High Sierra Electronics

Model 2500 Electrically Heated Rain and Snow Gauge
Instruction Manual 60-2500-01(C)

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1.0 INTRODUCTION

CAUTION: This equipment uses 110 VAC Electrical Power that can be **Hazardous** to life and limb. **ALWAYS** disconnect the electrical power before removing the thermostat cover or performing any other maintenance on this unit!

Failure to observe these precautions may result in death or severe permanent injury!

1.1 General Description:

The Model 2500 Electrically Heated Tipping Bucket Rain and Snow Gauge is constructed of a powder coated aluminum outer cylinder holding a spun aluminum funnel below which is a modified Model 2400-3 Tipping Bucket. A bull's eye level is integrally mounted to the tipping bucket base for ease of leveling at installation and service. A magnetically operated, sealed reed switch provides a reliable, normally open, momentary switch closure for transmission by *High Sierra Electronics* 3200 series ALERT transmitters.

The Model 2500 contains two heaters; a 500 Watt blanket heater attached to the underside of the funnel and a 100 Watt blanket heater attached to the underside of the Top Section base. Each heater is controlled by it's own "smart" thermostat to reduce electrical consumption and evaporation while insuring that freezing will not occur.

1.2 Receiving, Inspection and Unpacking:

Many *High Sierra Electronics* products are scientific instruments. Exercise care during unpacking and installation. Remove the contents of the package carefully and compare the contents with the enclosed packing list. Should any items be missing, notify *High Sierra Electronics* Customer Service. Please have your packing list available when you call.

If any of the items are received in damaged condition, notify the carrier immediately and request an inspection. You must notify the carrier within 15 days of shipment. If a claim is not made within that time period, then the carrier will not acknowledge any claim for the lost or damaged goods.

Note: the Rubber band which secures the tipping bucket during shipping must be removed at installation.

1.3 Specifications:

Calibration:	1 mm/tip
Optional:	0.01in/tip
Accuracy:	±1.5% for precipitation rates from 0-150 mm/hour
Output:	Normally open momentary contact (optional Form C SPDT switch)
Heaters:	1 each: 100 and 500 watt blanket heater
Thermostat:	1 dual intelligent, microprocessor based factory preset 41 F° (5 C°) lower (base) heater, 39 F° (3.8 C°) upper (funnel) heater each having a 5 F° (2.7 C°) hysteresis
Electrical supply:	120 V AC only (240 VAC on special order) 50 Hz or 60 Hz
Power consumed:	600 watts maximum
Size:	12" diameter by 23" tall cylinder
Weight:	15 pounds nominal

1.4 Thermostat Theory of Operation:

Two temperature sensors, base and funnel, control a thermostat that operates two heating blankets. The base sensor measures air temperature inside the top section and controls the operation of a 100 Watt heating blanket located under the spun shelf assembly. The funnel sensor is fastened to the funnel surface and controls a 500 Watt heating blanket on the funnel. The base heater has a lower set point of 41 F° (5 C°) and an upper set point of 46 F° (7.7 C°). The funnel heater has a lower set point of 39 F° (3.8 C°) and an upper set point of 44 F° (6.7 C°). At air temperatures above the lower set point, a heater will be off. When the temperature falls below the lower set point a heater will turn on and remain on until the temperature rises above the lower set point. At temperatures between the lower and upper set point a heater will cycle, on for one second, then off for one second, until the temperature rises above the upper set point. A heater will turn off and remain off until the temperature once again falls below the lower set point. Powering the heating elements in this manner assures that water will not freeze in the tipping bucket, while evaporation and electrical consumption will be kept to a minimum. This approach eliminates the overshooting of the temperature associated with bi-metal thermostats.

2.0 INSTALLATION

2.1 Needed Items:

1. An AC power source is required.
2. ¼" nut driver
3. Wire strippers
4. Electrician's pliers
5. Nylon wire ties
6. Spare fuses: 5mm x 20 mm 7 amp.

Additional tools needed for the roof mount option:

7. ⅞" conduit punch
8. 7/16" end wrench
9. Tools and hardware to mount base plate to the roof

2.2 General Instructions 1:

The following installation instructions assume that AC power has been run to the standpipe (or other supporting structure) and that a junction box for the AC power is located at or near the top of the standpipe. **NOTE: Insure that the AC power to the standpipe has been turned off.**

The Model 2500 comes supplied with a 6' power cord and a standard 110 v AC plug. This can be removed if gauge is to be hard wired into a junction box (recommend a disconnect switch in the standpipe if this is done). This unit should have its own 15 amp circuit controlled by a GFCI (Ground Fault Circuit interrupter). This will insure that there is no other equipment operating that might interrupt electrical service to this unit in the event of equipment malfunction. In the event of a gauge malfunction there will be no other equipment affected.

It is best at this time to verify the thermostats Electrical Circuitry is operating properly before completing this installation. Please see Maintenance, Section 4.2, for instructions on checking the circuitry.

2.2.1 Top Section, Standpipe Mount: *(see Section 2.2.2 for Roof Mount)*

Remove the upper tube and funnel from the base, by unlocking and rotating the top section clockwise. Disconnect the cable (6-pin Molex connector, "A" Figure 1) from the thermostat to the funnel heater/sensor. Set this assembly aside.

