

Model 6021 Electrically Heated Rain and Snow Gauge



User's Manual



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1 General Information

1.1

Introduction



The Model 6021 Series Gauges are equipped with internally mounted heaters that utilize AC power to keep the temperature of critical gauge parts above the freezing point of water. Four separate heaters are supplied with each gauge. Each drain tube contains a 20 W heater that prevents measured water from refreezing before it exits the gauge. A 125 W heater (200 W on 6021-E) is placed around the collection funnel for melting frozen precipitation. Finally, a 150 W heater is mounted on the gauge base assembly to keep the movable parts from freezing. The funnel heater is controlled by two thermostats in contact with the funnel, but placed away from the heating coils. A thermostat monitors the internal temperature and turns on the 150 W heater whenever the base assembly becomes cool enough to allow water residue to freeze on it. The two 20 W heaters are on continuously.

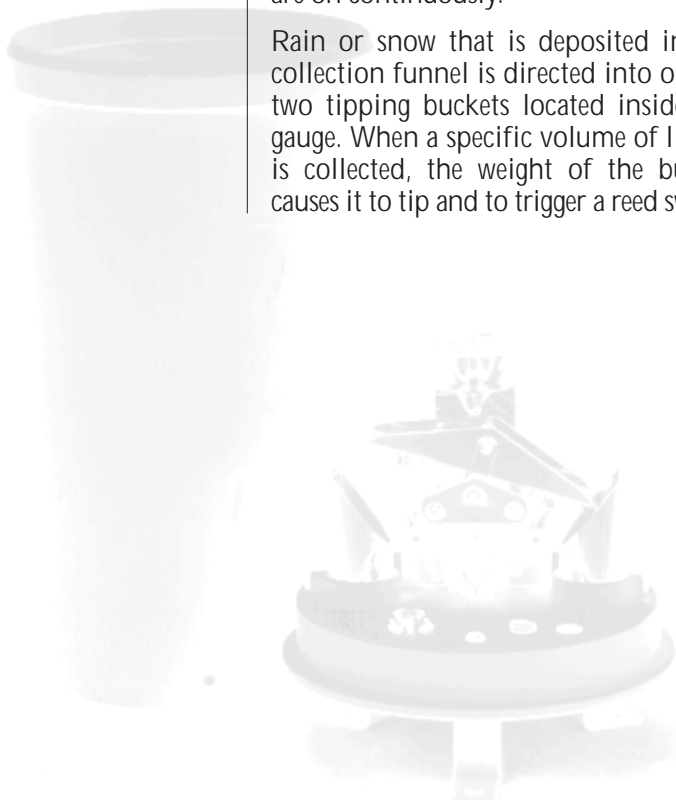
Rain or snow that is deposited in the collection funnel is directed into one of two tipping buckets located inside the gauge. When a specific volume of liquid is collected, the weight of the bucket causes it to tip and to trigger a reed switch

contact that can be recorded by event recorders or accumulators. At the same time, the second bucket is placed into position to collect the next liquid sample.

All versions of this gauge operate identically, and this manual is applicable to all. The differences between the gauges are in the amount of water required to cause a bucket tip, and the operational voltage of the heaters. The Model 6021-E is designed for extreme cold weather operation. The model differences are shown in the table below.

Model	Precip. per Tip	Supply Voltage
6021-A	.01"	115 VAC/60 Hz
6021-B	.1 mm	115 VAC/60 Hz
6021-D	.1 mm	230 VAC/50 Hz
6021-E*	.01"	115 VAC/60 Hz

* The Model 6021-E is designed for operation in extremely cold temperatures. It has a larger (200W) funnel heater and an insulated outer cover.



2 Installation

2.1 General

This instrument is thoroughly tested and fully calibrated at the factory and is ready for installation.

2.2 Unpacking

Remove the gauge from its shipping container and place it on a table or bench for power cord installation and preliminary tests.

Remove the upper funnel by unscrewing the screws near the bottom and lifting up. **WARNING:** Since the heater is installed, do not attempt to lift the collection tube off the base assembly more than 6 inches without unplugging the heater cable at the terminal cover inside.

2.3 Power Cord Installation

The customer must furnish the power cord, which must be minimum 16 gauge stranded 3-conductor cable. (*Note: With AWOS installations, the power cord is included.*)

1 Remove the heater control box cover by unscrewing the two screws.

2 Route the power cable through the rubber grommet closest to the base heater on the gauge base assembly and through the hole in the heater control box cover. Apply the strain relief.

3 Connect the leads of the power cord as shown in **Figures 9 and 10**. Lugs have been provided. Use a crimping tool to secure the leads to the lugs.

4 Replace the heater control box cover.

CAUTION: To avoid shock, never probe around inside the heater control box when the power is turned on.

2.4 Connection

Remove the foam inserts in the right and left drain tubes. These inserts are included to protect the tipping bucket mechanism during shipping and must be removed before the gauge will function.

Connect the wires from the recording device to the two binding posts located on the base assembly. Tip the bucket assembly by hand to make certain it tips easily and that the recording device is working properly. This completes the preliminary test. Replace the collection funnel while transporting to the field.

2.5 Siting

Site the gauge upon a level base above the maximum seasonal snow depth height. Locate the site in an area free from strong winds and large obstructions. Large open, level areas (i.e., meadows) are ideal but sometimes impractical. If no protection from wind is

possible, a wind screen (Model 6410) should be installed. If obstructions are inevitable, they must be located at a distance of 2-4 times their height away from the gauge. Otherwise they may prevent the precipitation from reaching the gauge.

2.6

Standard Installation

The rain gauge is normally mounted to a poured concrete pad with embedded mounting bolts. To mount the rain gauge to a pad:

- ① Pour a 2 ft. x 2 ft. level concrete foundation about 4 inches deep.
- ② Embed three 1/4" or 3/8" diameter bolts so that they protrude outward from the foundation, spaced to fit the three feet on the gauge.

If strong winds are common at the site, the model 6410 Wind Screen is recommended. Mount the wind screen as described in its accompanying manual, then proceed as follows:

Remove the collection funnel and check the bubble level on the base assembly before bolting the gauge to the foundation or tower mount. If the bubble is not centered, add washers between the base and the base assembly's feet in such a way that the bubble is centered **exactly** when the bolts are tightened. **This is of critical importance to the accuracy of the gauge.**

Connect the input of the recording device to the two binding posts that terminate the reed switch.

Replace the collection funnel, making sure that its heater cable is plugged into the heater terminal box. Secure the two side screws. Plug in the power cord.

2.7

AWOS Installation

2.7.1

AWOS Pad Installation

Rain gauges used at AWOS installations can be mounted to a pad or to the sensor tower.

