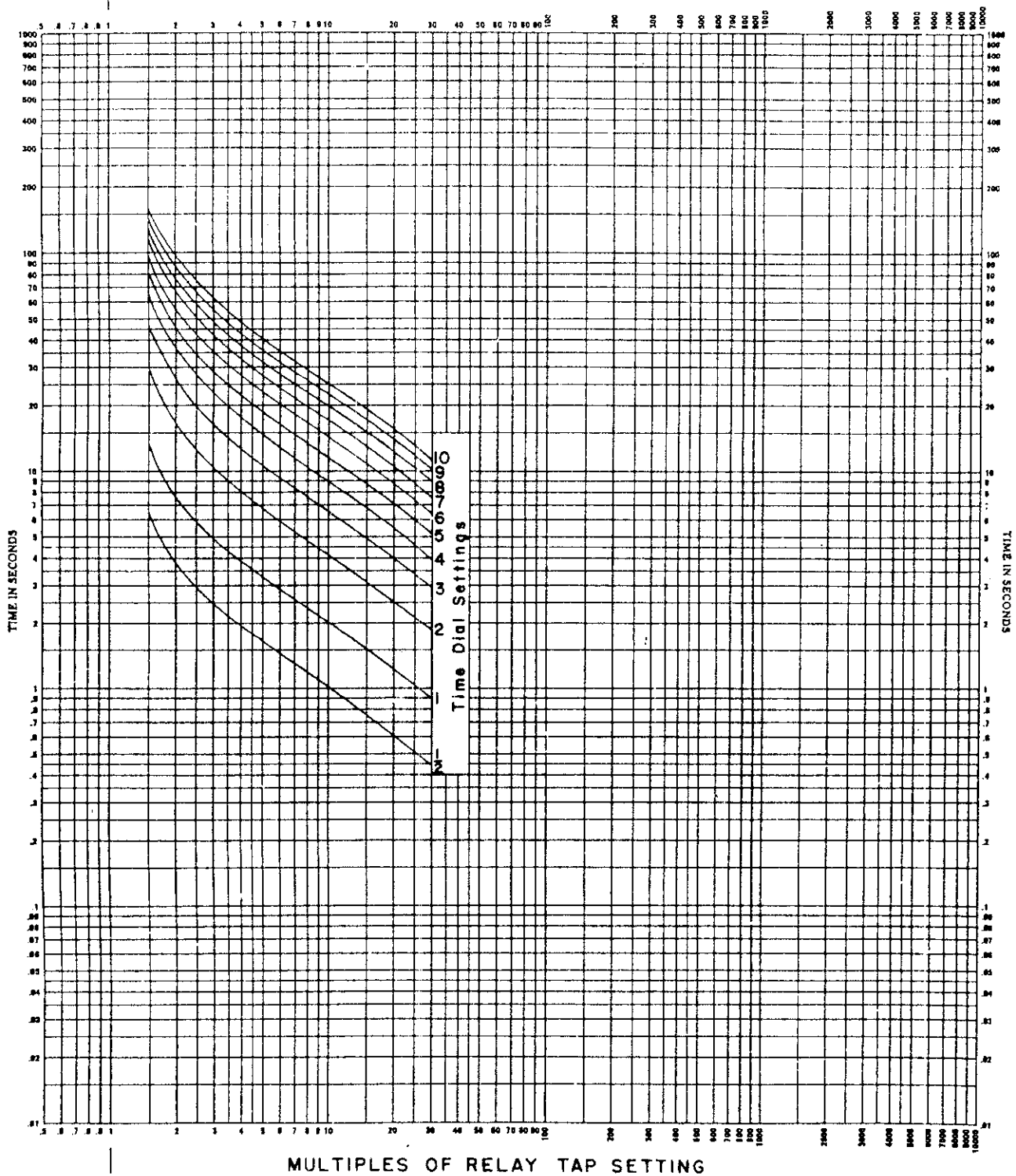


Figure 2 (0888B0273-0) Time Current Curve for the Long-time Overcurrent Unit

