0.9 ETI NOAH-II Precipitation Gauge
Quick Reference

Description:

The ETI gauge uses a weighing bucket mechanism to measure rain or liquid snow equivalent precipitation. A microprocessor in the gauge averages raw strain gauge signals, and uses temperature compensation to correct the data. Data is averaged over a period of 90 seconds to eliminate wind effects. The microprocessor also keeps track of the total accumulation and adjusts it when required to account for small evaporation losses. An oil film is used in the gauge to further minimize evaporation loss errors. The gauge is easy to use, because it simulates a standard tipping bucket unit.

A standard Alter type wind screen is included with the gauge to improve catch efficiency. The wind screen mounts directly to the gauge with special mounting hardware.

Pulse Output: each tip is 18ml = 0.254 mm = 0.01 inches of rain

The gauge generates 400mS 'pulled low' pulses every 1-second, beginning at the 'top' of a minute as determined by the ETI's internal clock (not EVE). The external system must hold the line at +5V, and the ETI pulls it low. Normally the gauge is interfaced via the Campbell logger 'P1' pulse input.

Pulses are accompanied by audible beeps. Note that these beeps do not occur when you're in the serial port communication program noted below. It usually takes a few minutes to output all of the pulses when a calibration is performed.

Installation:

Because of the design of the legs and the wind screen, it is important to follow the gauge installation procedure carefully to avoid difficulties in attaching the wind screen.

1) Loosely attach the three legs to the gauge. Leave the nuts very loose, because the legs are not spaced at exactly 120 degrees.

2) Insert the wind screen mounting arms into the legs.

3) Install the wind screen units onto the mounting arms.

4) Tighten the loose nuts holding the gauge to the legs.

5) Level the gauge legs as needed.

6) Stake legs to the ground.

7) Add antifreeze for winter operations. See maintenance section below to find correct amount of antifreeze needed. Always add about 0.5 liters of oil to the gauge reservoir to prevent evaporation loss errors.

8) Attach cabling between gauge electronics and data system. Two cables have been provided. One attaches to the PAM electronics box, and the second attaches to the CR10 data logger. Only one cable is needed. The cable which attaches to the data logger has labelling for the bare wires.

The cable to the PAM electronics box must be detached at the yellow wire nuts in order to thread the cable through the bottom opening in the gauge electronics housing.

9) When power is first applied to the gauge, it should beep to indicate it is on.

Electrical:

The gauge operates on 12 VDC, and draws approximately 15ma of current.

There are two connectors on the electronics unit. The 9 pin amp connector is used for normal operation, and the DB-9 serial connector can be used to communicate with the gauge for calibration purposes using a standard portable computer. An IBM PC type floppy disk is included with the gauge for calibration and diagnostics.

Wiring for simulated tip output and power:

	Stub Cable Inside Gauge	10-m Cable Gauge to Logger		Stub Cable Inside Logger Box
Signal	Sensor's 9-pin Amp	Bulkhead 9-pin Amp	CR10X Box 5-pin Conxall	CR10X Logger Terminal Strip
=======	========	========	==========	==========
+12V	8	8	1	+12V
tip output	1	1	4	P1
ground	7	7	2	G
ground	4	4	3	G

Maintenance:

Manually empty the gauge when 30 cm of liquid has accumulated. A lever inside the electronics housing is used to empty the gauge. Do not drain the oil film.

During winter operations the gauge must be charged with antifreeze. ETI recommends the following:

Above freezing; add enough antifreeze to cover inlet opening to measuring chamber.

Temperature to -30 deg C; use 6.6 liters to 7.5 liters of antifreeze

Temperature to -40 deg C; use 11.4 liters of antifreeze

Note about Evaporation:

The ‘ETI’ Oil is normally used to prevent evaporation of the antifreeze mixture. The gauge’s software is able to correct for evaporation equivalent to 1 tip every 12-hours during it’s reset cycle. In a very hot dry climate where the evaporation rate exceeds that, then under reporting of rain can occur.

PC Diagnostic Communications Program (supplied by ETI):

PG2GCOMM

This program can be used to examine the raw sensor output. It should be used with caution because there are Pascal diagnostic tools inside of the monitor and if you’re not careful, you can really screw up the ETI’s operating program.

Use F10 to get back to main menu
Diagnostic Tool in communication program:

space OE	provides 10 second output of #samples, avg,min,max.
space R	1 min output of temps, pulse counter.

Problems / Trouble Shooting Hints:

Gauge does not beep when power applied. Check that power is measured through cable. If gauge has power and still does not beep, then the electronics may be damaged. Return electronics can to manufacturer.

Gauge does not appear to register water added to unit.

1) At least 1” of fluid is needed in the gauge for it to register tips.

2) Wait three minutes for data to register.

3) Be sure cabling is properly attached to data system, and system is recording data.

4) Cycle power on gauge and repeat experiment. If second experiment works, then gauge may have experienced evaporation losses due to insufficient film of oil. Gauge does not measure rain accurately. Use supplied floppy disk and a PC to adjust calibration parameters.

5) The gauge uses an open collector output. Normally the CR10X ‘P1’ port which is connected to the gauge’s simulated tipping bucket output will register +5V. The simulated tips last about 1/2 second and occur when the ETI pulls the +5V to 0V. This can be verified using a voltmeter on the CR10X ‘P1’ pin.