To mount the sensor to a pad, construct the pad using a Ready-Form tube, rebar, and foundation bolts as shown in **Figure 1**, then proceed as follows:

Remove the collection funnel and check the bubble level on the base assembly before bolting the gauge to the foundation or tower mount. If the bubble is not centered, add washers between the base and the base assembly's feet in such a way that the bubble is centered **exactly**

when the bolts are tightened. **This is of critical importance to the accuracy of the gauge.**

Connect the input of the recording device to the two binding posts that terminate the reed switch.

Replace the collection funnel, making sure that its heater cable is plugged into the heater terminal box. Secure the two side screws. Plug in the power cord.

2.7.2

AWOS Tower Installation

Using the M488169-01 tower mounting kit, the sensor mounts to a horizontal boom attached to the tower approximately 7' above the ground. To mount the rain gauge to a tower, refer to Drawing No. M488169-01-007 at the back of this manual, then proceed as follows:

Remove the collection funnel and check the bubble level on the base assembly before bolting the gauge to the foundation or tower mount. If the bubble is not centered, add washers between the base

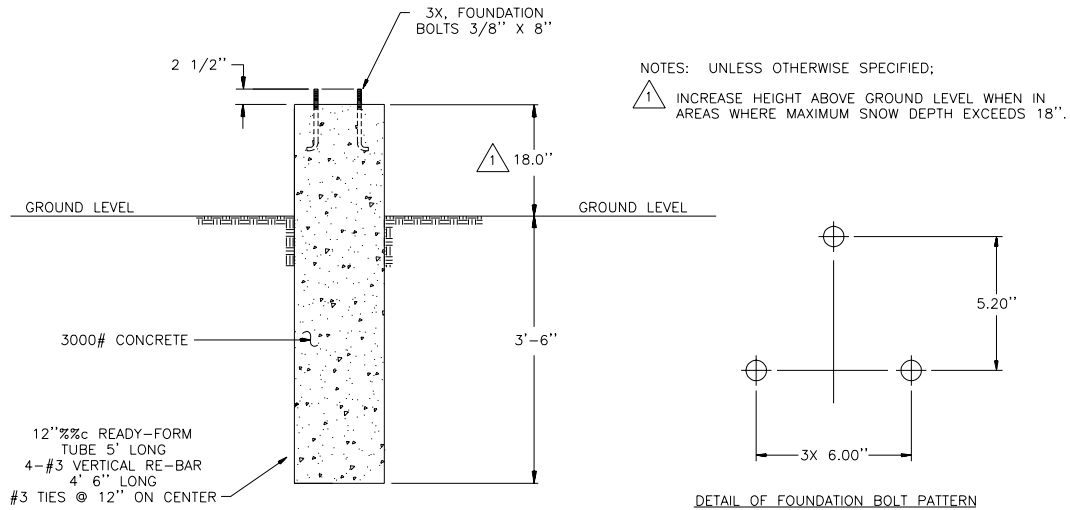
and the base assembly's feet in such a way that the bubble is centered **exactly** when the bolts are tightened. **This is of critical importance to the accuracy of the gauge.**

Connect the input of the recording device to the two binding posts that terminate the reed switch.

Replace the collection funnel, making sure that its heater cable is plugged into the heater terminal box. Secure the two side screws. Plug in the power cord.

MODEL 6021 ELECTRICALLY HEATED RAIN AND SNOW GAUGE

Figure 1



2.6 Upgrading the 6011-A

An upgrade kit is available for converting the Model 6011-A to a heated version 6021-A. Four heaters are included in the upgrade kit:

- 1 Base heater
- 1 Funnel heater
- 2 Drain Tube heaters

The following steps explain installation of the heaters and associated hardware.

Funnel Heater

- 1 Remove the two screws securing the collection tube to the rain gauge base and remove the collection tube (see Figure 2).

- 2 Remove the screen from the collection tube and set the collection tube upside down on a piece of cloth or foam so that the underside of the collection funnel is accessible.

- 3 (See Figures 3 and 4.) Pre-form the funnel heater to the underside of the funnel before removing the paper backing. The heater should be

Figure 2

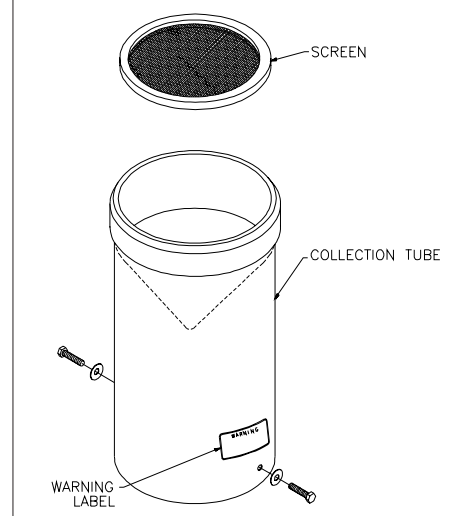
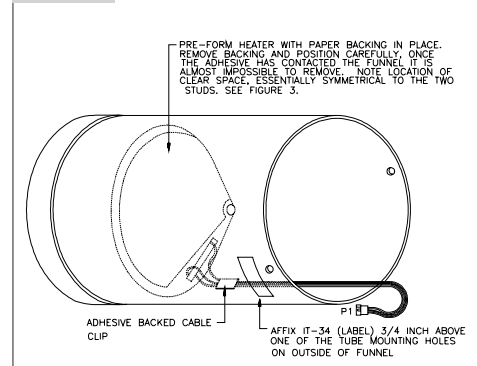


Figure 3



aligned to the funnel so that the two studs protruding from the funnel (to which the thermostat bracket mounts) are exposed in the gap between the two edges of the heater.

Remove the paper backing and set the heater in place. *Note: Line the heater up carefully before setting it in place—once the adhesive comes into contact with the funnel, the heater will be nearly impossible to move.* Beginning at the edge of the heater where the leads are located, press down and smooth the heater foil around the funnel to the opposite edge. A crinkled appearance is normal following installation.

- 4
- 5
- 6

Insert the two thermostats attached to the funnel heater into the slots on the thermostat bracket (see **Figure 4**). Set the thermostat bracket in place over the two studs protruding from the funnel. Fasten the bracket with the nuts and washers provided in the upgrade kit, with the green ground wire secured beneath the nut on the outermost stud. Apply heat sink compound to all surfaces of both thermostats.

Fasten the adhesive-backed wire clip to the heater wires as shown in **Figure 4** and attach the clip to the wall of the collection tube.

Drain Tube Heaters

- 1
- 2
- 3

For each of the two drain tubes remove the screw that extends into the drain tube through the drain tube boss and remove the tubes and screens. Discard the screens.

Disconnect the green ground wire from each of the heaters. Insert the heaters into the drain tube bosses, wire end first, so that the wires lead out through the bottom.

