INSTRUCTIONS

GEK-49945B

AC UNDERVOLTAGE RELAY

TYPE HGA14BH(-)A

GENERAL ELECTRIC

CONTENTS

AC UNDERVOLTAGE RELAY
TYPE HGA14BH(-)A

DESCRIPTION

The Type HGA14BH(-)A relay is a three-phase AC undervoltage relay with a low dropout. It is specifically designed for use as a dead-line or a dead-bus detection device. The relay consists of a hinged-armature operating element and a three-phase full-wave rectifier bridge mounted in a single-unit, single-ended (S1) drawout case. The rectifier bridge is provided with a resistance-capacitance (R-C) surge protection network. The internal connections are shown in Figure 1. The R1 rheostat, the R2 fixed resistor and the HI-LO link provide the adjustable dropout of the relay. The normally-closed contact makes the relay pickup independent of the dropout calibration.

APPLICATION

The Type HGA14BH(-)A relay is designed for dead-line or dead-bus detection on three-phase AC systems. It may be applied, however, wherever a low dropout single-phase or three-phase AC undervoltage relay is required. On three-phase applications, the relay dropout is adjustable over the range of 15% to 40% of its rated voltage. The relay pickup voltage is 62%, or less, of its rated voltage. For single-phase applications, the relay dropout adjustment ranges from 20% to 53% of rated voltage, but the pickup voltage remains the same.

One of the primary applications of this relay is its use as a three-phase residual voltage relay on automatic throwover schemes where induction motors are the principal load. The function of the relay in this application is to prevent an automatic throwover until the motor residual voltage has decayed to an acceptable predetermined value. This will result in limiting the motor inrush currents to a level that will not cause damage, regardless of the phase angle difference between the motor's residual voltage and the incoming voltage being applied. Since the relay employs a three-phase full-wave rectifier, its dropout calibration will be insensitive to the decrease in frequency of the residual voltage as the induction motors slow down.

For three-phase applications, connect the phase voltage leads A, B and C to relay studs 4, 5, and 6 in order, since the relay is unaffected by phase sequence. For single-phase applications, connect the voltage to any **two** of studs 4, 5 and 6, and make **no** connection to the third stud of this group.

RATINGS

The 12HGA14BH(-)A relays are available for operation on three-phase or single-phase AC sources at a 120 or 208 volt rating, depending on the model selected.

The pickup and dropout voltage values available are listed in Table I.

TABLE I

Relay Rated Voltage	Pickup Voltage Equal to or Less Than	Dropout Voltage **(3-Phase Application) Min	Max
120	75	18	50
208	130	30	90

** For single-phase applications, multiply the three-phase values by 1.33.

The contacts will make and carry 12 amperes continuously, or 30 amperes for one minute, and will interrupt the following:

Volts	Interrupt (Single Break)
115 AC	2 amps
230 AC	1 amp
125 DC	0.6 amp
250 DC	0.25 amp

BURDEN

The relay burden is 1.2 volt amperes (1.2 watts) per phase at rated relay volts.

CONSTRUCTION

The relay consists of a hinge-type auxiliary unit and a full-wave rectifier mounted in a single-unit, single-end drawout case. The rectifiers are provided with an R-C surge protection network.

The auxiliary unit is of the hinged-armature construction, with double pole contacts. The contact circuits are closed or opened by moving contact arms attached to the armature, which in turn is actuated by the operating coil and restrained by an adjustable control spring. The contact gap is adjustable by means of screw contacts and locknuts on the front fixed contacts. All adjustments have been made at the factory and should not need to be changed for normal operation.

The operation of the relay is best illustrated by the internal connection diagram in Figure 1. The operating coil of the relay unit is fed through a full-wave rectifier bridge circuit. The relay pickup is adjusted with the R1 rheostat and the Hi-LO link over the dropout range of 15%-40% of rated voltage on three-phase applications.

CASE

The case is suitable for either surface or semiflush panel mounting, and an assortment of hardware is provided for either mounting. The cover attaches to the case. Each cover screw has provision for a sealing wire.