Feed the tipping bucket signal cable through the 1 ⅜" tube. Connect the signal cable to the 'Precipitation' port of the Model 3206 transmitter. Lower the transmitter into the standpipe. Connect the AC Power cord to the Electrical outlet provided. Secure the top section base to the standpipe with either the locking mechanism or the four 10-32 SS button head screws (depending upon which standpipe configuration you have). Level the Tipping Bucket by adjusting the 1/4-20 SS nuts securing the tipping bucket to the base, such that the air bubble in the bull's eye level is within the centering circle.

2.2.2 Top Section, Roof Mount:

Select an appropriate site on the roof that is at least 10 feet from any structure that may create unusual wind patterns. Be certain that there are no tree branches overhanging the top section opening. Securely mount the base section to the roof above the level of any potential pooling or flooding. The thermostat box contains a 120 Volt AC circuit that will be extremely dangerous if submersed in water.

Remove the upper tube and funnel, from the base. This is done by unlocking and rotating the top section clockwise. Disconnect the funnel heater/temperature sensor cable (the 6-pin Molex connector, Figure 1, A_1 and Figure 2, A_2). Set this assembly aside.

Disconnect the tipping bucket signal cable from the tipping bucket. If the signal cable is to be run in conduit pull the cable through the conduit from the equipment side. The 2-pin Molex connector should easily pull through a ½" conduit if no other wires are inside. Attach the pull wire to the cable rather than the connector. After pulling the signal cable through the conduit, feed the cable through the cable tube in the spun shelf assembly and connect it to the Molex plug on the tipping bucket assembly. Wire tie the temperature sensor to the signal cable such that the sensor is at the elevation of the reed switch. Be certain that none of the wires installed interfere with the operation of the tipping bucket.

The 120 Volt AC power source must be run in conduit from a secure, dry location with a disconnect switch (HSE recommends a 15 Amp GFCI). Consult a local Electrical Contractor for the requirements in your area. Connect the 120 VAC supply wires to the receptacle in the base section. Plug the electrical cord from the thermostat control into the receptacle.

2.2 General Instructions 2: *(See Appendix 8.1and 8.2 for reference)*

Remove the rubber bands that secured the tipping bucket during transit. Verify that the bucket moves freely between the adjustment screw stops. The cable routing should be inspected and routed as necessary to be certain there will be no interference between the cable and the tipping bucket.

Turn on the AC power to the Model 2500. Verify that the AC circuit is working and that the tipping bucket is operating properly (See Section 4.5).

Secure the tipping bucket assembly (figure 2) on the standpipe (or roof mount base) with either the locking mechanism, or with the four (4) 10-32 SS screws and lock washers provided (depending upon which base configuration you have). Level the tipping bucket by adjusting the three (3) 1/4-20 SS nuts securing the tipping bucket to the base, such that the air bubble in the bull's eye level is within the centering circle.

Install the Top Section Funnel Assembly (figure 2) on the tipping bucket assembly. Plug the 6-pin Molex connector (Figure 1, A1) from the funnel heater/temperature sensor into the mating connector (Figure 2, A2) from the thermostat box, which is mounted to the underside of the Top Section base. Align the locking mechanism on the top section with the 1 ⅜" tube and rotate counter clockwise until it stops and then lock the top section in place. Fit the small and large insect/debris screens into the funnel. During the winter it may be best to leave the debris screens off if site conditions allow.

Note: For standpipe installations an easier method for one person on a ladder, is to separate the top section and the funnel (held on with two sheet metal screws) first. Then align the top section lock with the 1 ⅜" tube, rotate counter clockwise to the stops and lock. The funnel heater/sensor cabling is connected to the thermostat and the funnel replaced and secured with the two sheet metal screws.
Before leaving the site be certain that the 120 Volt AC power is turned on.

2.4 Insects:

In areas that have a very large insect population, it is suggested that an aggressive maintenance schedule be followed. This is to prevent insects from clogging either the mechanism or drain holes.

3.0 OPERATION

The operation of the Model 2500 is completely automatic and requires no supervision when properly installed. It has been calibrated at the factory and another calibration is only essential if the gauge has been damaged during shipping, installation or through vandalism. It has been found that a clean bucket is a calibrated bucket and field calibration is seldom, if ever, needed. If your Model 2500 has been in the field for a while and has collected a coating of dirt, a good bath will free up any dragging of the bearings and bring the bucket assembly back into balance. Tipping buckets can be out of calibration due to dragging bearings or increased weight of the bucket. No adjustments are necessary, just cleaning.

NOTE: Disconnect A/C power before any cleaning of the Model 2500.

4.0 MAINTENANCE

4.1 Special equipment needed:

1/4 and 1/2 inch Bottle brushes and scrub brush
Mild detergent or other cleaning solution and Clean rags
Ohm meter
Graduated cylinder and/or calibration bottle (if checking the calibration)

4.2 Standard Maintenance:

The Model 2500 should be serviced at a minimum of once per year. In areas that have a very large insect population, a more aggressive and frequent maintenance program may be needed to prevent insects from clogging up the drain holes.