Replace the drain tubes and secure them with one screw through each boss, drain tube, and heater. Set the new screens on top of the heaters. *Do not yet tighten the screws.*

Figure 4

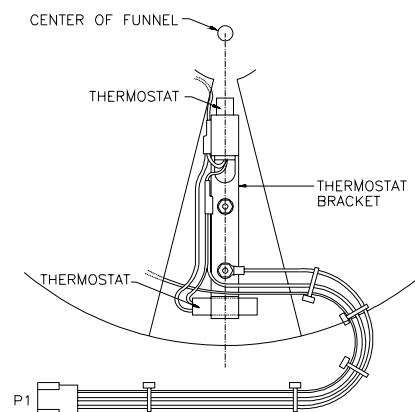


Figure 5

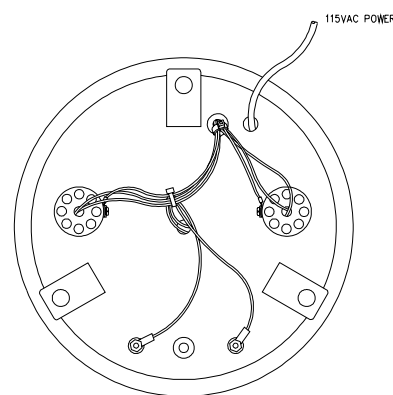
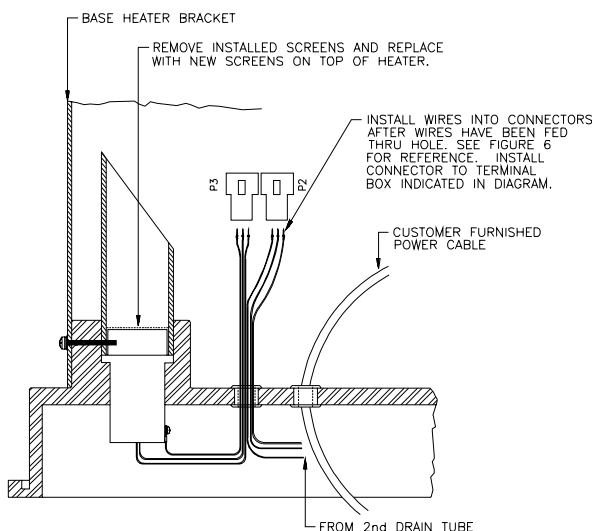


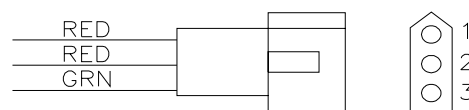
Figure 6



MODEL 6021 ELECTRICALLY HEATED RAIN AND SNOW GAUGE

- 4 Reconnect the ground wires to the drain tube heaters. Route all the wires from the drain tube heaters up through the hole near the edge of the rain gauge base (see **Figure 5**).
- 5 Insert the pins on the wire ends into the two connectors as shown in **Figure 6**, in the order shown in **Figure 7**.

Figure 7



Base Heater

- 1 Slide the base heater plate down onto the rain gauge base (between the tipping bucket assembly and the wires extending up from the drain tube heaters) so that it wraps around the tipping bucket assembly (see **Figure 8**). The two slots in the lower edge of the heater plate will slide down over the drain tube screws.

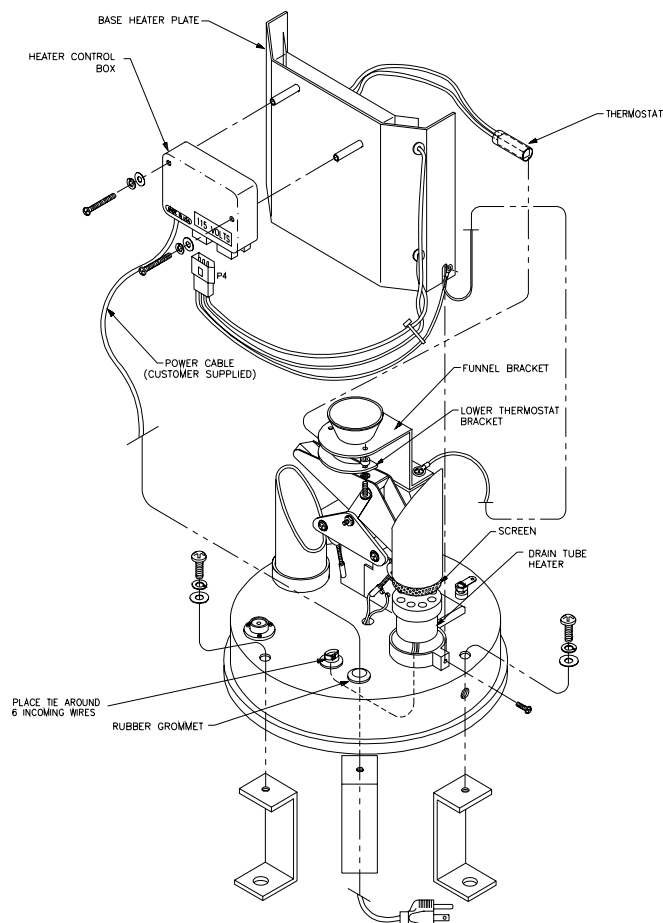
- 2 In order to install the base heater thermostat, the funnel bracket must be removed from the tipping bucket assembly. Lift the small funnel from the funnel bracket and set it aside. Remove the two screws from the funnel bracket and remove the bracket.

- 3 A lower bracket is provided in the upgrade kit for securing the thermostat. Clamp the thermostat between this bracket and the funnel bracket. Inset two spacers between the lower bracket and funnel bracket and secure the entire assembly with two screws inserted from below (see **Figure 9**).

- 4 Reinstall the funnel bracket with the thermostat attached and secure it to the tipping bucket assembly with one screw. Hold the other screw aside; it will be used in the next step to attach the base heater ground wire.

- 5 The green ground wire from the base heater is equipped with two spade lugs—one at the end of the wire, and another a short distance up. Insert the screw held aside in the preceding step through the lug at the end of the wire and into the funnel bracket. The other ground lug should be positioned near one of the drain tube screws; insert the screw through the lug, through the base heater plate, and into the drain tube boss. Tighten the screw. The opposite drain tube screw may also be tightened now.

Figure 8



Power Cable Installation

1 Install the rubber grommet in the large hole near the edge of the base (beside the hole through which the drain tube heater wires were routed—see *Figure 5*). Route the power cable (not supplied) through the rubber grommet.

2 Screw two standoffs into the holes on the outside face of the base heater plate (see *Figure 8*). Attach the heater control box to the standoffs with two screws, flat washers, and lock washers.

