INTRODUCTION

To provide power to the station when its primary power is absent or at below-normal voltage, the circuit and housing of the weather station console include provisions for a 9-Volt battery. The total time during which this standby battery can provide the required current varies between 16 and 72 hours, depending on the system (as shown in Table 1 below).

If a longer life of the standby battery is desired, a higher-capacity battery may be connected in lieu of the standard one; if it is physically larger, this battery must be located outside the console housing.

This Note outlines some of the considerations involved in selecting and connecting a higher-capacity standby battery.

Table 1. Battery Life of Standard 9-Volt Alkaline Battery

STATION TYPE	STANDBY BATTERY LIFE (In Hours)	
	Console & Sensors Only	Console, Sensors & WeatherLink
7400 Perception	60	24
7415, 7425 Wizard	72	36
7440 Monitor	60	24
7450, 7455 GroWeather	17	17
7460, 7465 Energy EM	24	17
7470, 7475 Health EM	24	17

CIRCUIT CONSIDERATIONS

Four considerations govern the choice of a standby battery:

a. the voltage required if the battery is to work properly;
b. the desired time duration during which the battery must power the station;
c. the current drawn by the station;
d. the current x time (milliamp-hours) capacity of the battery while its output voltage remains within the required range.

VOLTAGE REQUIREMENTS

The voltage output of the battery must meet two limitations:

a. It must be high enough to enable the station circuits to work correctly.
b. It must not be higher than the primary power voltage or 16 Volts, whichever is less.

To meet the first requirement the battery voltage must be **6.0 Volts or greater**.

The specific voltage limit to meet the second requirement is, of course, dependent upon the nature of the primary power supply. It is best to assume that the output voltage of the standby battery should be always **less than 10 Volts**. Whenever the voltage of the standby battery exceeds that of the primary power, current will be drawn from the standby battery, draining it.

STATION CURRENT LOADS

Typical supply currents for the weather stations are shown in Table 2.

Table 2. Current Drain by the Weather Station (incl. Sensors and Console)

STATION TYPE	CURRENT DRAIN (in mA)	
	Console Light Off	Console Light On
7400 Perception	7	127
7415, 7425 Wizard	6	--
7440 Monitor	7	127
7450, 7455 GroWeather	22	142
7460, 7465 Energy EM	16	136
7470, 7475 Health EM	16	136

SOME BATTERY POSSIBILITIES

At Davis Instruments we tested a few batteries that meet the above criteria. For each test we ran a GroWeather station continuously on the battery, which was at room temperature. We recorded the number of hours the station ran before failing.

We tested the following batteries:

1. Lithium 9-Volt: Ultralife U9VL. Radio Shack 23-665. A direct replacement for the alkaline 9-Volt battery (same size and connections), it is claimed to have four times the capacity.
2. Zinc-air 8.4-Volt. Unipower B01377. Also a direct replacement.
3. Carbon-zinc 9-Volt Lantern. Eveready #266. ANSI 1605.
4. Carbon-zinc 9-Volt Lantern. Eveready #276. ANSI 1603.
5. Lead-acid 8-Volt rechargeable. Eagle-Picher CF8V6. The terminals are .032” x .250” tabs that mate with AMP Faston 250 series connectors.
6. Carbon-zinc 7.5-Volt Lantern. Rayovac 903. ANSI 903.

The results of this limited test are given in Table 3. FIT is listed instead of dimensions for the two battery types that fit within the battery chamber of the weather station’s console.

CONNECTIONS

The first two batteries in the list and table are connected to the station by plugging them into the standby battery cable and inserting the battery in the chamber, as described in the station’s manual.

The other two batteries with snap terminals may be connected to the existing standby battery cable if the mounting situation permits. If necessary, the cable may be extended by cutting off the connector, splicing on longer wires, and reconnecting the snap connector.

Connection to the other battery types is made by splicing to the cable wires with quick-disconnect terminals for the tab terminals or ring or spade lugs for the screw and knurled-nut terminals. The red wire must be connected to the POSITIVE terminal of the battery.

Table 3. **Battery Life When Powering Weather Station (One Sample, Room Temp.)**

BATTERY TYPE	**BATTERY LIFE – in Hours**		**DIMEN.**	**TERM.**	**PRICE**
	GroWeather (observed)	**Monitor** (estimated)	(inches)		(approx)
Lithium 9V	57	180	FIT	snap	$ 7
Zinc Air 8.4V	63	200	FIT	snap	$13
Carbon-Zinc 9V Lantern (1605)	75	236	1.8 x 1.9 x 2.4	snap	$ 8
Carbon-Zinc 9V Lantern (1603)	192	600	2.6 x 2.1 x 3.2	snap	$11
Lead-acid 8V (rechargeable)	496	1500	3.4 x 2.2 x 6.5	tab	$27
Carbon-Zinc 7.5V Lantern (903)	744	2300	7.3 x 4.1 x 6.5	screw	$19

Davis Instruments
3465 Diablo Avenue, Hayward, CA 94545 U.S.A.
Phone: 510-732-9229 • Fax: 510-732-9188
sales @davisnet.com • http://www.davisnet.com