



# UNDERSTANDING POLARITY

## For Positive and Negative Ground Sites

### OVERVIEW

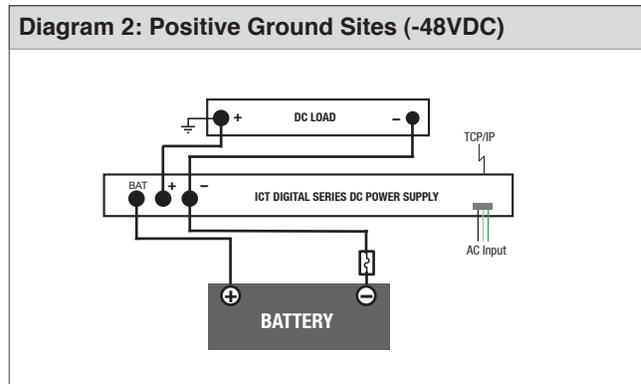
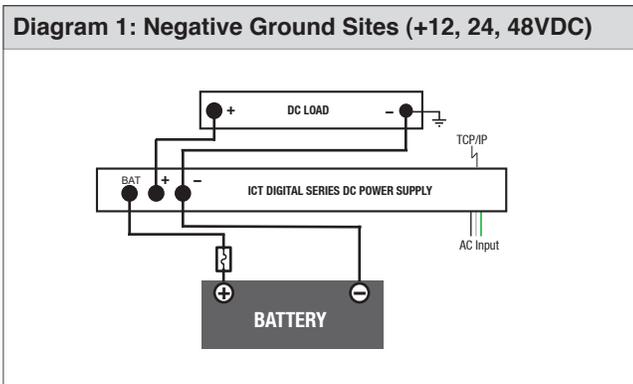
Wireless communications sites and network devices typically operate on 12, 24 or 48 volts DC. For 12- and 24-volt sites, the polarity of these devices are typically either +12 volts DC or +24 volts DC. This is also often referred to as negative ground, i.e. the negative line is used as the ground – also referred to as return or common – and the positive line is the “hot” line which carries the +12 or +24 volt potential.

For 48-volt sites, these typically operate with either a negative-ground configuration as described above, or a positive-ground configuration. Negative-ground systems supply +48 volts (the negative line is grounded and used as the return or common); positive-ground systems supply –48 volts (the positive line is grounded and is used as the return or common).

When incorporating batteries into sites, it is very important to be aware of which configuration the site is using. For positive-ground systems (–48 volts DC), the positive (+) line of the battery is referenced to ground and the negative (–) line of the battery is the “hot” conductor. The opposite is true for negative-ground systems: the negative (–) line of the battery is referenced to ground and the positive (+) line of the battery is the “hot” conductor.

While –48 volts is more common, +48 volts does exist at some sites. It is very important to understand the configuration of the site, as failure to note the polarity can result in short circuit conditions which can represent a safety hazard.

Examples on how to connect ICT’s Digital Series power supplies in either a negative or positive ground system are illustrated below:



When using the LVD in a positive ground system, do not ground the positive terminal of the battery. The system must only have a single ground connection, normally located at the power distribution or load point. An additional ground connection at the battery will allow current to bypass the LVD contactor, thereby preventing the disconnection of the battery during a low voltage event.