During the maintenance visit to the site, use the following checklist:

1. Clean dirt/debris from funnel and funnel tube.
2. Clean dirt/debris from Tipping Bucket
3. Check switch operation:

The tipping bucket shaft should have .030-.050inches of free play. The magnet arm should freely pass the reed switch. There should be at least .005" clearance between the magnet and the reed switch when the shaft with magnet arm is shifted towards the magnet. If the magnet is too close to the reed switch, carefully bend the arm until there is sufficient clearance.

When the bucket is resting on the acorn nuts, your ohmmeter will read infinite resistance. As the magnet passes over the switch, the resistance of the contacts should be less than 1 Ohm. Be certain that when the shaft is shifted away from the reed switch that switch closures are still registered correctly.

4. Check All Cables & Connectors
5. Check Enclosures for Leaks, Insects, Spider Webs, etc.
6. Check for Physical Damage

The rim of the funnel should be round, as any dents could affect the accuracy of the gauge. Bullets and other penetrating objects will affect operations and/or destroy the tipping bucket mechanism.

4.3 Field Calibration check:

It is recommended that every two years a calibration check be performed on the tipping bucket. If extra tipping buckets are available a rotation schedule may be established. The tipping buckets needing a calibration check may be returned to *High Sierra Electronics,* or the calibration check may be done by maintenance personnel at the shop. If no replacement buckets are available a simple field calibration is described in appendix 8.5.

4.4 Fuse Replacement:

The thermostat uses one 7 Amp (115 VAC) 5mm x 20mm fuse as a protective device. It is located on the thermostat circuit board. Should replacement be necessary the following steps should be followed:

1. Disconnect the AC power (i.e. turn off the circuit breaker servicing the unit).
2. Unlock the top section with funnel.
3. Rotate clockwise and lift up to remove from the base.
4. Disconnect the cable (6-pin connector) to the funnel.
5. Set the top section with funnel aside.
6. Unlock and rotate the spun shelf assembly (Figure 1, #8) clockwise and remove the spun shelf from the standpipe.
7. Remove the cover from the thermostat box (Figure 1, #G) on the bottom of the spun shelf.
8. Remove the faulty fuse and replace with a 7.0 Amp fuse for 120 V, or 3.5 Amp fuse for 230 V.
9. Replace the thermostat box cover and secure with four screws.
10. Replace the spun shelf assembly on the standpipe. Align the cable entry tube on the spun shelf with the lock on the standpipe. Rotate counter clockwise and lock in place.
11. Check the bull's eye level on the tipping bucket base and level as necessary.
12. While balancing the top section with one hand, with the other connect the cable (6-pin connector) to the funnel.
13. Align the locking mechanism with the 1 ⅜" tube and replace top section.
14. Rotate counter clockwise to stops and lock top section to the base.
15. Connect the AC power.

4.5 Checking Electrical Circuitry:

In order to verify that the thermostats electrical circuitry is working properly it is best to have an AC ammeter with a 10 ampere capability. You will also need a bag of snow or ice or a can of spray freezing solution. NOTE: if temperatures are below freezing when attempting to test this unit see note at the end of this section.

Switch power off at the main disconnect.

Connect ammeter in series with the 120 VAC circuit. Set meter to the 10 Amp scale.

Be certain that the funnel heater is connected to the 6-pin Molex connector (#A, Figure 1) from the thermostat box.

Turn on the AC power to the unit. You should see a momentary current pulse of up to 0.8 Ampere.

Pack ice around the base heater temperature sensor (C2) that is attached to the tipping bucket signal cable. After a few minutes you should see a current reading of about 0.7 Ampere. Reading may vary depending on the actual AC voltage supplied to

the unit. If you spray the sensor with freezing solution, you should see the current surge after only a few seconds. In the absence of an ammeter, you should feel the base of the spun shelf. It should warm up as the 100 watt blanket heater turns on.

Remove ice from the temperature sensor. After a short time you should see the current cycling between idle current and the 0.7 Ampere high current. As the sensor warms you should see the current drop to idle current and remain there.

Pack the funnel with ice. After 10 minutes or so you should read a current of around 4 Amperes on the meter. In the absence of a meter, you can easily feel the heat from the 500 watt funnel heater blanket. If you are using a freeze spray it is best to spray directly on the temperature sensor (C1). A short time after removal of the ice you should see the current cycle between 4 Amperes and idle current and then return to a stable idle current after the sensor warms up.

If the unit checks out OK, turn off the power to the unit and finish the installation.

Note: If temperatures are below freezing it may be best to put the top section on the spun shelf and pack the funnel with ice. Connect an Ammeter as per instructions above, turn on power and observe a current reading that may be as high as 5 Amperes if both heaters are on. After a few minutes you should observe the current drop as either the base or the funnel heater turns off. Remove the ice from the funnel and after a short time you should see the current cycling and then drop to a low current, 0.7 A or a cycling of low current and then an idle current as the chamber warms up.

5.0 TROUBLESHOOTING

If the 2500 Rain and Snow Gauge does not perform to specifications, a careful step-by-step procedure should be followed. It should be noted that a common cause of failures are bad connectors or connections (either corrosion or loose wires).

Should blown fuses be an ongoing problem it is possible that one (or both) heating elements has shorted to ground or that a wire has shorted to ground. An ohmmeter may be used to determine whether the problem lies in a heating element or in faulty wiring. Typical resistance for the heating blankets are: 100 watt, 150 ohms and 500 watt, 30 ohms. Resistance values for 230 volts will be approximately double these values. Note that these values are typical, variations of 10% are most likely inconsequential.