The case has studs or screw connections at the bottom for the external connections. The electrical connections between the relay units and the case studs are made through spring-backed contact fingers mounted in stationary molded inner and outer blocks, between which nests a removable connecting plug that completes the circuits. The outer blocks, attached to the case, have the studs for the external connections, and the inner blocks have the terminals for the internal connections.

The relay mechanism is mounted in a steel framework called the cradle and is a complete unit, with all leads being terminated at the inner blocks. This cradle is held firmly in the case with a latch at the top and the bottom and by a guide pin at the back of the case. The cases and cradles are so constructed that the relay cannot be inserted in the case upside down. The connecting plug, besides making the electrical connections between the respective blocks of the cradle and case, also locks the latch in place. The cover, which is fastened to the case by thumbscrews, holds the connecting plug in place.

To draw out the relay unit, the cover is first removed and the plug is drawn out. Shorting bars are provided in the case to short the current transformer circuits. The latches are then released, and the relay unit can easily be drawn out. To replace the relay unit, the reverse order is followed.

A separate testing plug can be inserted in place of the connecting plug to test the relay in place on the panel, either from its own source of current and voltage, or from other sources. Or, the relay unit can be drawn out and replaced by another that has been tested in the laboratory.

RECEIVING, HANDLING AND STORAGE

These relays, when not included as part of a control panel, will be shipped in cartons designed to protect them 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 Sales Office.

Reasonable care should be exercised in unpacking the relay, in order that none of the parts are injured or the adjustments disturbed.

If the relays are not to be installed immediately, they should be stored in their original cartons 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.

INSTALLATION

LOCATION

The location should be clean and dry, free from excessive heat and vibration, and well lighted to facilitate inspection and testing.

MOUNTING

The relay should be mounted on a vertical surface. The outline and panel drilling dimensions are shown in Figure 2.

CONNECTIONS

Internal connections for the HGA14BH(-)A relay are shown in Figure 1.

One of the mounting studs or screws should be permanently grounded by a conductor not less than No. 12 B&S gage copper wire or its equivalent.

MECHANICAL ADJUSTMENTS

The mechanical adjustments listed below are approximate, and **should not be disturbed** before the electrical parameters have been checked.

Contact wipe - "a" contact

The contact wipe should be approximately 1/32 inch. The front wipe is adjusted by forming the moving contact arms.

Contact gap

The contact gap should be set at approximately 1/16 inch. This is adjusted with the "b" stationary contact.

ELECTRICAL ADJUSTMENTS

The pickup voltage is adjusted with the control spring. Moving the spring up on the notched tongue lowers the pickup, and moving it downward increases the pickup. The control spring is set at the factory for a pickup (three-phase basis) equal to or less than:

120V relay - Pickup equal to or less than 75V
208V relay - Pickup equal to or less than 130V

The dropout voltage range is selected in two steps with a link in the R1-R2 resistor circuit marked LO and HI. With the link in the LO position, the relay dropout voltage can be adjusted with the R1 rheostat from the minimum dropout setting to approximately the middle of the dropout range. With the link in the HI position, the relay dropout voltage can be adjusted with the R1 rheostat from approximately the middle of the dropout range to the maximum dropout voltage calibration. Each relay is checked to determine that there is an overlap between the LO link setting's upper dropout voltage and the HI link's lower dropout voltage.

The control spring can be adjusted if necessary, by moving the front loop of the spring up or down on the notched tongue. There is also a two-step adjustment on the opposite end of the control spring, provided by two holes in the anchor pin, which is supported by a hole in the base.

Adjusting the control spring will affect the pickup and dropout voltage; therefore it is recommended that the control spring be adjusted **only as a last resort,** if needed to get the relay in calibration.

The wipe has been set at the factory so that the relay will pick up, close its contact, and seal in with one motion; therefore it is **not recommended** that the wipe adjustments be disturbed.

PERIODIC CHECKS AND ROUTINE MAINTENANCE

Auxiliary relay equipment should be checked for operation at regular intervals, preferably at the same time that the associated protective devices are inspected. The relay should be checked for pickup and dropout values. Normally no adjustment should be required, but if changes are necessary the points covered in the previous section should be observed.

