INSTRUCTIONS

GEI-20915C
SUPERSEDES GEI-20915B
A

D-C REVERSE-CURRENT AIR-CIRCUIT BREAKER

Type XRP12A

LOW VOLTAGE SWITCHGEAR DEPARTMENT

GENERAL ELECTRIC

PHILADELPHIA, PA.

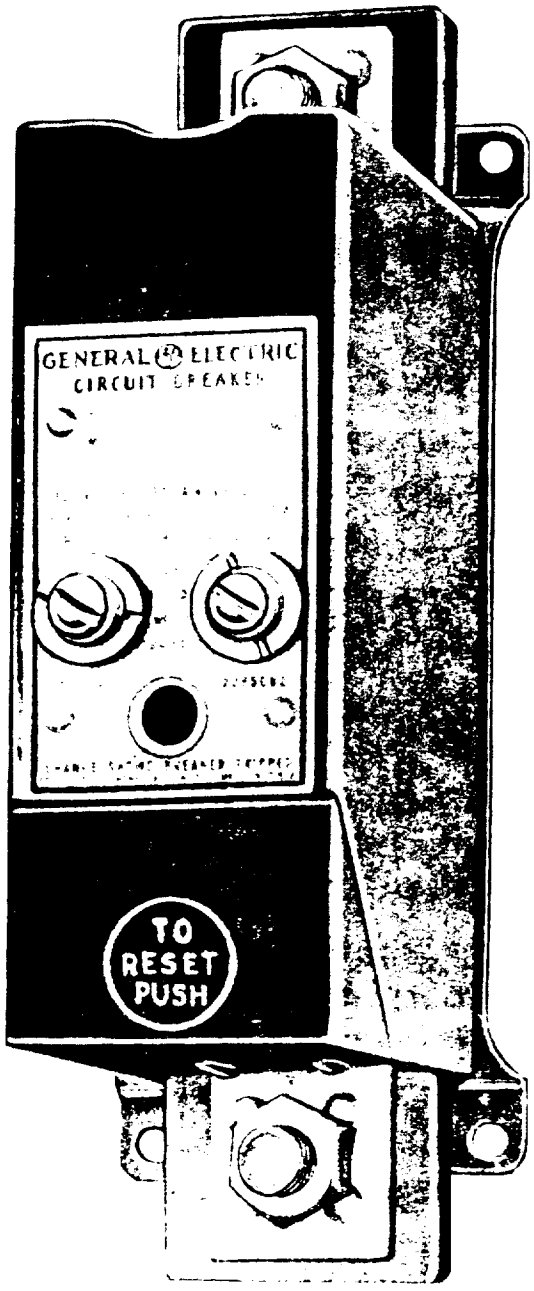

Fig. 1 (8001198) G-E Reverse-Current Circuit Breaker Type XRP12A

D-C REVERSE-CURRENT AIR-CIRCUIT BREAKER

TYPE XRP12A

GENERAL INFORMATION

The Type XRP air circuit breaker is a circuit-protective device designed especially for air craft use. It is connected in the generator circuit between the generator relay and the positive bus. In case of an electrical fault occurring in the generator, the generator relay, or their connecting cables, the Type XRP breaker will trip on the reversed flow of current from the bus. This will interrupt the current, and at the same time, an auxiliary switch on the Type XRP breaker opens the shunt-field circuit of the faulted generator. Interruption of the field "kills" the generator excitation so that it cannot continue to feed current into the fault.

OPERATING CHARACTERISTICS

The standard Type XRP breaker Model 12XRP 12A1 shown in Fig. 1 is suitable for use with standard 28.5 volt aircraft generators of either 300 or 400 ampere rating.

The breaker is electrically tripped on reverse current only, and is manually reset after removal of the fault.

Reverse currents occur in normal operation. Large values exceeding the generator rating are experienced during recovery from system faults, by interruption of the field circuit, etc. Small values occur when, for example, the generator speed is reduced to a point at which its generated voltage is lower than the bus voltage. In this case, the generator relay operates to disconnect the generator from the bus. The Type XRP12A does not trip for these normal reverse currents because the reverse current-time characteristic shown in Fig. 2 gives adequate time delay. However, all new system designs should be tested under service conditions to assure that the characteristic of Fig. 2 is satisfactory for that system.