To verify the operation of the reed switch connect an ohmmeter between pins A and D on the 5 pin MS connector. Very Slowly tip the bucket with your hand and observe momentary continuity. If no continuity is observed the problem could be either a weak magnet or a faulty reed switch. Use a known good magnet to operate the switch to determine which is the problem.

For technical assistance with this product, consult *High Sierra Electronics* technical personnel at: Phone: 1-800-275 2080 or FAX 1-530-273-2089 between 8:00 AM and 5:00 PM Pacific Coast time, Monday thru Friday. To e-mail: info@highsierraelectronics.com.

6.0 RETURNS

If you need to return this product for any reason, call *High Sierra Electronics* at (530) 273-2080 between 8:00 a.m. and 4:00 p.m. Pacific Coast time. Ask for a return Authorization Number (RA#) to be assigned to your unit. Carefully pack the unit so that it will not be further damaged in shipment. Write the RA# on the outside of the box and on any paperwork enclosed with the unit. Please include a written description of the problem and any unique conditions that occurred when the unit failed.

7.0 WARRANTY

All *High Sierra Electronics*' manufactured products are warranted against defects in materials and workmanship for a period of three (3) years from the date of shipment. If the equipment fails due to such defects, *High Sierra Electronics* will, as its option, repair or provide a replacement for the defective part or product. In no case will *High Sierra Electronics* be liable for more than the original purchase price.

Equipment supplied by *High Sierra Electronics* and manufactured by others, carries the respective manufacturer's warranty. *High Sierra Electronics* assumes no warranty obligation, either express or implied, for equipment manufactured by others and supplied by *High Sierra Electronics.*

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH IS EXPRESSLY DISCLAIMED.

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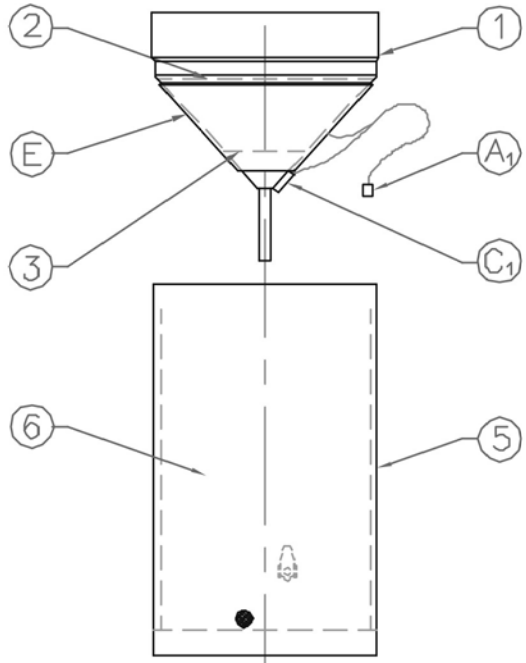
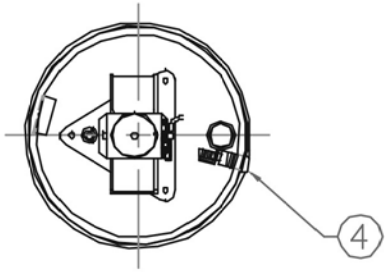
Fax: (530) 273-2089

REVISIONS			
REV NO	ECO NO	DESCRIPTION	DATE
A		RELEASED	12-10-03

FIGURE 1, TOP SECTION



TOP VIEW
(FUNNEL REMOVED)



PARTS:

1. FUNNEL ASSY
2. OUTER FUNNEL SCREEN
3. INNER FUNNEL SCREEN
4. LOCK ASSY
5. TOP SECTION SUB ASSY
6. INSULATION (INSIDE)
7. STRIKER ASSY
8. SPUN SHELF ASSY (WITH TIPPING BUCKET MOUNTING PLATE)
9. INSULATION (INSIDE)
10. TIPPING BUCKET