CONTACT CLEANING

A flexible burnishing tool should be used for cleaning relay contacts. This is a flexible strip of metal with an etched-roughened surface, which in effect resembles a superfine file. The polishing action of this file is so delicate that no scratches are left on the contacts, yet it cleans off any corrosion thoroughly and rapidly. The flexibility of the tool ensures the cleaning of the actual points of contact.

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 embedded in the contacts and thus prevent closing.

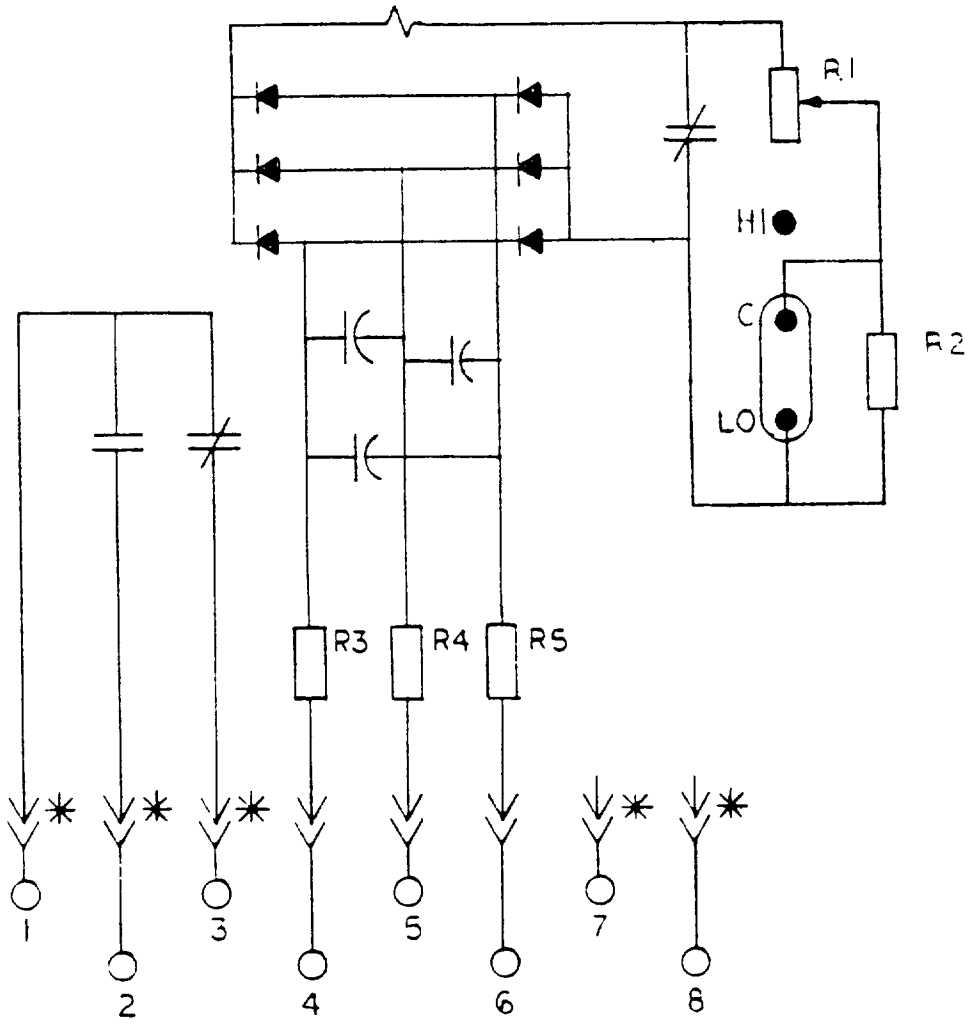
The burnishing tool described above can be obtained from the factory.

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. If possible, give the General Electric Company requisition number on which the relay was furnished.

Since the last edition, Figure 2 has been changed.