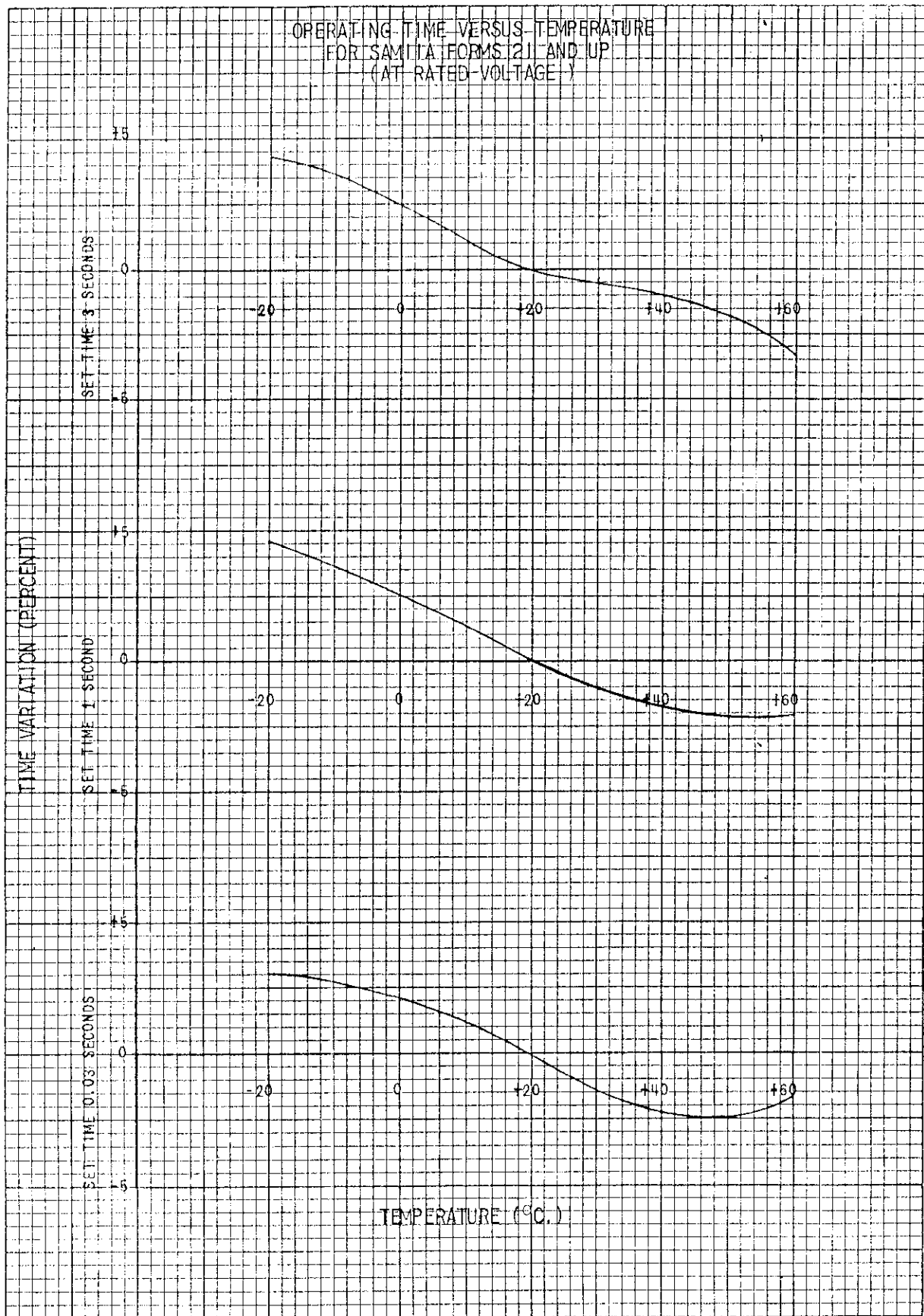


Figure 3 (0246A2598-0) Typical Operating Time of the Timer Unit Versus Temperature