When a fault occurs in the generator circuit, however, the reverse current may rise quickly to values far in excess of the interrupting ability of the generator relay. In such a case, the Type XRP12A device rapidly trips and clears the fault.

A typical external connection diagram, Fig. 3, shows the application of the Type XRP breaker.

RATINGS

The breaker has a continuous rating of 30 volts and 300 amps, a current-interrupting capacity of 15,000 amperes and has a minimum reverse-current trip setting of 300 amperes. The band of operation is given in Fig. 2.

The continuous current rating of the breaker may be increased to 400 amperes on applications where two cables of size 1/0 or larger are used at each terminal of the breaker. The minimum reverse-current trip setting will remain at 300 amperes for this increased rating.

UNPACKING

The breaker should be unpacked and inspected for possible damage in shipment. If injury or rough handling is evident, a damage claim should be filed at once with the transportation company and the nearest General Electric Sales Office should be notified.

INSTALLATION

Outline internal connections and mounting dimensions are shown in Fig. 4. Four holes in the base are provided for mounting the breaker. The mounting can be made in any position on any flat surface.

After mounting, external connection should be made as shown in Fig. 3. Particular attention should be given to insure that the polarities are as indicated, i.e., the generator cable should be connected to the terminal marked "generator" (see Fig. 4) and the positive bus should be connected to the terminal marked "+ bus".

OPERATION AND MAINTENANCE

As the breaker only functions to remove a fault in the generator circuit, its operations will be limited in number. In the event of such an operation, the generator circuit should be completely checked and the insulation failure corrected. The operation is indicated by a orange signal appearing through the hole in the nameplate of the breaker. With the

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.

