

Assembly Equipment Application Notes

Assembly equipment provides automation in the production process. Automated assembly equipment includes insertion, brazing and soldering, clinching and stitch folding, eyeletting, injected metal (IMA), riveting, screw driving and welding, just to name a few. Typical high-speed assembly rates are 200-1000 parts per minute. Industries served by assembly equipment include, but not limited to, aerospace, agriculture, automotive, computer, electrical, electronics, fiber optics, food and beverage, general industry, medical, plumbing, microelectronics or semiconductor, and telecommunications. Electrical protection, such as ground fault circuit interrupters (GFCI's), is the first line of defense in the event of an electrical hazard. Bad equipment can be replaced in a short time; however, fire and serious injury or death caused by a ground fault could shut down a facility for several days or weeks.

Ground fault circuit interrupters (GFCI's) should be the first consideration in protecting personnel and equipment from electrical failure. Should equipment or a person come in contact with a live (hot) wire, they become a path to ground; the result could be electrical current passing through their body, possibly resulting in damage, injury or death. A ground fault occurs when electrical current finds a bridge to ground via worn insulations, conductive dusts, water or other "soft grounds" instead of the normal path back to its source. More than 80% of short circuits in equipment are ground faults, and 90% of these events are due to insulation deterioration on wires and cables. In cases where workers accidentally bridge power and ground, current in the mA range can send their hearts into ventricular fibrillation.



A GFCI (Ground Fault Circuit Interrupter) functions by measuring the outgoing amperage to a piece of equipment and comparing it against the return amperage. If a difference (leak) of > 5 milliamps occurs (or set higher for certain equipment), the GFCI stops the flow of electricity to protect equipment and workers from potential electrocution.

Avoiding electrical accidents and equipment damage are keys to reducing liability and increasing productivity. Minimum ground fault protection can be incorporated into the main power disconnect device and could be considered adequate for the entire system. In such a design, however, any downstream ground fault could trip the main protective device resulting in a complete substation power outage. The NEC's purpose, in its own words, is "the practical safeguarding of persons and property...but not necessarily efficient, convenient, or ...for good service..." (Article 90.1A, B). In other words, system reliability is left to common sense and good engineering design practices. For this reason ground fault protection of the circuit may be highly desirable and recommended for reliable and continuous operation.

Guidelines for electrical safety are:

- Know where the GFCI is located in the assembly equipment. If there is not a GFCI installed, have one installed local to the equipment to confirm you have protection.
- Always test the GFCI before using the assembly equipment.
- Always have a qualified electrician check the assembly equipment for electrical problems after it has tripped a GFCI.

Why Use Technology Research Corporation (TRC) HD-PRO Series?



TRC engineers designed the HD-PRO models specifically for high current, rugged environments and these models are field-proven in all kinds of tough applications. The entire HD-PRO family (120V/30A to 600V/80A) is designed to trip within 25 milliseconds after ground fault detection at an adjustable selected trip level of 6, 10 or 30 mA.

Before the development of the HD-PRO Series, facilities with high current – high voltage equipment or three phase systems employed expensive ground fault breakers at the source of the branch circuit, or went without ground fault protection, leaving personnel and equipment unprotected.

Circuit breakers can withstand high current levels but have short mechanical lives and were not designed for switching duty. Localized ground faults, with circuit breakers, either shut down the whole branch circuit or were overloaded because the available devices were not portable and were often too costly.

The HD-PRO Series utilizes contactors that are fully rated for motor switching demands. In addition to being far less expensive than three phase breakers, the HD-PRO models protect expensive high current – high voltage equipment at the point of use while offering substantial shock protection for personnel.

TRC is an internationally recognized leader in electrical safety products that protect equipment, prevent electrical fires and protect against electrocution and serious injury from electrical shock.