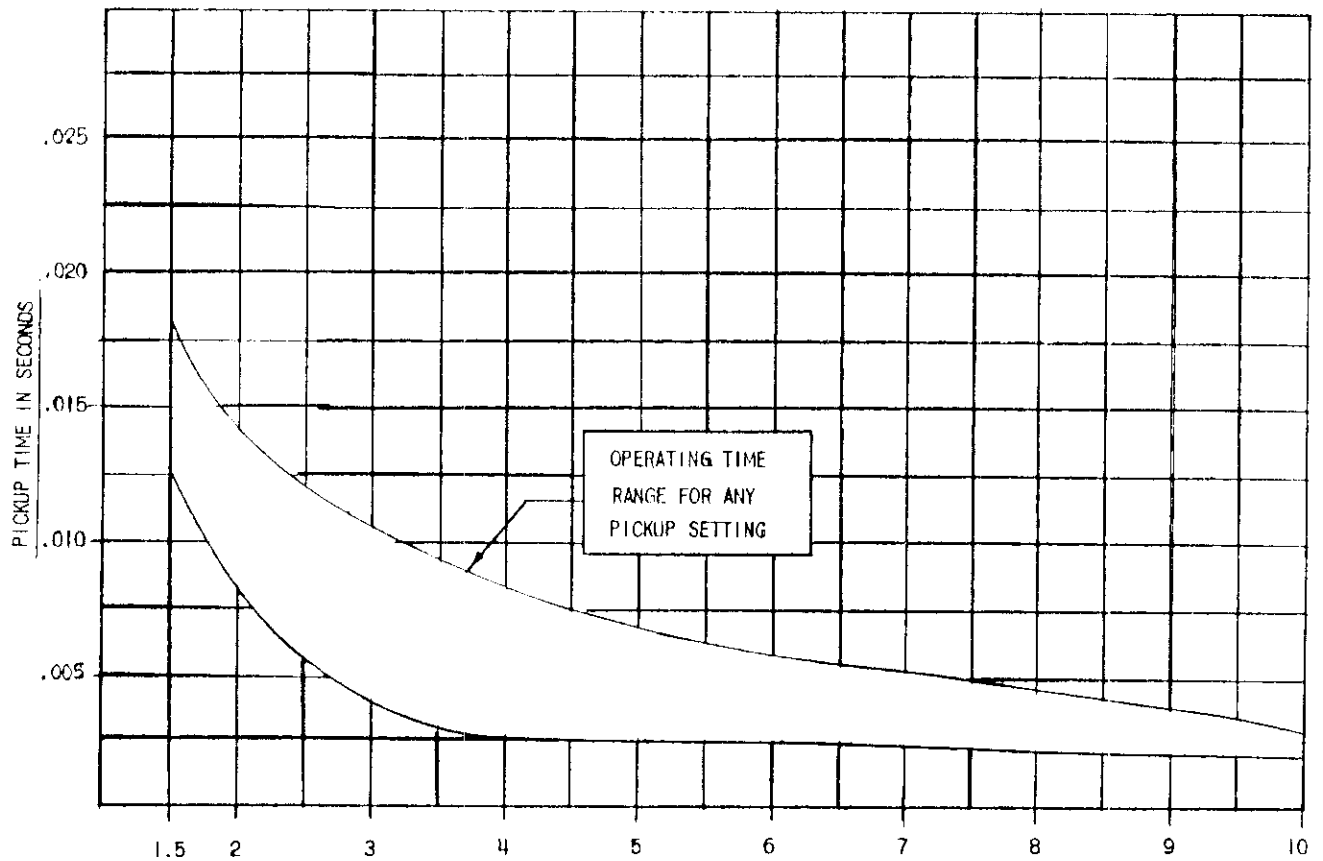


Figure 4 (0208A8695-1) Operating Time Versus Current for the High Seismic Instantaneous Unit