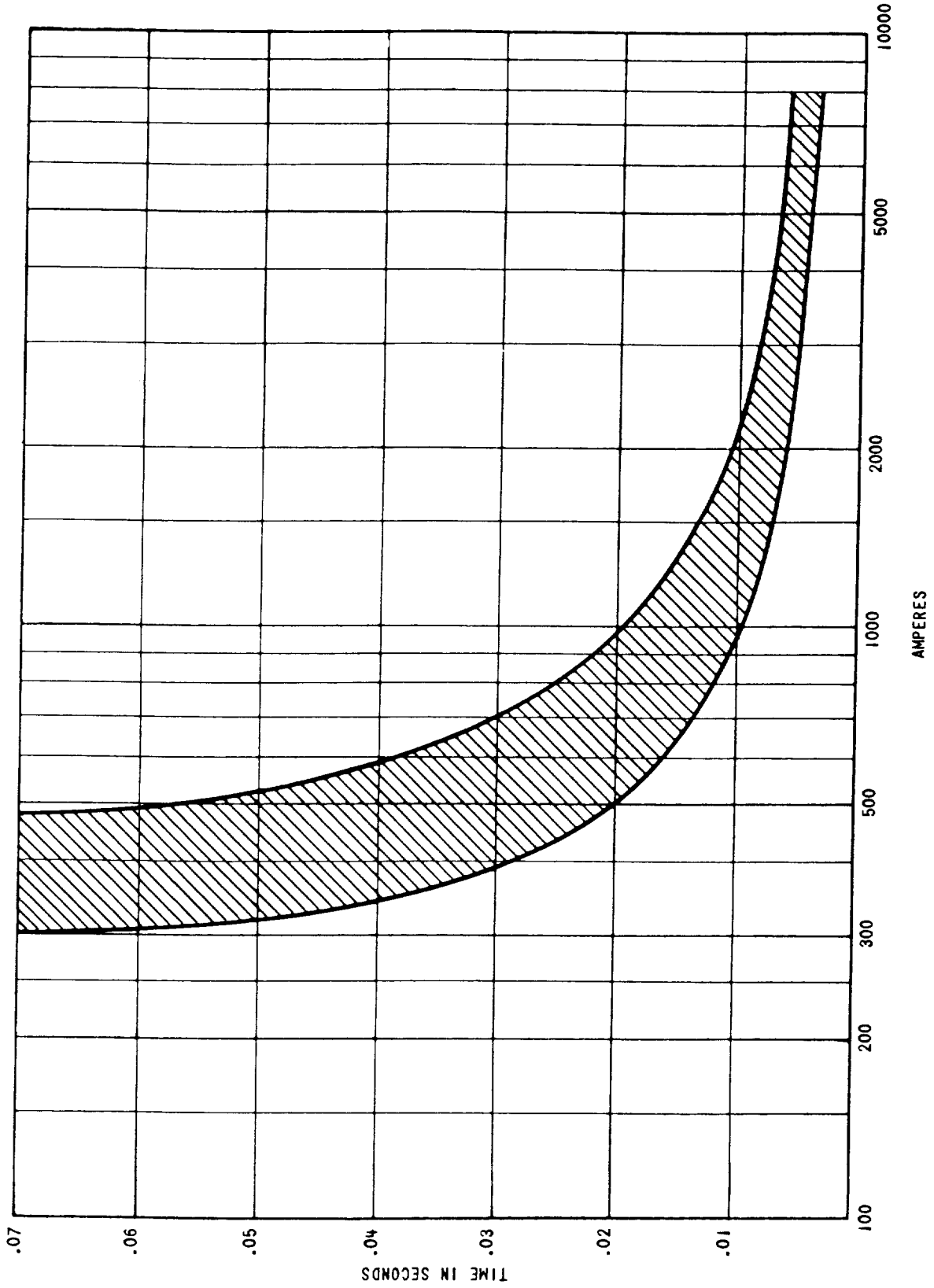

Fig. 2 (K-6400176) Time-Current Characteristic For Type XRP12A Application Showing Time To Release Trip Armature (Time To Interruption Add Approximately .006 Second.)

insulation failure corrected, the Type XRP breaker should be given a millivolt drop test as outlined below to check the condition of the main contacts. The millivolt drop after a tripping operation should not exceed 100 millivolts. The breaker can be manually reclosed by pushing on the bell crank (Fig. 6) through the flexible reset cover as indicated in Fig. 5, making the generator available to the system through the generator relay.

The breaker may also serve to remove the generator in such case where the generator relay fails to disconnect the circuit provided that there is sufficient connected system capacity to supply the load and to produce reverse currents to the generator of tripping magnitude.

Should the breaker be damaged or fail to function correctly, it should be replaced. For the safety of equipment and plan, the system should be de-energized when working on the Type XRP breaker.

INSPECTION AND TEST

Being a protective device and not subject to control operation, this breaker should require no more that a general inspection and calibration test after 1000 hours or at the time the plane receives a complete overhaul. A millivolt drop test should be made after each operation of a breaker, to indicate the condition of the contacts.

To test the breaker, a d-c source capable of supplying approximately 400 amperes in increments of 10 amperes or less is required. The positive bus should be connected to the terminal marked "+ bus" to produce a reverse current through the breaker. The trip should be within the limits indicated by Fig. 2. The nominal setting is 375 amps.

A millivolt drop test on the breaker gives an electrical check of the main contacts. Applying 400 amps with the positive bus connected to the "generator" terminal the drop through the breaker should not exceed 100 millivolts. (NOTE: If a breaker has been standing for a considerable time with contacts open, its millivolt drop may exceed 100 mv.) This measurement should be made on the contact bar and not through any terminal stud or lugs. In general, it is necessary to switch the positive bus to the generator terminal to prevent its tripping with the 400 amps. The condition of the main contacts will vary the millivolts reading and if the value exceeds the above limits, the breaker is not satisfactory for further use without repair.

The protective case as one of its functions is intended to maintain the armature gap free from foreign materials and should not be removed at any time before or while the breaker is in service. As most repairs will require special tools, it is recommended that the breaker be returned to the factory without removing the protective case.

