PORTABLE GROUND DETECTOR FOR USE WITH
POWELL GROUND-GARD®
HIGH RESISTANCE GROUNDING EQUIPMENT

I. INTRODUCTION

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 purpose, the matter should be referred to the Powell Electrical Manufacturing Company.

The portable ground detector, Part No. 176A2823P1, is used in conjunction with Powell Ground-Gard® high resistance grounding equipments to aid in locating system ground faults detected by the Ground-Gard® equipment. It is furnished as an optional accessory to Ground-Gard® equipments when specified.

II. SAFETY

Since the portable ground detector is designed to be used to measure current in an energized power circuit, great care must be taken to insure that no part of the device comes into contact with energized parts of the electrical equipment being monitored. Both the handle and the magnetic core of the portable ground detector are insulated for added safety, but this insulation should not be relied on for personnel protection.

III. RECEIVING, HANDLING AND STORAGE

Receiving and Handling

Each portable ground detector is inspected and then packed by workmen experienced in the proper handling of electrical equipment. Upon receipt of a device, an examination should be made for any damage sustained during shipment. If injury or rough handling is evident, a damage claim should be filed at once with the transportation company and the nearest office of the Powell Electrical Manufacturing Company should be notified.

The portable ground detector is a sensitive electrical measuring instrument, and should be handled carefully. Do not drop the device or expose it to unnecessary shocks, either mechanical or electrical. Protect it from moisture and corrosive atmospheres, both while in use and while in storage.

Storage

The portable ground detector is furnished in a padded carrying case (see Fig. 1), and should be kept in this case when not in use. The instrument and its case should be stored in a clean, dry location free of any atmospheric contaminants.

Fig. 1. Portable Ground Detector in Carrying Case.

IV. DESCRIPTION

The portable ground detector is a sensitive clamp-on alternating current ammeter. This meter is furnished with five scales, 1 A, 2 A, 5 A, 10 A and 20 A. The meter also has a "SHORT" position. The scale may be changed by turning the knob located just below the meter dial.
The window of the clamp-on current transformer has an internal diameter of 6 inches, allowing it to be used over a 5-inch conduit. The left half of the magnetic core which encircles the window is movable, and may be moved by squeezing the movable handle located to the left side of the main fixed handle of the device. This spring-loaded handle will open the jaws of the core approximately 3½ inches. To open the jaws further, the left side of the core may be pivoted about its support arm, up to a maximum opening of over 8 inches.

Fig. 2. Portable Ground Detector Ready for Use

V. OPERATION

The portable ground detector is a sensitive alternating current clamp-on ammeter, and as such, may be used to read ac currents up to its maximum rating of 20 A. When used with Ground-Gard® High Resistance Grounding Equipment, however, the portable ground detector is used to detect a pulsing ground current produced by the Ground-Gard® when it is in its pulsing mode, and to locate the point of the ground fault in the power system.

To locate a ground fault, turn the selector switch on the Ground-Gard® equipment to "PULSE". See Powell instruction book IB-60100 for further instructions on the use of the Ground-Gard® equipment. Place the jaws of the portable ground detector around the conductors of each outgoing circuit of the power distribution system in turn. On the circuit on which the ground is located, the portable ground detector will indicate a pulsing current, varying at a rate of approximately 40 pulses per minute. The absolute value of the pulsing current will depend on the setting of the Ground-Gard® equipment, but this value is not important when searching for the location of the ground fault.

Once the circuit on which the ground is located is found, the portable ground detector may be used to locate the ground fault. The circuit should be checked for pulsing at accessible locations. The pulsing will disappear once the location of the fault is passed. The fault location can be pinpointed by taking a series of readings with the portable ground detector.

When placing the jaws of the ground detector around the conductors, be sure to include all phase conductors of the circuit, and also the neutral if the circuit has an active neutral conductor. If possible, the grounding conductor should be left outside of the jaws. The ground detector may be placed around a conduit or an armored cable, but the magnitude of the pulses may be decreased due to a partial return of the ground fault current in the conduit or cable armor.

When placing the jaws of the ground detector around the conductors, be sure that the scale selector on the instrument is in the "SHORT" position. Once the jaws are in place and completely closed, the scale selector may be used to choose a scale that clearly shows the current pulses in the faulted circuit. Care should be taken not to exceed the rated current on any scale setting, as the meter may be damaged by too high a current.