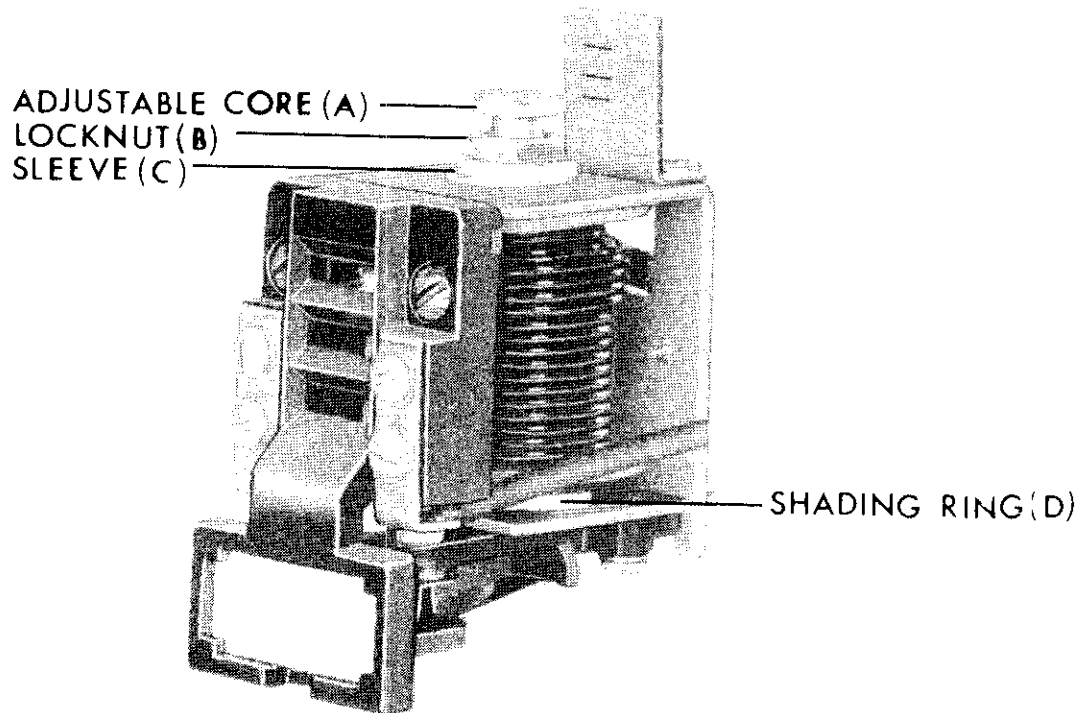


Figure 5 (8036365) Photograph: High Dropout Unit Construction

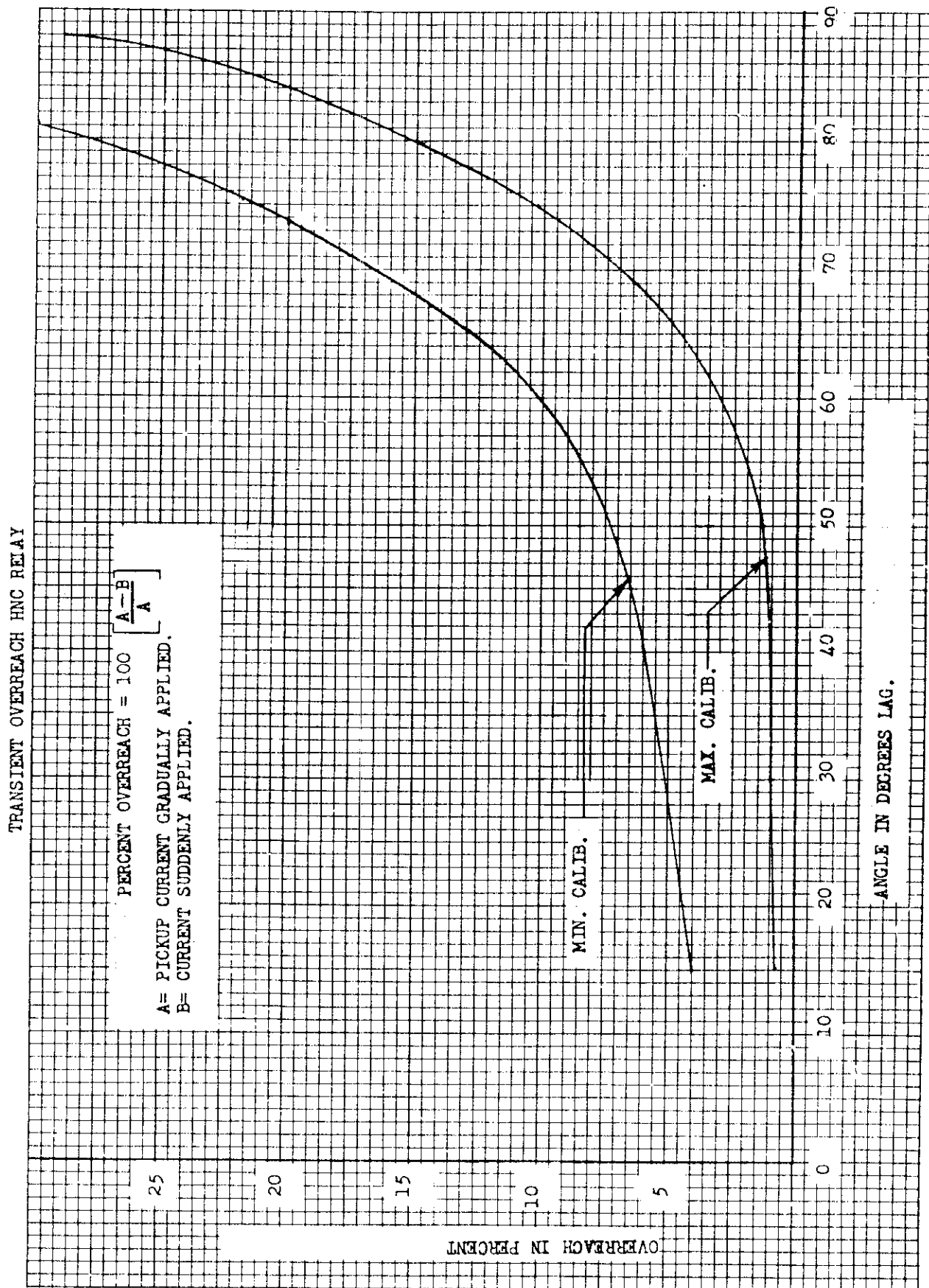


Figure 6 (0195A4950-0) Transient Overreach of the High Dropout Instantaneous Unit