In Fig. 6, the protective case has been removed to show the internal construction and some of the parts have been marked for identification purposes. Under special conditions where a disassembly is needed and where the techniques used in manufacturing can be applied a partial disassembly showing the main and arcing contacts can be made by removing the four screws from the magnet supports and the four screws from the frame supports. As the mechanism is removed from the base, the latch will be released and the bell crank will operate to the tripped position. An arc shield is located between the frame support post and the base and is assembled with a post to stop the latch armature.

RENEWAL PARTS

The replacement requirements for the Type XRP breaker should be very small and it is recommended that spare breakers be carried in stock rather than several parts requiring special assembly tools for utilization. Orders should be addressed to the nearest sales office of the General Electric Company with quantity required, name or description of part, and complete nameplate data.

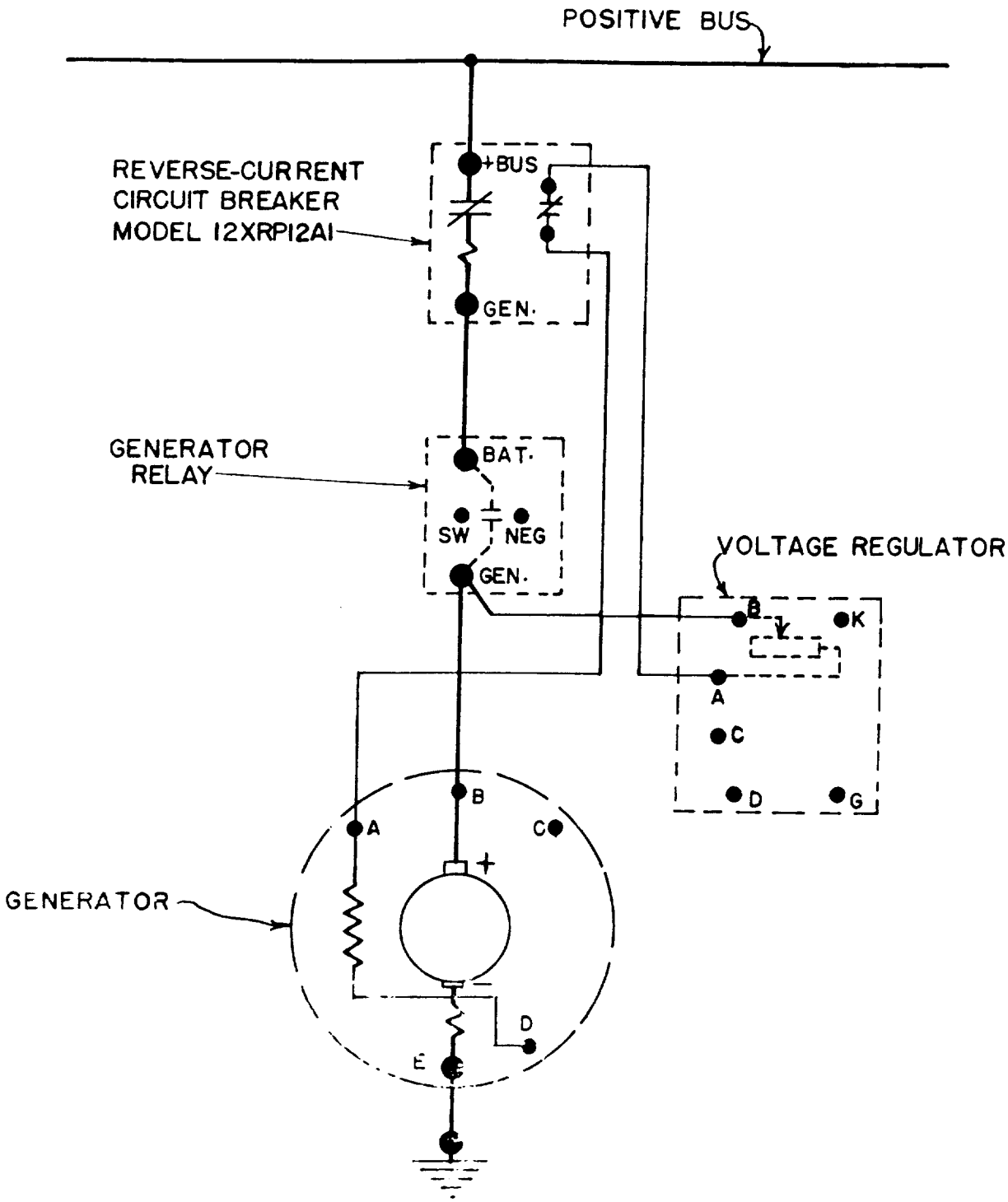

Fig. 3 (K-6306605) External Connection Diagram For Reverse-Current Circuit Breaker Type XRP12A

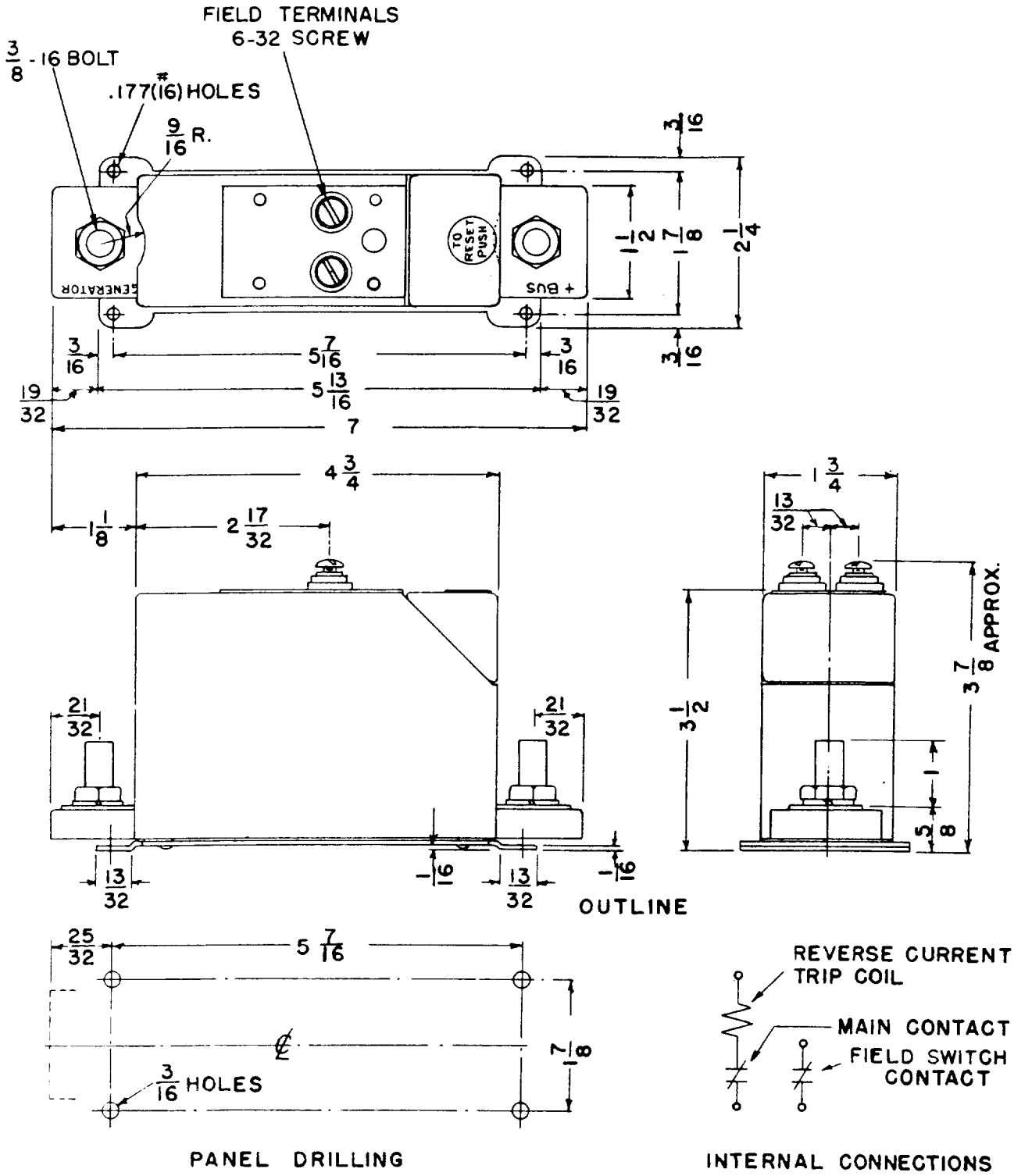

Fig. 4 (K-6400163) Outline, Panel Drilling And Internal Connections For Circuit Breaker Type XRP12A