3 Remove the cover from the heater control box. Feed the power cable through the plastic strain relief provided (Item 31), then through the hole in the underside of the control box cover. Crimp spade lugs to the power cable wires and connect them to the control box terminals as shown in *Figures 10* and *11*.

4 Slide the strain relief up the power cable and into the hole in the control box cover until it snaps into place (see *Figure 10*). Replace the control box cover.

5 Four connectors, J1-J4, are located on the underside of the control box. Plug the funnel heater cable into connector J1. Plug the two drain tube heater cables into connectors J2 and J3 (the two connectors are interchangeable—either heater may be plugged into either connector). Plug the base heater cable into connector J4.

Figure 9

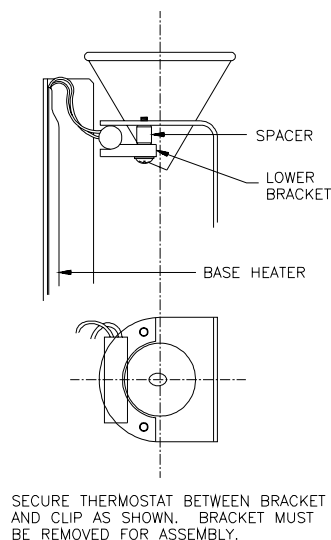


Figure 10

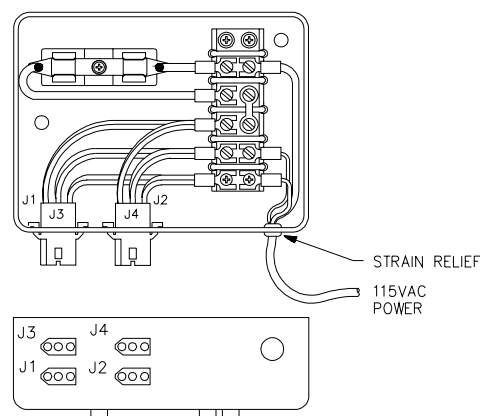
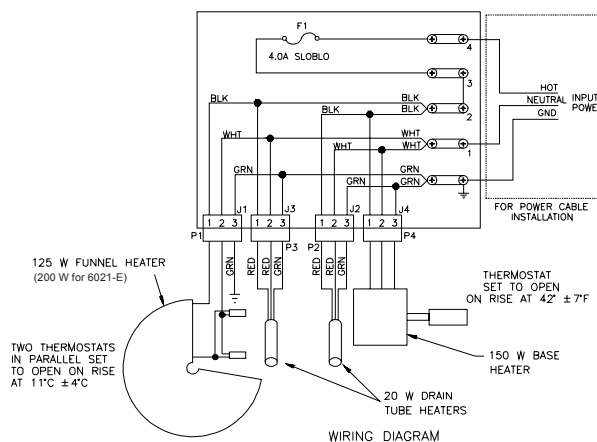


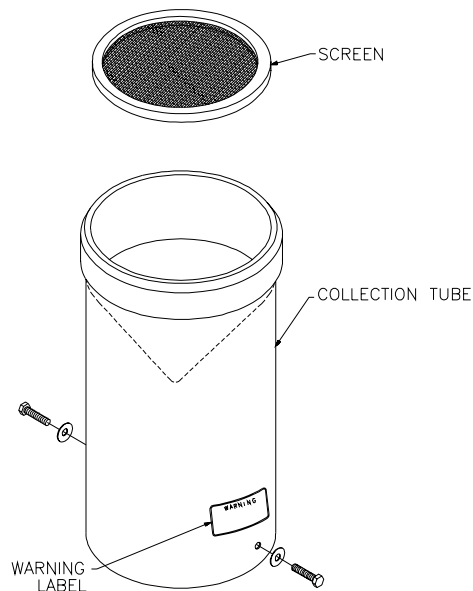
Figure 11



Final Assembly

- 1 Clip a plastic wire tie around the drain tube heater wires where they come through the top side of the rain gauge base.
- 2 Slide the collection tube back over the rain gauge, making sure that no wires are pinched between the collection tube and base, and secure the tube with the two screws removed at the beginning of this procedure.
- 3 Set the collection tube screen in place above the collection funnel.
- 4 Affix the warning label to the collection tube as shown in **Figure 12**.

Figure 12



3 Theory of Operation

3.1 Heating System

Heat is transferred through the gauge in such a way as to keep the temperature at the thermostat location constant at the thermostatic set point. The thermostats prevent the heaters from remaining on for any great length of time (usually a second or less at a time) and, therefore, prevent the gauge from overheating and causing evaporation errors. However, on very cold nights the thermostats must switch some 2 to 7 times each minute to keep the temperature of the gauge regulated. Any alteration to the thermostats will have a great effect on heat regulation and rate of snow melt. It is very important that the switch settings of these thermostats are not altered.

The 125 W funnel heater (200 W on 6021-E) and its thermostats were designed to melt the accumulation of heavy snowfall (rates up to 2.5 inches/hour at freezing temperatures) while keeping the temperature of the funnel as low as possible to avoid evaporation errors. The base heater (150 W) was designed to remain off until the temperature inside the gauge drops to freezing or below. The power rating of this heater is high enough to keep the temperature inside the gauge above freezing even when ambient temperatures drop as low as -25°C . Its thermostat prevents the inside temperature from reaching levels that could evaporate water accumulated in the tipping buckets. The drain tube heaters (20 W) insure that the measured precipitation remains liquid while it exits the gauge.

3.2 Operation

Rain or melted precipitation is directed into the gauge, where it is measured by a tipping bucket mechanism consisting of two buckets. When a certain amount of water fills one bucket (see Calibration for specific amounts), its weight causes it to tip and trigger a reed switch. At the same time, the other bucket is moved into position directly under the collection funnel. The sampled water is directed out of the gauge by drain tubes, giving the gauge unlimited capacity.

In AWOS systems, the rain gauge is used to correct visibility measurements when precipitation is present. When precipitation is falling, visibility measurements register a value less than the actual visibility. The degree to which the visibility value is affected depends on the intensity of the precipitation. To correct for this, the AWOS interprets the rain gauge data and corrects the visibility value with one of several correction factors corresponding to the intensity of the precipitation. ☒

4 Calibration

4.1 Calibration Requirements

The following steps describe the calibration procedure of the tipping bucket mechanism. Calibration is performed at the factory prior to shipping, and will only need to be done if damage has occurred or if serious doubt about its accuracy exists.

NOTE: For the Models 6021-A and 6021-E, 8.683 milliliters is equivalent to 0.01 inches of rain (or water equivalent). For the Models 6021-B and 6021-D, 3.418 milliliters of water is equivalent to 0.1 millimeters of rain.