✳=SHORT FINGER

FORM	VOLTAGE	R1	R2	R3	R4	R5
1	120	15K	10K	100	100	100
2	208	25K	22K			

igure 1(0273A9589-0 Sh. 1 & 2) Internal Connections Diagram for the 12HGA14BH(-)A Relay

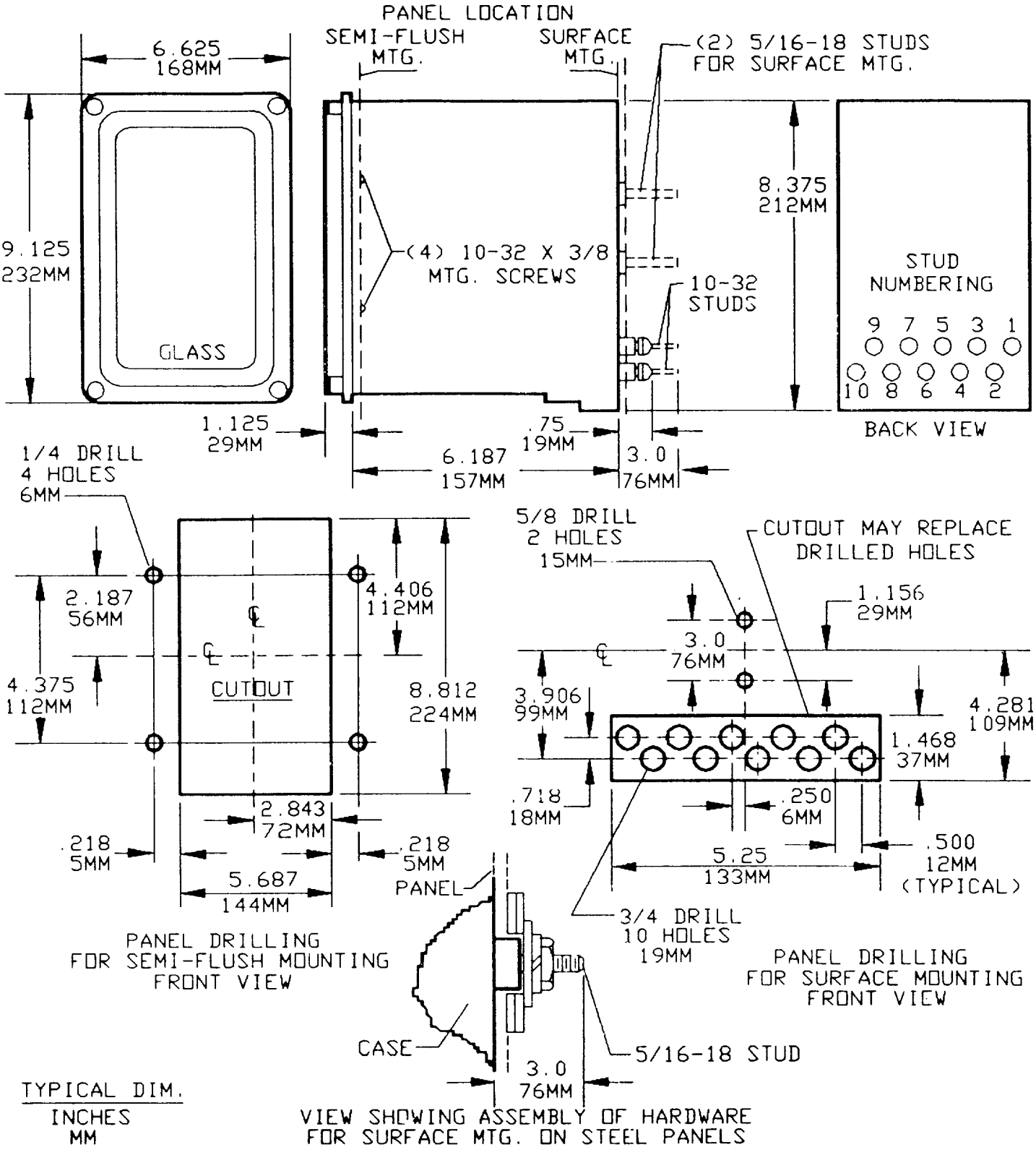


Figure 2 (K-6209271-8) Outline and Panel Drilling for the 12HGA14BH(-)A Relay

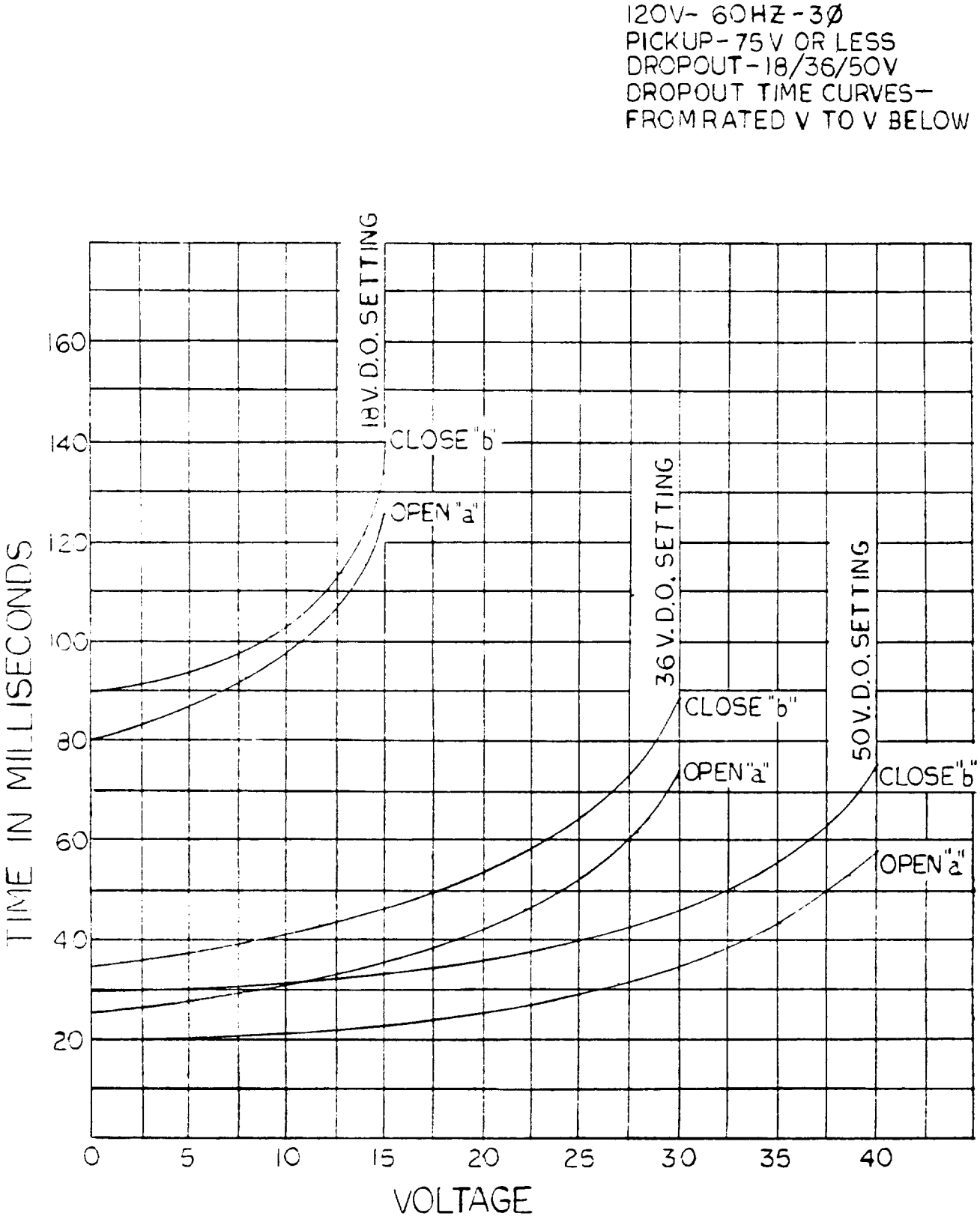


