Moisture•Point™

MP-917 Technical Brief 9

Using Solar Power with the MP-917

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The power consumption of the MP-917 and its datalogger for a nominally 12 Volt DC power supply are:

Idle mode	50 mAmp continuous
Measuring (5 segment probe)	400 mAmp for 2 minutes
Datalogger (additional load)	35 mAmp continuous

To determine the correct size of solar panel and battery to use, start by converting these current consumption values to AmpHour equivalents:

Idle mode	1.2 AmpHr per day
Measuring	0.013 AmpHr per measurement
Datalogger	0.84 AmpHr per day

Using these figures and the number of measurements that will be taken in a 24 hour period, the daily current requirement of the installation is calculated. For example, assume an installation comprised of an MP-917 with an internal datalogger set up to acquire one measurement per hour. The daily current requirement is:

Idle mode	1.2 AmpHr
Measuring (24 x 0.013 AmpHr)	0.31 AmpHr
Datalogger	0.84 AmpHr
Total Daily Requirement	2.35 AmpHr

Thus, the capacity of the battery storage system of the solar panel charger must exceed 2.35 AmpHrs per day to satisfy the station power requirements. Determing the best solar panel / battery combination for a particular installation requires a knowledge of the long term daily and seasonal insolation figures for the site location. These figures are used in combination with the solar panel performance data to select an appropriate configuration.

SAMPLE CALCULATION

Assume a mid latitude, northern hemisphere installation in an area with a temperate climate. Using hypothetical insolation figures for such an area and performance specifications for a standard 20 Watt (1.5 Amp @ 12 VDC nominal) solar panel, it is determined that the solar panel will provide the equivalent of 2 hours of full output per day, as a daily average calculated over the month, during the months December and January. This panel is therefore capable of supplying the power required to operate the system (1.5 Amps x 2 hours/day = 3 AmpHr/day).

As solar panels are only capable of providing power during daylight conditions, a battery is required to store the power generated by the panel during the day for use during periods of no power output by the panel. The battery capacity required is calculated by determining the maximum length of time over which the power output of the solar panel will be inadequate to operate the station. This time period is usually measured in days and is the result of sustained periods of poor weather conditions, snow accumulation on the panel, etc. Assuming an maximum expected period of 7 sequential days at zero power output by the solar panel, a minimum battery storage capacity of 16.5 AmpHrs (7 days x 2.35 AmpHr/day) will be required to maintain system operation. In practice, a battery with approximately double this capacity would be selected to allow for system losses such as self-discharge of the battery and inefficiencies such as reduction in the battery capacity at low temperatures.

PURCHASING A SOLAR POWER SYSTEM

A complete range of alternate power systems are available for the MP-917 including solar power systems. Included with the purchase of a solar power system is a design service comprising specification of the optimal solar panel and battery combination for a particular application. A list of recommended accessories such as battery charge regulators, mounting hardware, cabling, etc. is provided with each solar system purchase.

The following information must be provided to complete the design and specification of the solar power system:

- the maximum number of measurements to be taken in a 24 hour period.
- the time of year and duration of expected deployments.
- the geographic location (latitude and longitude) of the installation.
- notification of site conditions that may affect operation of the solar system. For example, a site located in a valley that receives only morning sun or a coastal site subject to heavy fog and overcast conditions.