4.2 Calibration

1 Remove the collection funnel to expose the tipping bucket mechanism.

2 Make sure that the tipping bucket assembly is leveled by centering the bubble on the bubble level.

3 Calibration of tipping bucket gauges is best accomplished using a uniform flow of water at a rate of 400 ml per hour. Allow a few preliminary bucket tips to insure that the internal funnel, tipping buckets, and drain tubes are wetted before beginning the calibration procedure.

4 Use a recording device to count the switch contacts, and place a calibrated container at the drain tube outlet for measuring volume.

5 Apply the water flow to the tipping bucket mechanism. Direct the water flow into the small funnel. Allow at least 10 tips of each bucket (20 counts total on the recorder) per calibration test.

6 Stop the flow and allow all the remaining water in the drain tube to drip into the volume container. Divide this quantity by the total number of counts to obtain the average volume per tip. This should be within the specified accuracy of the instrument.

7 If the average volume per tip in Step 6 does not agree with the specified accuracy, then the bucket stops may need adjustment as described in Step 8 below. Before making any changes to the instrument, repeat Steps 5 and 6 several times to insure no errors were made during the test.

8 Adjustments are made to the stops located under each bucket in order to change the tipping point of the bucket. Raising the stops will reduce the volume of water for each tip, while lowering the stops will increase the volume per tip. Adjust the stop under the opposite bucket to correct a bucket tip point. Make only small changes to the adjustment each time (1/4 turn) and repeat Steps 5 and 6 after each change.

The procedure described above is for a rainfall rate of 0.5 inches per hour. Other rates can be calibrated by changing the value in Step 3.

9 Note the date, accuracy, and flow rate after each calibration. Store that information with this manual for future use.

NOTE: If the gauge is calibrated in a laboratory, insure a level installation when the gauge is returned to the field location.

10 Replace the collection funnel.

For checking the gauge in the field, first wet the collection funnel, then slowly apply a known volume of water to the main collection funnel. Count the number of tips and compare this to what was obtained from laboratory calibrations. Be certain the recording device is not counting this test as a precipitation event.

An additional quick method for checking rain gauge calibration is to use a Model 60103 Calibrator. ☒

5 Maintenance

5.1 General

Normal maintenance is limited to cleaning debris out of the orifice. Use the precipitation screen during periods of rain to prevent insects and stones from entering the gauge, but **remove** this screen

during snowfall. When the sensor is installed as part of an AWOS system, special maintenance procedures are required. Refer to the following section for details.

5.2 AWOS Periodic Maintenance

Periodic maintenance of AWOS sensors is divided into three categories: monthly maintenance, quarterly maintenance, and

annual maintenance. The listed maintenance routines are performed according to that schedule.

5.2.1 Tools and Equipment Required

The following tools and equipment are required for performing periodic AWOS maintenance:

- 1/4" wrench

5.2.2 Monthly Maintenance

Remove the screen from the funnel of the gauge and gently tap the screen to free any dirt or debris. Replace the screen.

With heated rain gauges, if the ambient temperature is below 40° F, feel the rain gauge cover to check operation of the heaters. If they are working, the outer cover should be warm to the touch.

5.2.3 Quarterly Maintenance

Quarterly maintenance of the Model 6021 is identical to the monthly maintenance procedure: Remove the screen from the funnel of the rain gauge and gently tap the screen to free any dirt or debris. Replace the screen.

If the ambient temperature is below 40° F, feel the rain gauge cover to check operation of the heaters. If they are working, the outer cover should be warm to the touch.

5.2.4 Annual Maintenance

During annual maintenance, perform the following procedures in addition to those outlined for monthly and quarterly maintenance.

- 1 The output of the rain gauge is a switch closure, each closure being equivalent to a known volume of collected rainfall (0.01"). The funnel, screen, and buckets shall be cleared of debris before this procedure as described in the monthly tasks.
- 2 Remove the outer cover by removing two 1/4" bolts. Check for sensor level using the bubble level provided on the base. Adjust if necessary.
- 3 Inspect the interior of the gauge for physical lightning damage.
- 4 Place your hand close to the outlet orifices and detect heat from the two orifice heaters. If these are operational, then the heater system is powered up.

- 5 Note the precipitation quantity on the DCP's LCD display. Toggle the bucket assembly one cycle (2 tips). Again read the precipitation quantity on the LCD display. It must be 2 counts greater than before.
- 6 Replace the outer cover, bolts, and screen.

6 Warranty

6.1 **Standard Warranty**

Unless specified otherwise, All Weather Inc. (the Company) warrants its products to be free from defects in material and workmanship under normal use and service for one year from date of shipment, subject to the following conditions:

- a. The obligation of the Company under this warranty is limited to repairing or replacing items or parts which have been returned to the Company and which upon examination are disclosed, to the Company's satisfaction, to have been defective in material or workmanship at time of manufacture.
- b. The claimant shall pay the cost of shipping any part or instrument to the Company. If the Company determines the part to be defective in material or workmanship, the Company shall prepay the cost of shipping the repaired instrument to the claimant. Under no circumstances will the Company reimburse claimant for cost incurred in removing and/or reinstalling replacement parts.
- c. This warranty shall not apply to any Company products which have been subjected to misuse, negligence, or accident.
- d. This warranty and the Company's obligation thereunder is in lieu of all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, consequential damages, and all other obligations or liabilities.

No other person or organization is authorized to give any other warranty or to assume any additional obligation on the Company's behalf, unless made in writing and signed by an authorized officer of the Company.

6.2 **AWOS Warranty**

This equipment has been manufactured and will perform in accordance with requirements of FAA Advisory Circular 150/5220-16B. Any defect in design, materials, or workmanship which may occur during proper and normal use during a period of 1 year from date of installation or a maximum of 2 years from shipment will be corrected by repair or replacement by All Weather Inc.

7 Specifications

Sensor type	Tipping Bucket
Output	100 ms switch closure
Switch	Form A reed, mercury wetted
Sensitivity	
Model 6021-A, 6021-E	1 tip per 0.01" (0.25 mm)
Model 6021-B, 6021-D	1 tip per 0.1 mm (0.004")
Resolution	
Model 6021-A, 6021-E	0.01" (0.25 mm)
Model 6021-B, 6021-D	0.1 mm (0.004")
Calibrated accuracy	±0.5% at 0.5"/hr.
Repeatability	±3%
Capacity	Unlimited
Operational temperature range	-13° F to 104° F (-25° C to 40° C)
Gauge orifice	8.214" dia. (208 mm)
Heaters:	
Collection funnel	NiChrome wire in foil, 125 W (200 W for 6021-E), thermostatically controlled
Base	NiChrome wire in foil, 150 W, thermostatically controlled
Drain tubes	2, cartridge, 20 W each, continuous duty
Thermostatic set points:	
Collection funnel	approximately 52° F (11° C)
Base	approximately 42° F (6° C)
Input voltage:	
Model 6021-A, 6021-B, 6021-E	115 VAC, 60 Hz
Model 6021-D	230 VAC, 50 Hz
Size	8.25" dia. x 17.50" H (210 x 445 mm)
Weight/shipping	8 lbs./15 lbs. 3.6 kg./6.8 kg.)