Figure 3 (0275A4310-0) Dropout Time Curve for 120 Volt Rated 12HGA14BH(-)A Relay

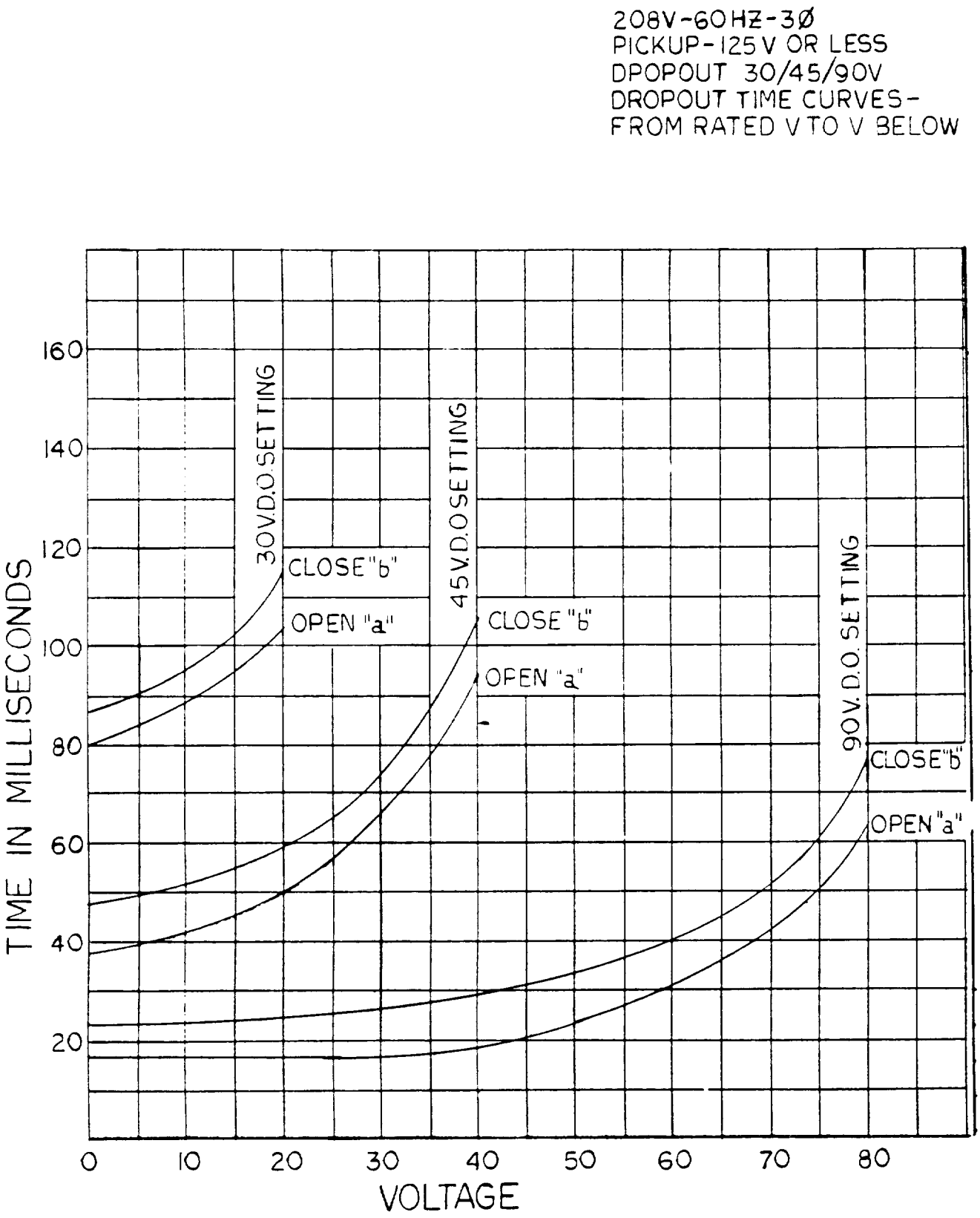


Figure 4 (0275A4309-0) Dropout Time Curve