

# Automatic Transfer Switch Option Ground Fault Protection

## Introduction

Ground faults in any power distribution system require special consideration. A ground fault occurs whenever a phase conductor develops an electrically conductive path to ground. This path may be caused by deteriorated insulation, mechanical damage, surges, heat, aging, presence of rodents, and the intrusion of foreign objects such as tools into bare bus compartments.

A ground fault may develop as a "bolted fault" and or "arcing fault." Ground fault protection will protect against either type if properly set.

A "bolted fault" occurs when a phase conductor is solidly connected to ground. This produces a high fault current which dissipates energy throughout the distribution system.

An "arcing fault" occurs when a phase conductor develops an electrically conductive path to ground but is not solidly connected to ground. This path develops an arcing fault which, if self-sustaining, is capable of releasing tremendous energy at the point of fault. This tremendous energy, released at low current levels over a period of time, creates devastating results sufficient to ignite fires.

The I.E.E.E. studies indicate that the typical arcing fault current is only 38% of the bolted fault current. It is this low current level that renders normal over current protection useless. The only recourse is to add supplemental relaying to secure adequate protection.

The National Electric Code requires in Article 230-95: "Ground fault protection of equipment shall be provided for solidly grounded Wye electrical services of more than 150 volts to ground, but not exceeding 600 volts phase to phase for each service disconnecting means rated 1,000 amperes or more".

The voltage range for ground fault protection is specified since arcing faults in circuits less than 150 VAC to ground are usually self-extinguishing and arcing faults in circuits over 600 VAC line to line approach bolted fault levels which may be detected by ordinary phase over current devices if the system is solidly grounded.

When a ground fault is detected, the Normal and/or the Emergency source will be opened, isolating the ground fault from the external voltage source. To ensure that the alternate source will not be closed to a known fault.

The Automatic Transfer Switch will be inhibited from transferring to the alternate source until:

- 1) The Fault is Cleared
- 2) Automatic Transfer Switch is Manually Reset
- 3) Ground Fault Relay is Reset by Pushing the Reset Pushbutton

The maximum setting of the ground fault protection shall be 1200 amperes, and the maximum time delay shall be one second for ground fault currents equal to or greater than 3000 amperes.

## NOTE:

For Delta connected systems, please consult the factory. Ground Fault Protection is not required for a continuous industrial process where a non-orderly shutdown will introduce additional or increased hazards.

## Product Features

- UL 1008 Listed
- Monitors for Ground Fault and the System will be Tripped in the Event of a Ground Fault Condition being Detected
- Aux Contact, (TRBL), is Provided for the Customers to Indicate a System Trouble (General Trouble Contact; Overcurrent, Ground Fault, etc.)
- HMI will Display the Fault Condition

## Operation

This option provides Ground Fault Protections on the normal source. When a Ground Fault Condition is detected, the system will trip open the normal side breaker to remove the ground fault from the load.

The Trouble contact, TRBL, will change state to indicate there is a problem with the power source. This will require operator intervention to remove the ground fault and reset the ATS for automatic operation.

## Recommendations

Lake Shore Electric Corporation highly recommends that the specifying engineer recommend where any and all ground fault protection should be placed within the facility.

If GFP has already been specified, please consult the factory for ordering the appropriate equipment and further information.

## Order Guide

### Part Number Examples:

1. ICFA32000BPSB/GFP - Insulated Case ATS, 3 pole, 2000 Amp, 120/208Vac, **24Vdc Microprocessor Controls**, 65kAIC @ 480Vac, NEMA 1 Free Standing Enclosure with option GFP.
2. MCDA31000CESA/39A - Molded Case ATS, 3 pole, 1000 Amp, 277/480Vac, **Electromechanical Controls**, 35kAIC @ 480Vac, NEMA 1 Wall Mount Enclosure with Option 39A.
3. MCDM31000CESA/39A - Molded Case MTS, 3 pole, 1000 Amp, 277/480Vac, **Manual Transfer Switch**, 35kAIC @ 480Vac, NEMA 1 Wall Mount Enclosure with Option 39A.