8 Drawings

8.1

Contents

The following pages include reference drawings to assist in the maintenance and use of this instrument.

NOTES: UNLESS OTHERWISE SPECIFIED;



USE WASHERS AS REQUIRED TO LEVEL RAINGAUGE.

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M012021-01



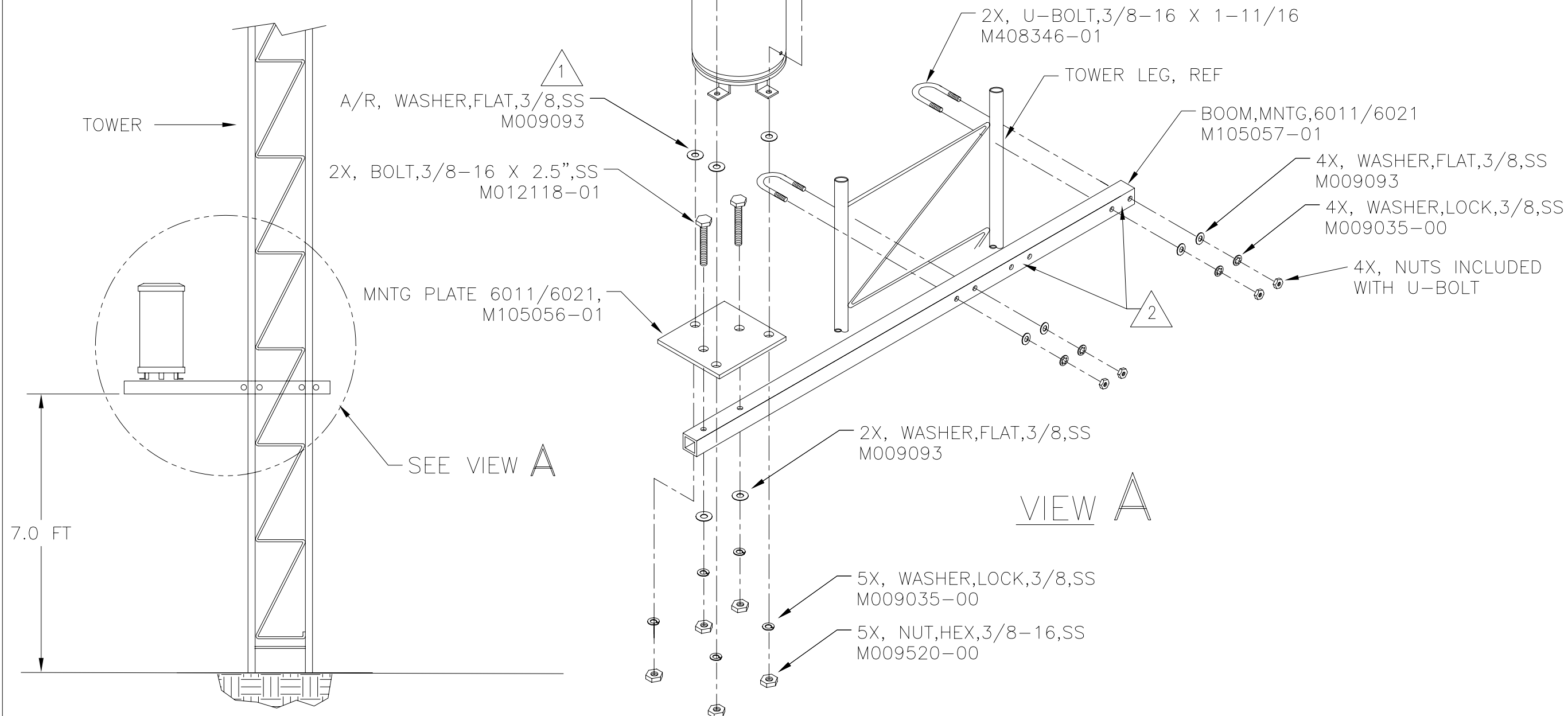
WHEN USING MODEL 8518-A FOLDOVER TOWER,
MOUNT TO HINGED SIDE OF TOWER USING THE
HOLES SHOWN.

6011/6021
RAIN GAUGE

NOTES: CONTINUED

3. APPLY LOCTITE SILVER GRADE ANTI-SEIZE COMPOUND (M401065-00)
OR EQUIVALENT TO ALL EXTERNAL THREADED CONNECTIONS.

4. AFTER INSTALLATION IS COMPLETE, APPLY A LIGHT SPRAY OF
CORROSION BLOCK (M402010-00) TO ALL METALLIC CONNECTORS,
GROUND LUGS AND THREADED FASTENERS.