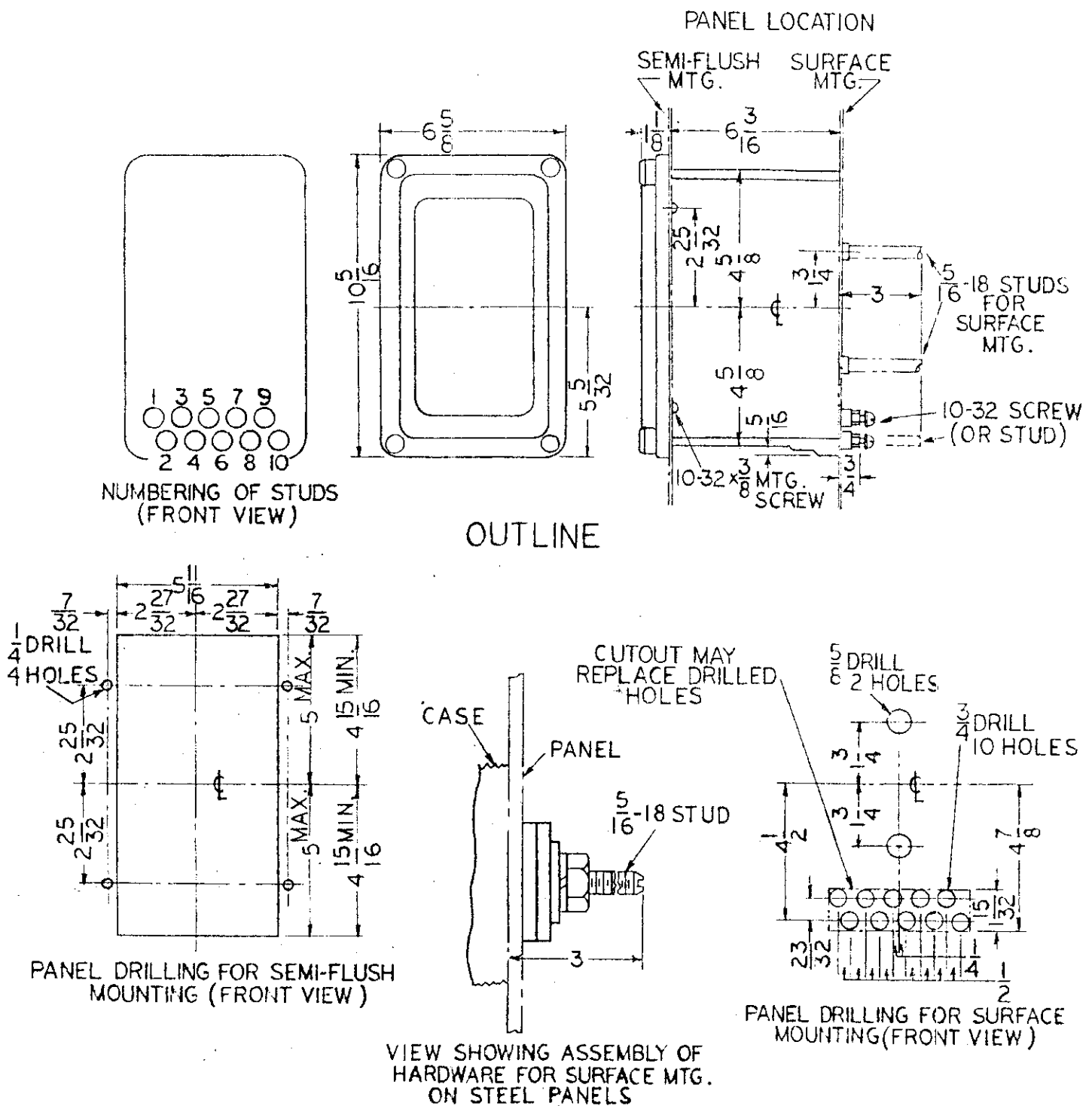
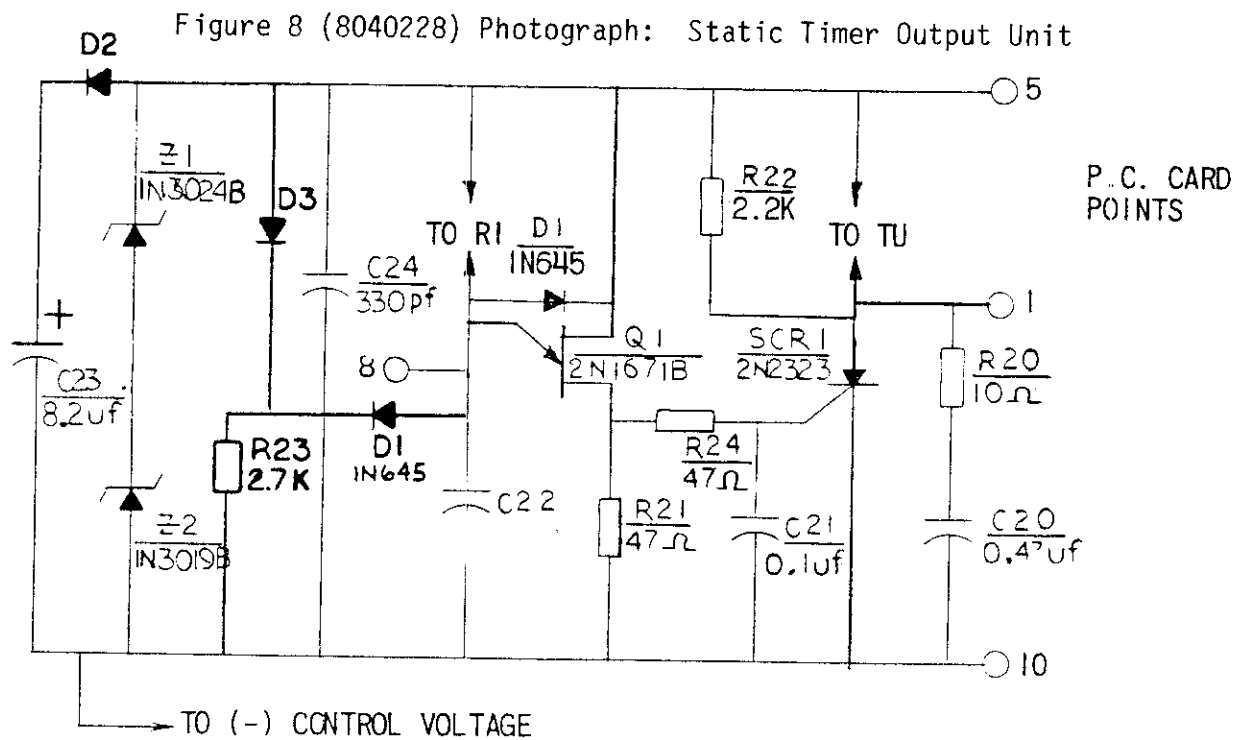