A_1. 6-PIN MOLEX RECEPTACLE, HEATER AND SENSOR CABLE

A_2. 6-PIN MOLEX PLUG, HEATER AND SENSOR CABLE

B. 2-PIN MOLEX RECEPTACLE, TIPPING BUCKET CABLE

C_1. FUNNEL TEMPERATURE SENSOR

C_2. BASE TEMPERATURE SENSOR

D. A/C POWER CORD

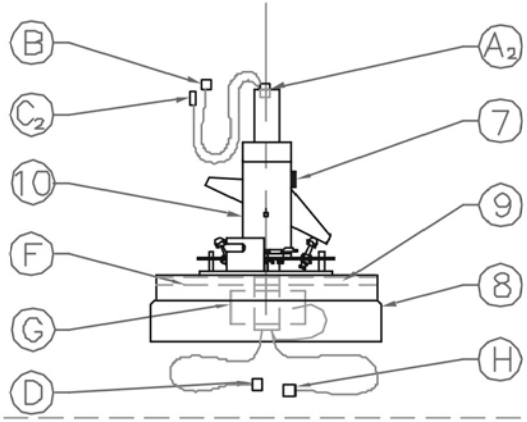
E. 500 WATT HEATER

F. 100 WATT HEATER

G. THERMOSTAT CONTROLS

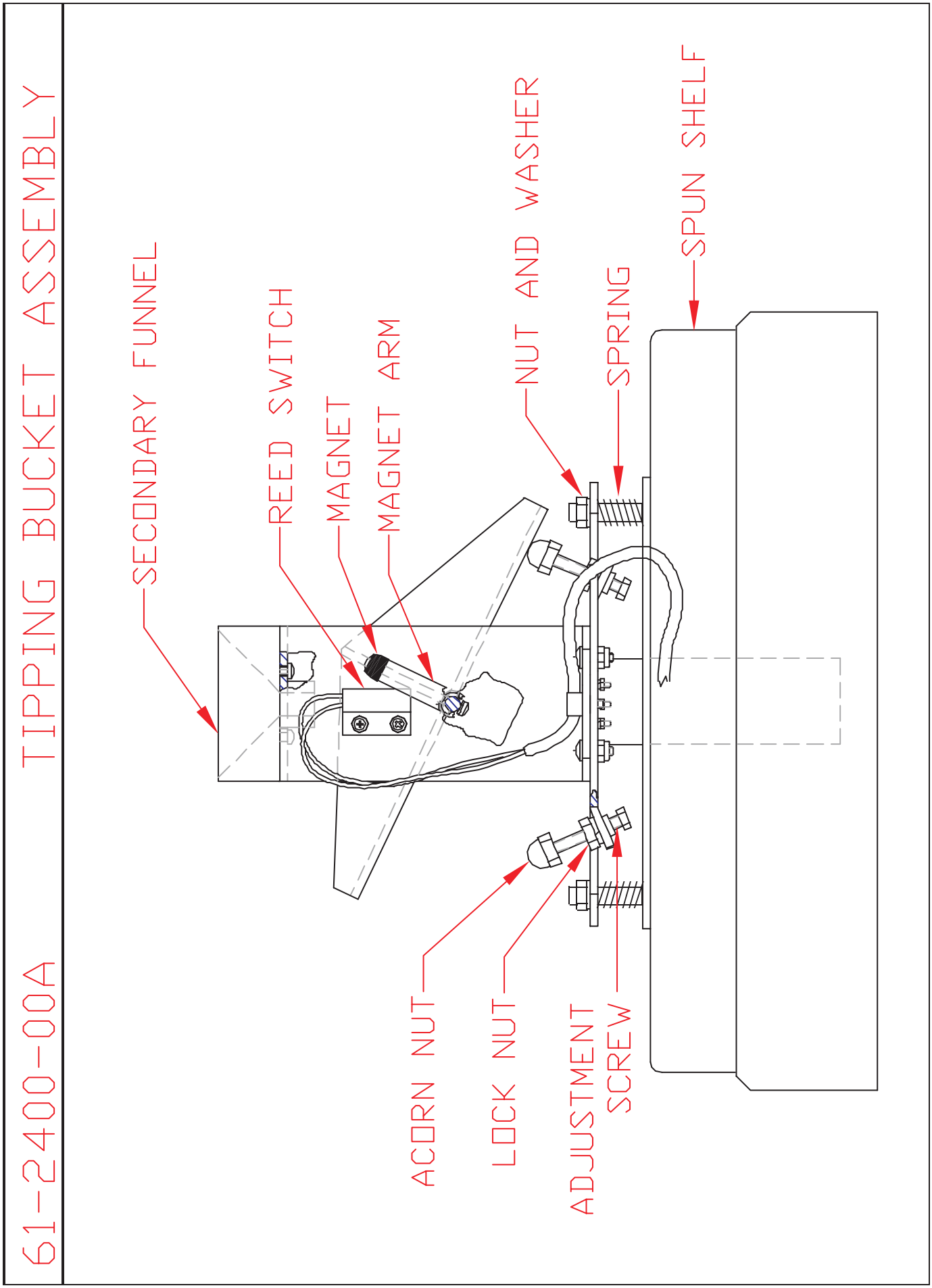
H. 5-PIN FEMALE M/S, TIPPING BUCKET CABLE