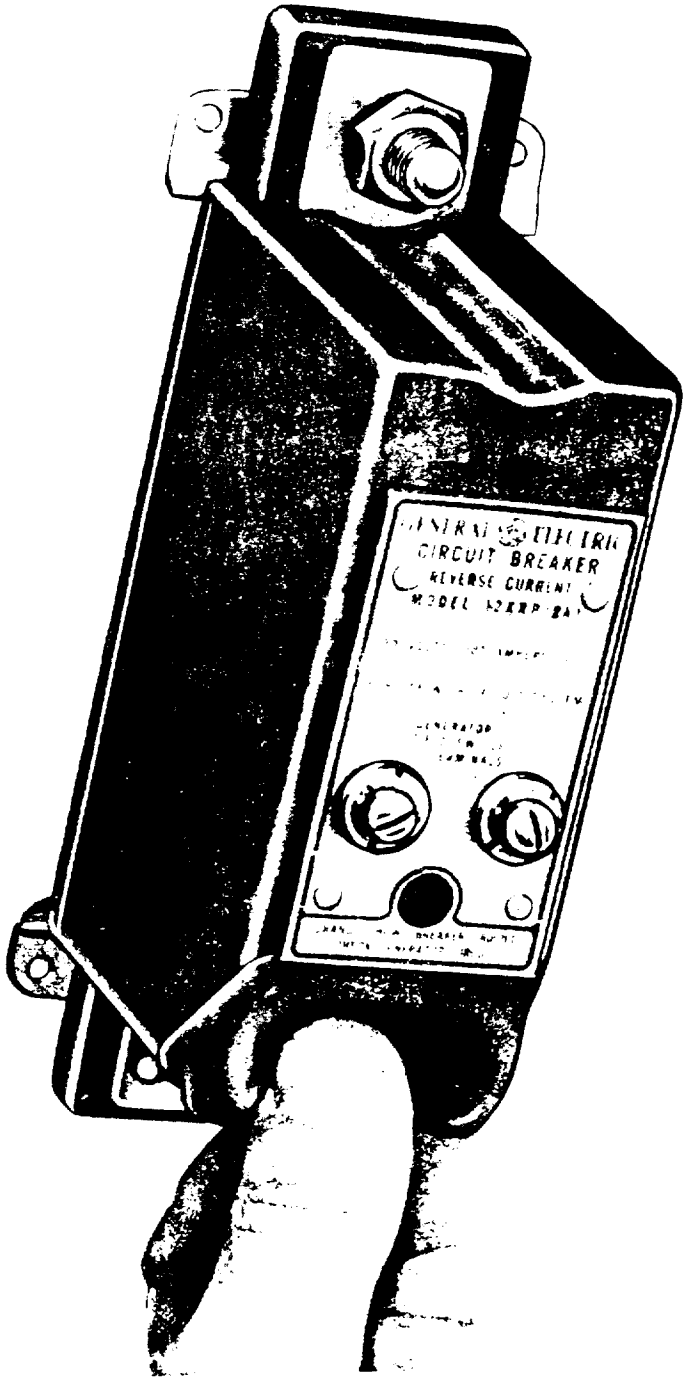

Fig. 5 (355282) G-E Reverse-Current Circuit Breaker Type XRP12A, Illustrating Method Of Operating Reset