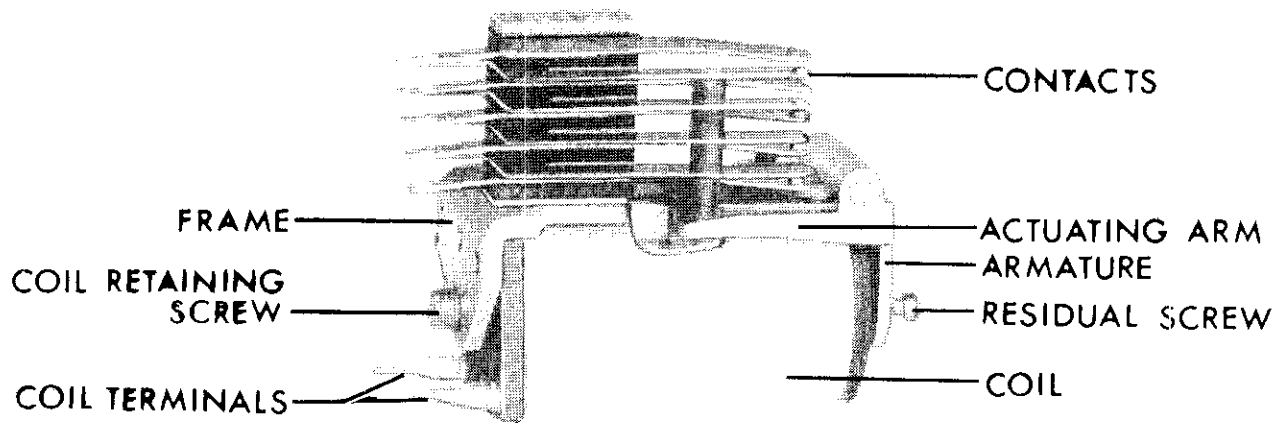