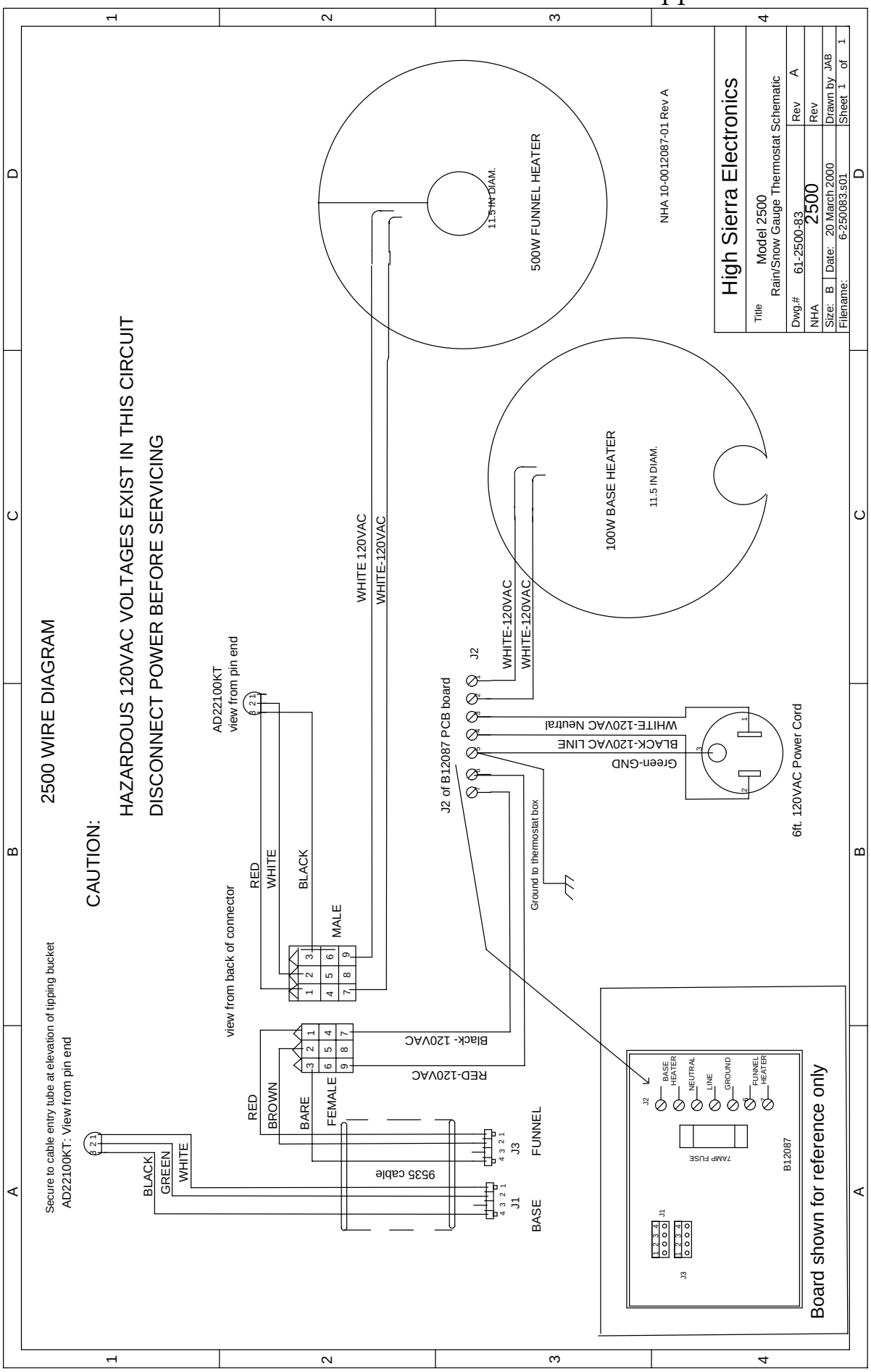
FIG.2, TIPPING BUCKET ASSY.