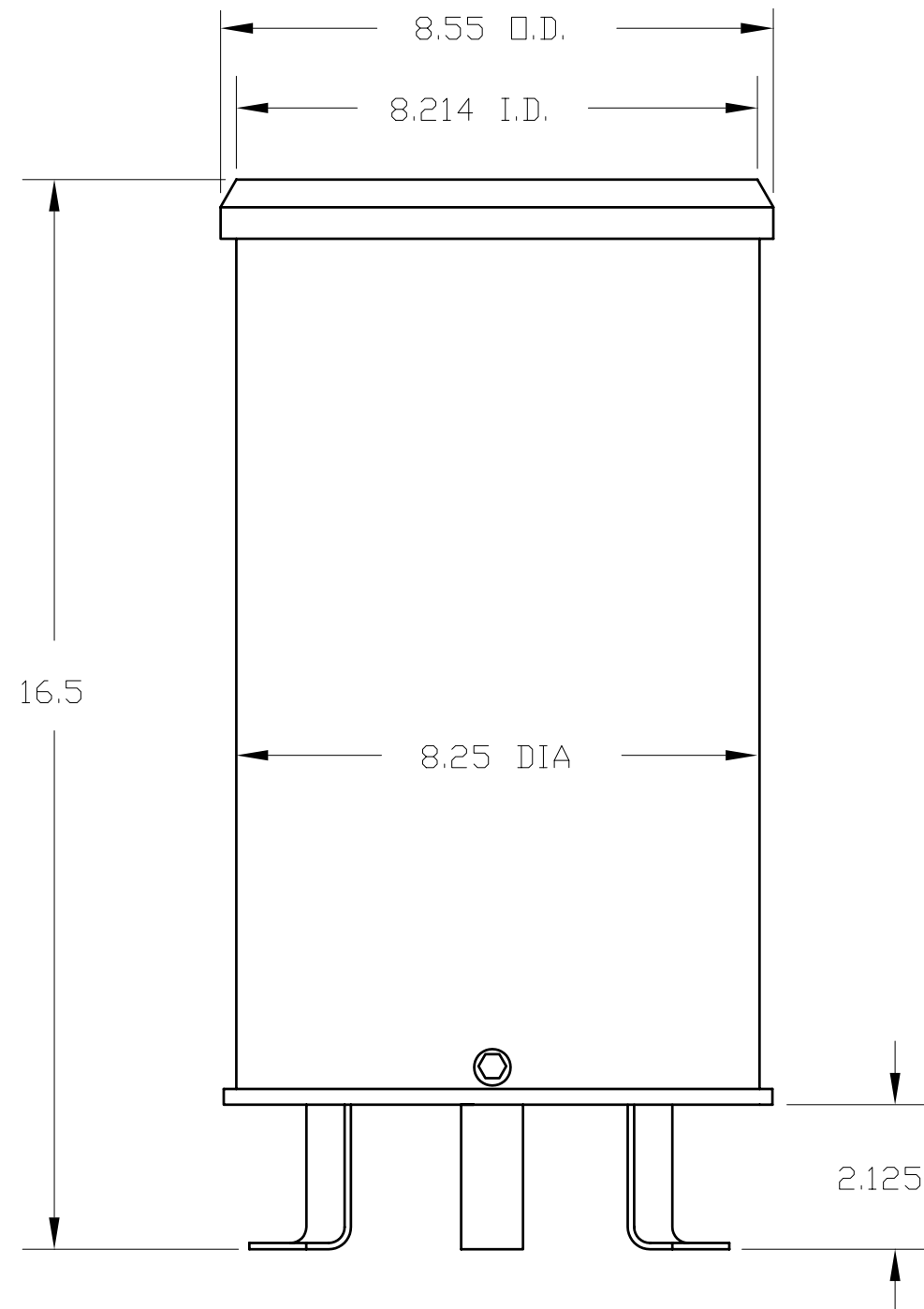
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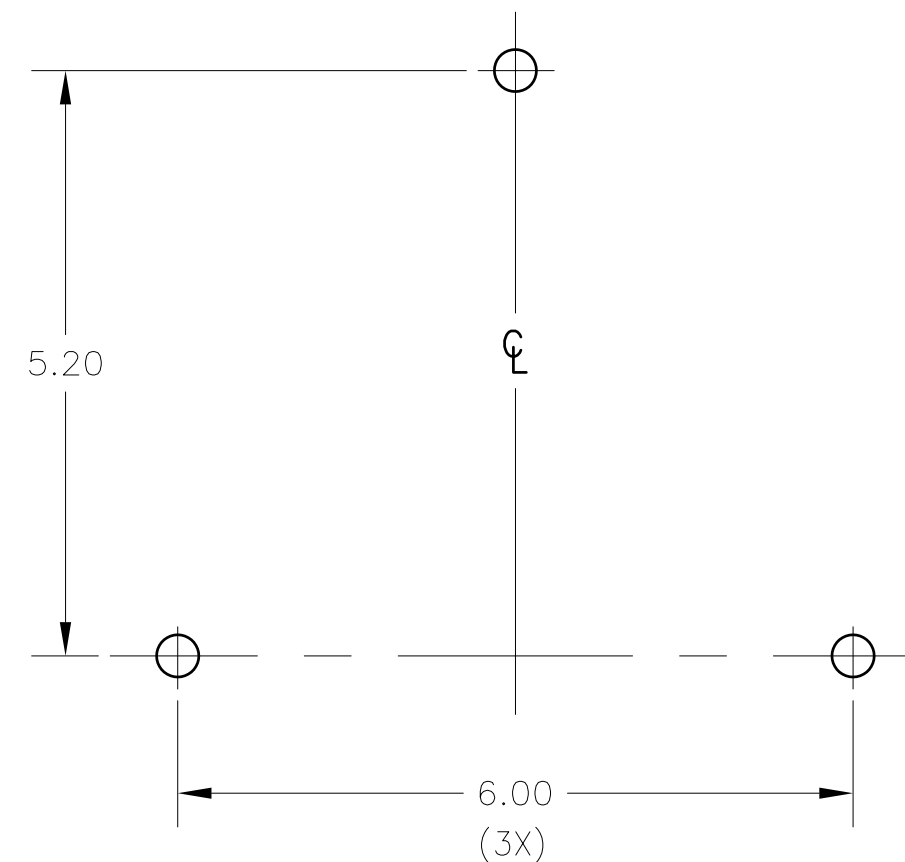
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THE WRITTEN PERMISSION OF ALL WEATHER INC.

APPEND THE FOLLOWING DOCUMENTS WHEN CHANGING THIS DOCUMENT:		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2' XXX=±.005 CONCENTRICITY: .003 TIR DO NOT SCALE DRAWING		DRAWN BY: B. GALARPE	10/25/07	TITLE INSTALLATION DRAWING, KIT, MOUNTING, 6011/6021 RAIN GAUGE CORROSION RESISTANT			
		MATERIAL SEE BILL OF MATERIALS		REVISED BY:					
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		TREATMENT		DESIGN ENGINEER: J. CONNER	-				
				PROJECT MANAGER:					
				APPROVALS	DATE	SCALE	NONE	RELEASE DATE	-
								SHEET	1 OF 1




REVISIONS			6021-A-005	
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B	2788	SEE ECN FOR HISTORY	9/88	
C	4148	REDRAWN, UPDATE TO CURRENT FORMAT	OCT 1992	P.S.