Figure 7 (0227A8541-0) Outline and Panel Drilling Dimensions for the IAC66T Relay



P.C. CARD ASM.	C 22
0165B2022 G-4	5.0
0165B1987 G-10	
0165B1987 G-12A	10.0

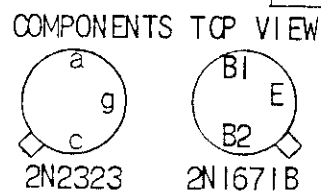
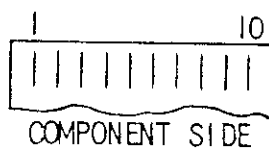


Figure 9 (0227A2505-4) Internal Connections Diagram for the Timer Unit, IAC66T Relay - Front View

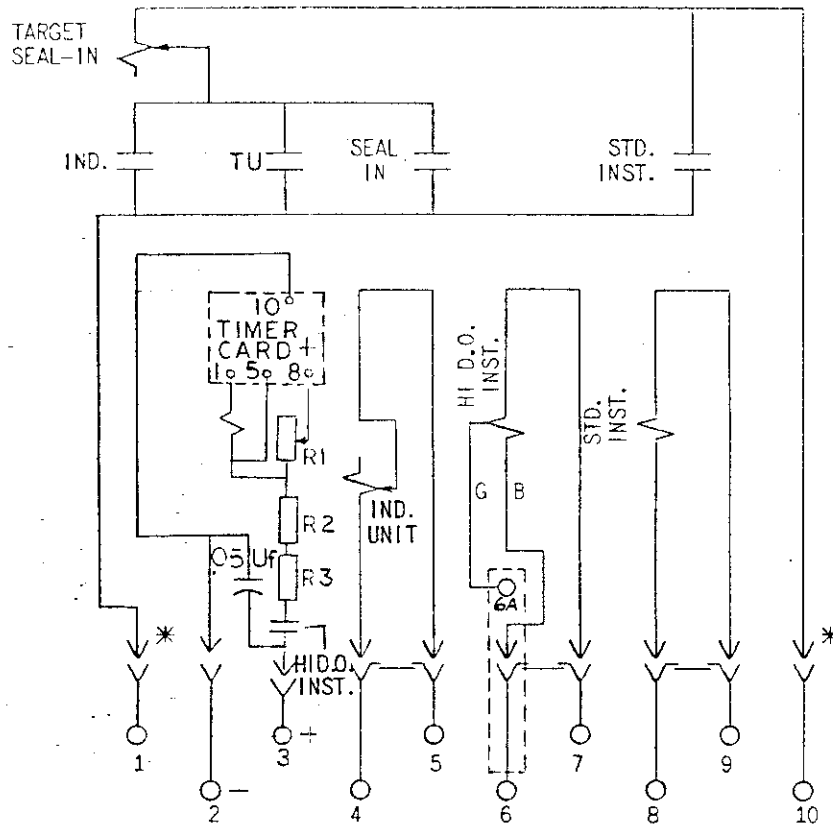


Figure 10A (0226A7010-3) Internal Connections Diagram for the IAC66T Relay (Front View)

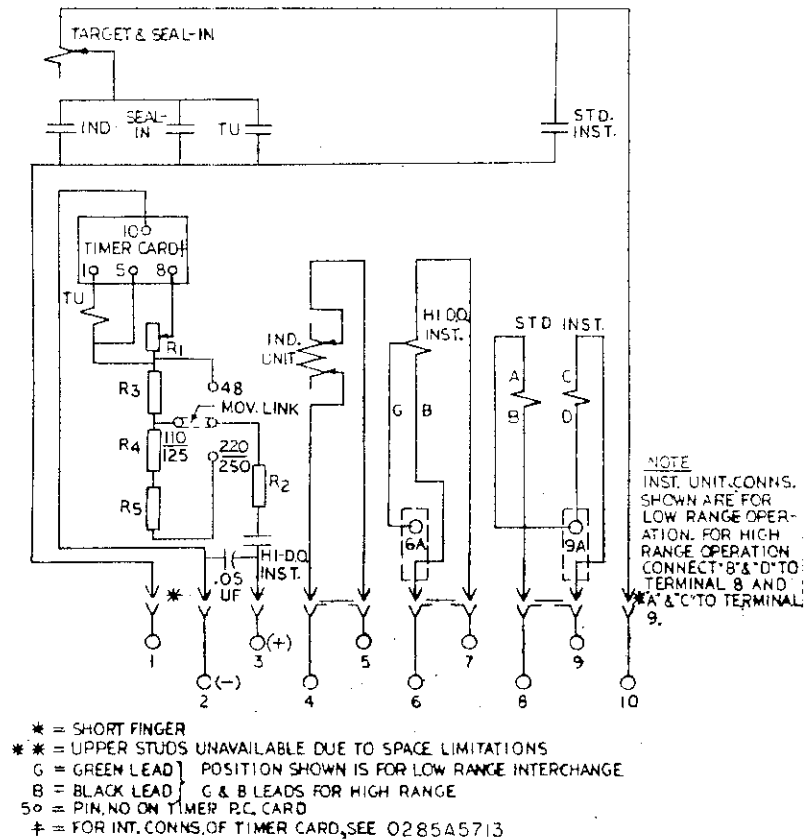
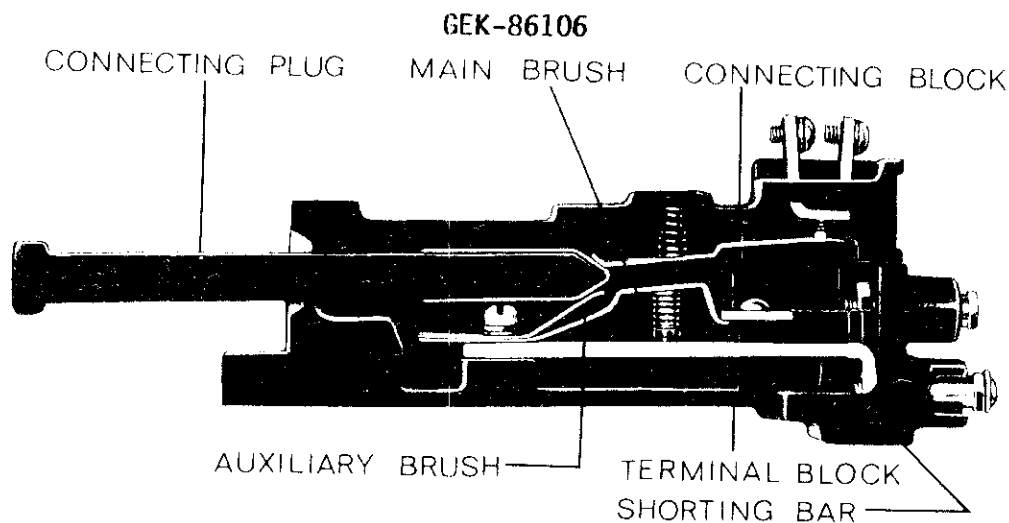