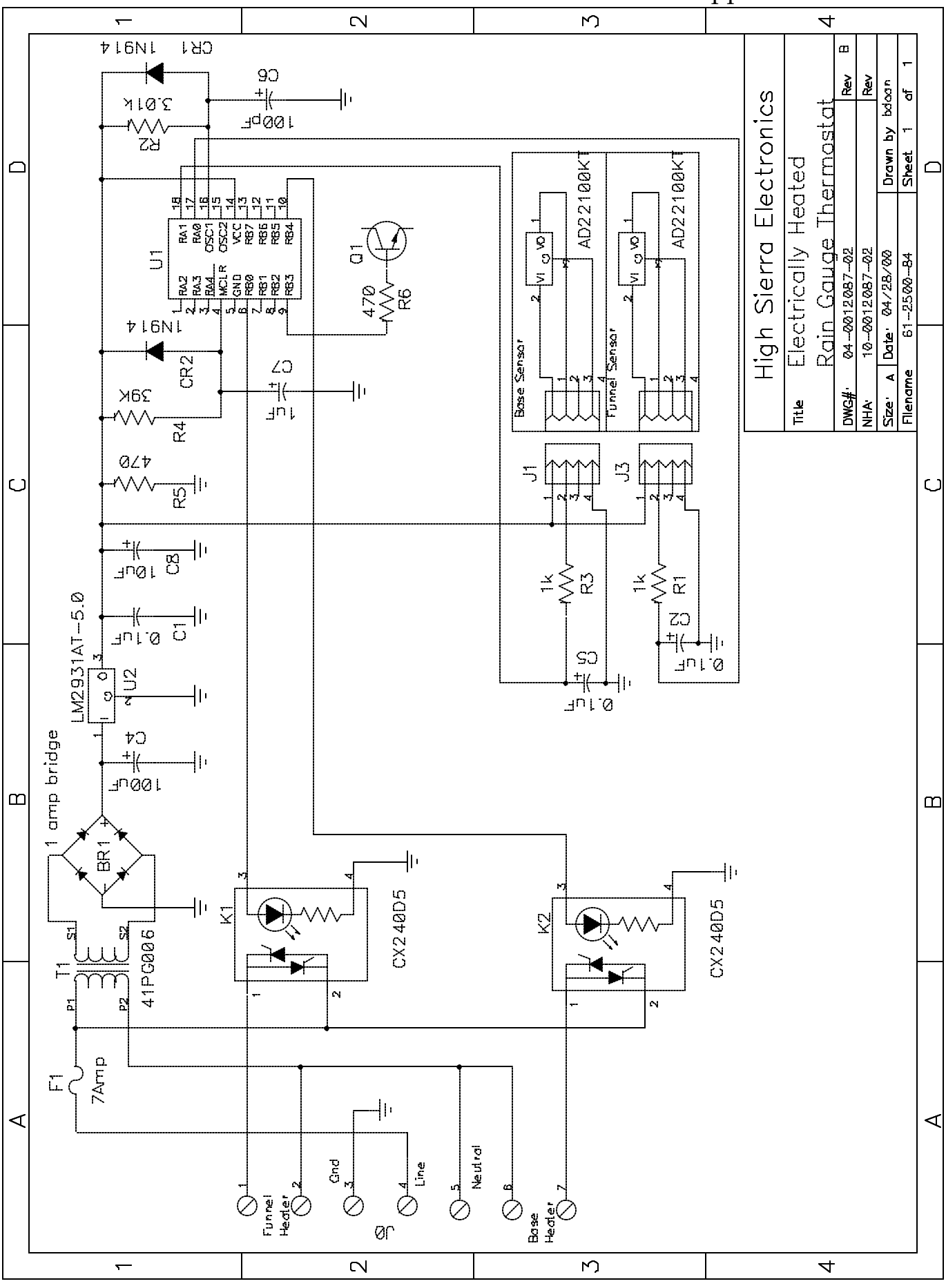


High Sierra Electronics
GRASS VALLEY, CALIFORNIA

TITLE: MODEL 2500/TOPSECTION			
N.H.A.:			DWG.NO.: 61-2500-81
DRAWN BY: JEANIE ALVEY	DATE: 12-10-03		
SIZE: A	SCALE: 1:1	APPROVED BY:	SHT. NO.: 1 OF 1


61-2400-00A TIPPING BUCKET ASSEMBLY
SECONDARY FUNNEL
REED SWITCH
MAGNET
MAGNET ARM
NUT AND WASHER
SPRING
SPUN SHELF
ACORN NUT
LOCK NUT
ADJUSTMENT SCREW


2500 WIRE DIAGRAM
CAUTION:
HAZARDOUS 120VAC VOLTAGES EXIST IN THIS CIRCUIT
DISCONNECT POWER BEFORE SERVICING
Secure to cable entry tube at elevation of tipping bucket
AD22100KT: View from pin end
BLACK
GREEN
WHITE
9535 cable
RED
BROWN
BARE
FEMALE
J1
BASE
J3
FUNNEL
view from back of connector
RED
WHITE
BLACK
MALE
AD22100KT
view from pin end
WHITE 120VAC
WHITE-120VAC
500W FUNNEL HEATER
11.5 IN DIAM.
NHA 10-0012087-01 Rev A
J2 of B12087 PCB board
J2
WHITE-120VAC
WHITE-120VAC
100W BASE HEATER
11.5 IN DIAM.
Green-GND
BLACK-120VAC LINE
WHITE-120VAC Neutral
6ft. 120VAC Power Cord
Black- 120VAC
RED-120VAC
Ground to thermostat box
BASE HEATER
NEUTRAL
LINE
GROUND
FUNNEL HEATER
7AMP FUSE
B12087
Board shown for reference only
High Sierra Electronics
Title
Model 2500
Rain/Snow Gauge Thermostat Schematic
Dwg.# 61-2500-83
Rev A
NHA 2500
Rev
Size: B
Date: 20 March 2000
Drawn by JAB
Filename: 6-250083.s01
Sheet 1 of 1