for 208 Volt Rated 12HGA14BH(-)A Relay

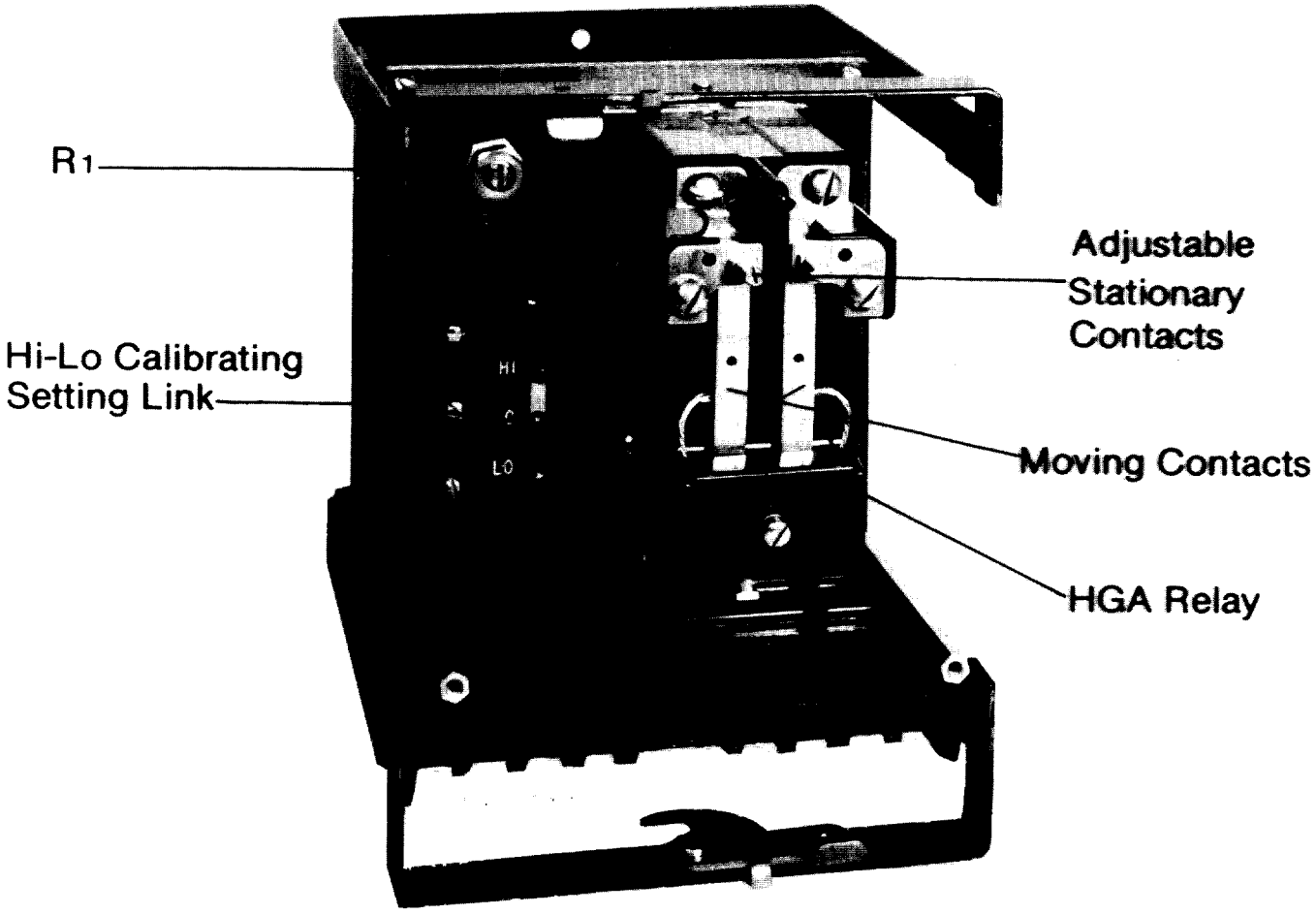


Figure 5 (8043559) Front View of 12HGA14BH(-)A Relay Out of Its Case Without Nameplate

