Power Box Equipment for Year Round Polar Programs

The Extreme-Cold Temperature Power Management Module for Year Round Use

PASSCAL's Polar Group specifically designed a power management module to control the charging and manage the power system in extreme-cold temperature environments. There are two main parts in the power box: The solar charge controller and the power switcher. The solar charge controller, as the name implies, takes care of the proper and efficient charging of the batteries when solar energy is available. The power switcher takes care of switching from the rechargeable batteries to the primary batteries when the rechargeable batteries' voltage dips below a threshold, and switches from the primary batteries to the rechargeable batteries when the rechargeable batteries' voltage gets high enough from solar charging. Both the charge controller and the power switcher were tested successfully for operation at -55C after having been subjected to -70C for several hours.

The solar controller, manufactured by GenaSun, is very efficient and was designed to maximize the power from the solar panels by MPPT (Maximum Power Point Tracking), and minimize energy loss when the sun is not shining on the panels.