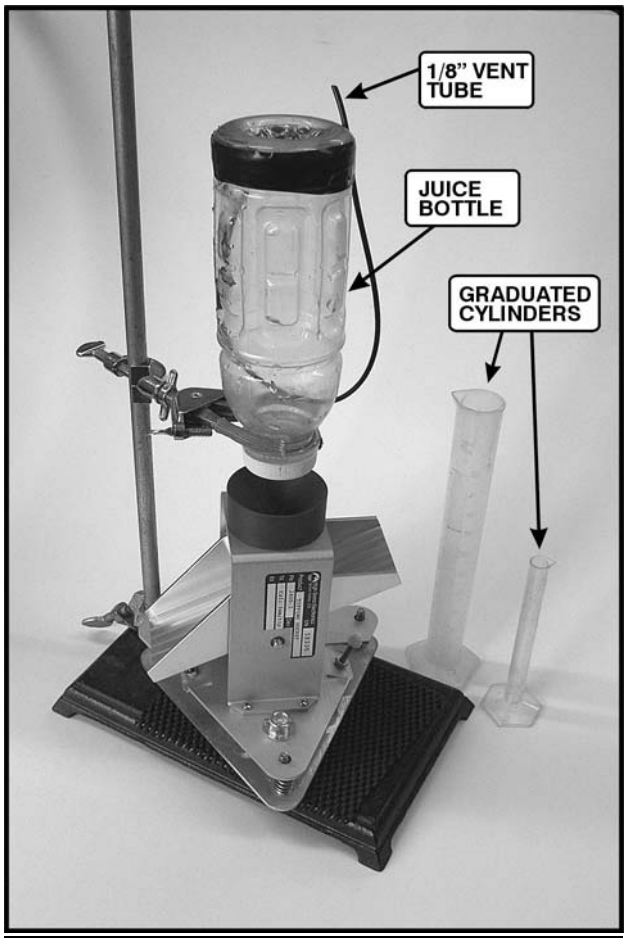

High Sierra Electronics
Title Electrically Heated Rain Gauge Thermostat
DWG# 04-00120B7-02 Rev B
NHA 10-00120B7-02 Rev
Size A Date 04/28/00 Drawn by bdoan
Filename 61-2500-84 Sheet 1 of 1
CR1 1N914
C6 100pF
R2 3.01k
U1
Q1
R6 470
CR2 1N914
C7 1uF
R4 39K
R5 470
C8 10uF
C1 0.1uF
U2 LM2931AT-5.0
C4 100uF
BR1 1 amp bridge
T1 41PG006
F1 7Amp
K1 CX240D5
K2 CX240D5
Base Sensor AD22100KT
Funnel Sensor AD22100KT
J1
J3
R3 1k
R1 1k
C5 0.1uF
C2 0.1uF
Funnel Heater
Gnd
Line
Neutral
Base Heater

8.5 Field Calibration

8.5.1 equipment needed:

Calibration Bottle
100ml Graduated Cylinder
10ml Graduated Cylinder

8.5.2 Simple Calibration bottle



A simple calibration bottle may be made from a plastic water or juice bottle. Drill a hole near the top (the natural top) of the bottle and insert a vent tube in the bottle. The vent tube should form a 'U' with the inside leg not quite touching the bottle bottom and the outside leg protruding an inch or more above the bottom of the bottle. Secure the outside leg of the vent tube to the bottle with water resistant tape. Place a bead of silicone caulking at the vent tube opening. Drill two or three 1/16 inch holes in the bottle top. Using the 100ml and 10ml graduated cylinders, carefully measure the desired volume of water and fill the bottle. Mark the water level with water resistant ink. It is best to perform this initial calibration a couple of times to be certain that the calibration is consistent.

A single calibration check using the calibration bottle described above should take about 15 minutes. Note: After filling the bottle and inverting it, gently blow

through the vent tube to free any water trapped in the tube. If the flow appears restricted during the calibration check, blow gently through the tube to restore normal flow. It should be noted that the flow will slow as the water level decreases. At the beginning of the test there will be about 1.5 minutes between tips. The last tip may take 4 minutes or longer. Gently blowing through the vent tube while the bucket is filling can decrease the calibration check time required. Try to let the natural flow occur when the bucket is almost full and ready to tip. Be careful not to disturb the mechanism if this method is used.

The picture shown above uses a stand for holding the water bottle and a baseplate for leveling the tipping bucket. In the field, the top section base may be used to hold the tipping bucket and the top section and funnel, loosely set over the base used to hold the water bottle.

8.5.3 1 mm tipping bucket calibration check:

Separate the top section from the spun shelf assembly of the Model 2400 Rain gauge. Remove the spun shelf assembly from the standpipe. (The tipping bucket may be calibrated in place on the standpipe, but for ease of access on tall standpipes, it might be best to remove the entire top section.

Place spun shelf assembly on a level platform and level the tipping bucket by adjusting the 3 adjusting screws on the spun shelf assembly. Connect the signal cable to either the data transmitter or a digital counter (you may also just watch and count the tips).

With the graduated cylinders, accurately measure 605 ml of clean water and fill the calibration bottle (or fill to the calibration mark on the bottle). Gradually pour the water from the calibration bottle through the secondary funnel. If not using a slow delivery water bottle such as described above, do not pour at a rate faster than 20 seconds per tip (1mm tipping bucket). You may fill most of the bucket faster, but the rate should be slow as the bucket tips. With 605 ml. of water the bucket should tip 8 times with 21 ml of water remaining. If after eight tips, the volume of water remaining in the bucket (or bottle) is between zero and 40 ml. of water the tipping bucket may be considered within tolerance (this is a three percent tolerance). After the eighth tip the remainder of water in the calibration bottle may be measured rather than run through the tipping bucket. Measure the water remaining with one of the graduated cylinders. If the tipping bucket calibration check falls outside of a tolerance that is acceptable, the field test should be run again. If a second test confirms that the tipping bucket is out of tolerance the tipping bucket should be returned to High Sierra Electronics for re-calibration. Field adjustment of the calibration is not recommended.

Example:

Volume of water/72.97=Number of tips expected + remainder.

605/72.97 = 8.291tips

Remainder x 72.97= remainder in ml.

0.291 x 72.97 = 21 ml

Tolerance with 3% error acceptable = volume introduced x .03

605 x 0.03 = ±18ml

8.5.4 0.01 INCH TIPPING BUCKET CALIBRATION CHECK:

Follow the directions in section 8.3.3. The Volume of water placed in the calibration bottle may be reduced to 306 milliliters. The bucket should tip 16 times with 9.5ml remaining. An acceptable range is no water in the bucket after 16 tips, or the bucket just tips for a 17th time.

Example:
Volume of water/18.53=Number of tips expected + remainder.
306/18.53 = 16.514 tips
Remainder x 18.53 = remainder in ml.
0.514 x 18.53 = 9.5 ml
Tolerance with 3% error acceptable = volume introduced x .03
306 x 0.03 = ±9ml