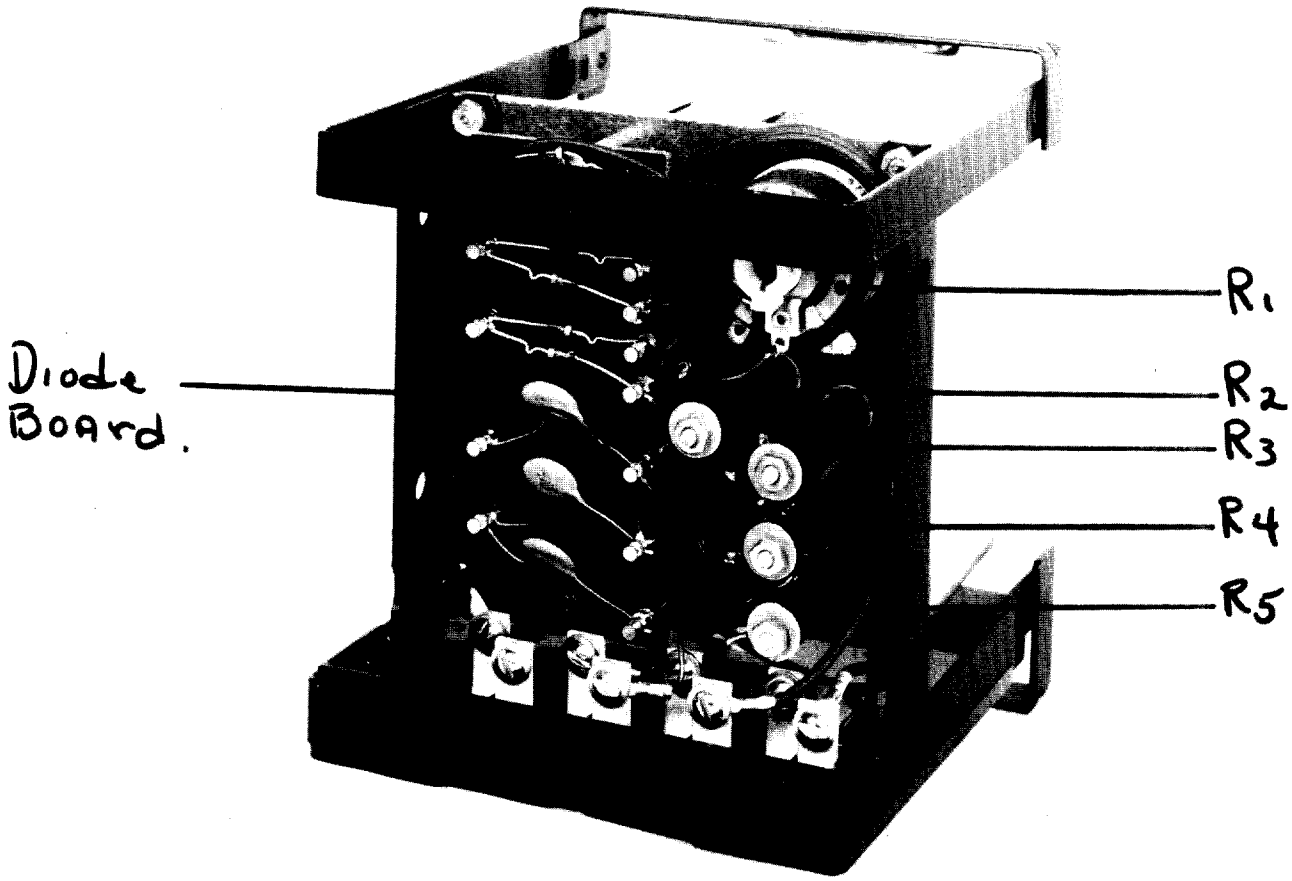


Figure 6 (8043560) Rear View of 12HGA14BH(-)A Relay Out of Its Case

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