Figure 10B (0285A8841-0) Internal Connections Diagram for the IAC66T Relay, Forms 51 and Up (Front View)



NOTE: AFTER ENGAGING AUXILIARY BRUSH CONNECTING PLUG TRAVELS $\frac{1}{4}$ INCH BEFORE ENGAGING THE MAIN BRUSH ON THE TERMINAL BLOCK

Figure 11 (8025039) Photograph: Cross Section of Drawout Case Showing Position of Auxiliary Brushes

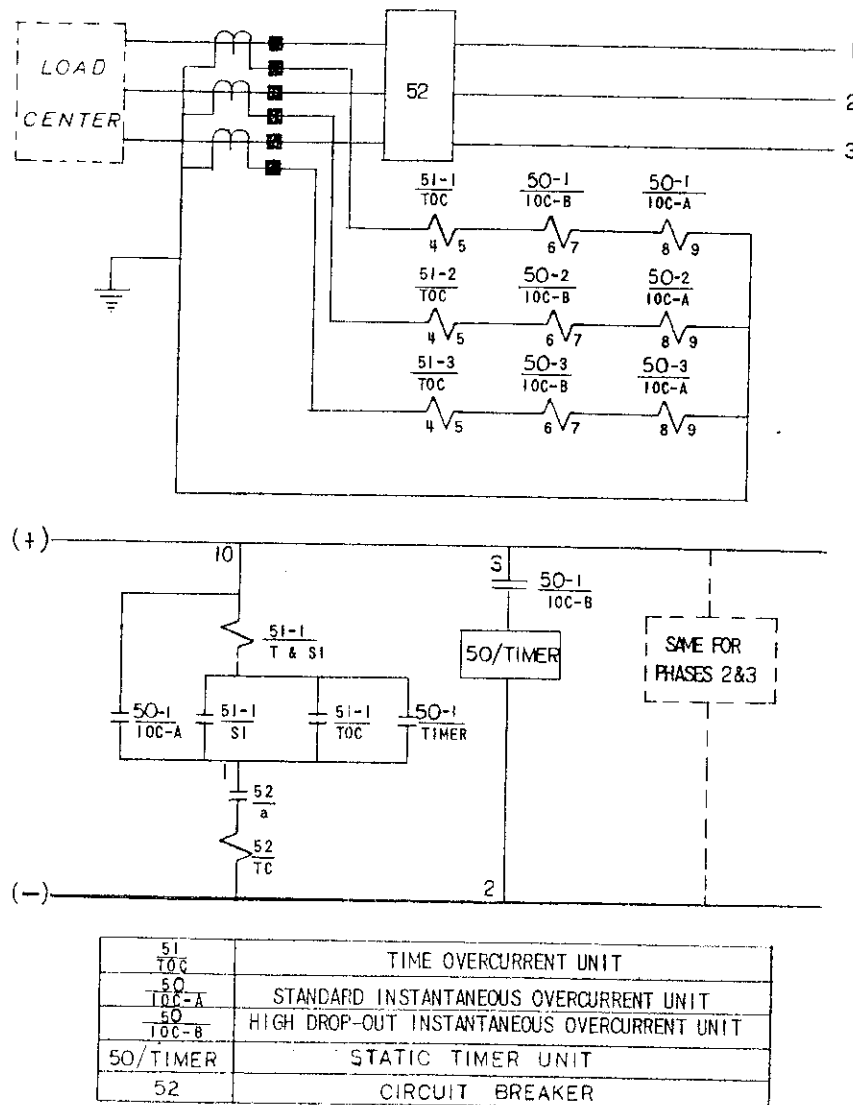


Figure 12 (0208A5596-1) Typical External Connections Diagram for IAC66T Relay

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