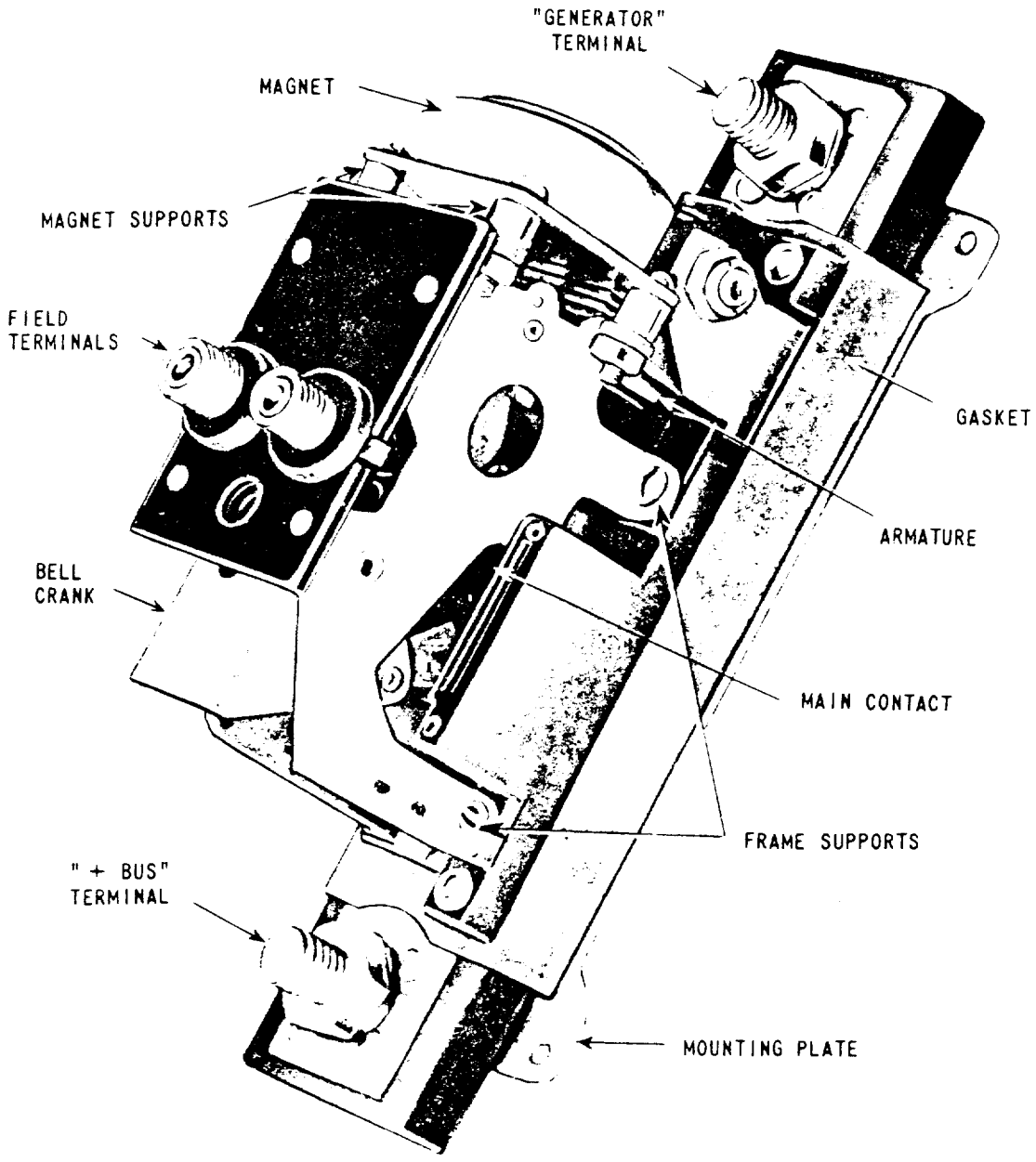

Fig. 6 (355280) G-E Reverse-Current Circuit Breaker Type XRP12A With Protective Case Removed

GE Power Management

215 Anderson Avenue
Markham, Ontario
Canada L6E 1B3
Tel: (905) 294-6222
Fax: (905) 201-2098
www.ge.com/indsys/pm