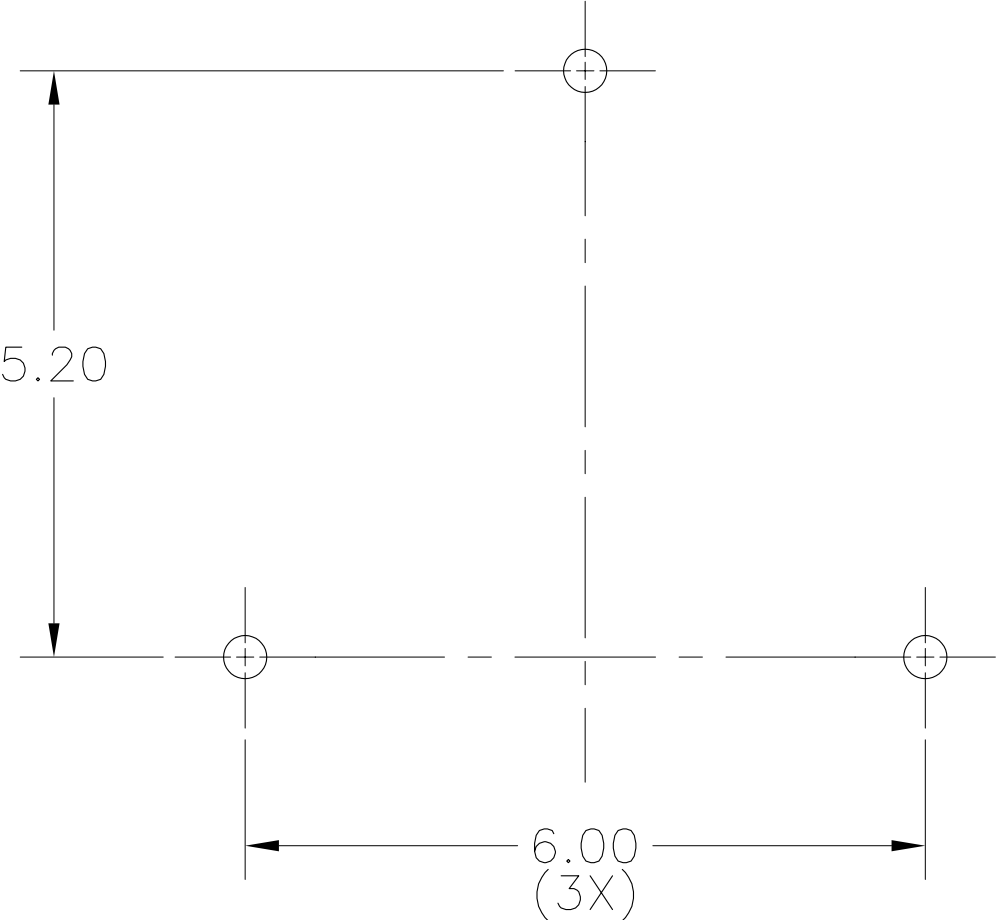
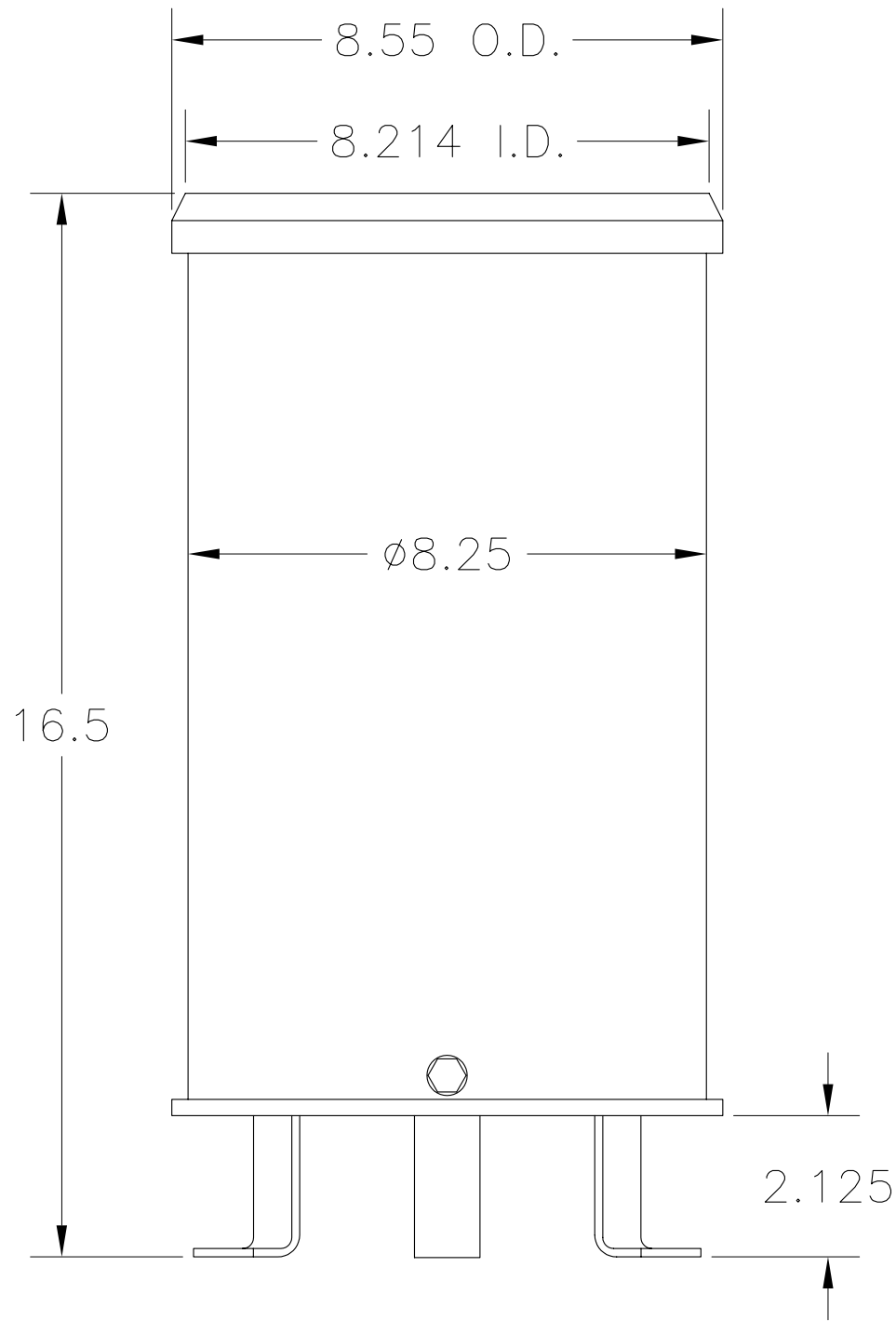


DETAIL OF MOUNTING HOLE PATTERN

EXCEPT AS MAY OTHERWISE BE SPECIFIED BY CONTRACT, THIS DOCUMENT AND THE DATA DISCLOSED HEREIN AND HERewith, IS NOT TO BE USED, REPRODUCED OR DISCLOSED, IN WHOLE OR IN PART, TO ANYONE WITHOUT THE WRITTEN PERMISSION OF ALL WEATHER INC.


			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2° XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: PETE SANCHEZ	19OCT92	TITLE OUTLINE, RAIN GAGE MODEL 6021-A						
				CHECKED BY:								
				MATL SEE BILL OF MATERIALS	DESIGN ENGINEER:							
				FINISH AS ISSUED	PROJECT MANAGER:							
				TREATMENT	PROGRAM MANAGER:							
NEXT	NEXT ASSY	USED ON	APPLICATIONS	APPROVALS	DATE	SIZE B	DWG NO. 6021-A-005					
QTY REQD						SCALE	NONE	RELEASE DATE		SHEET 1 OF 1		

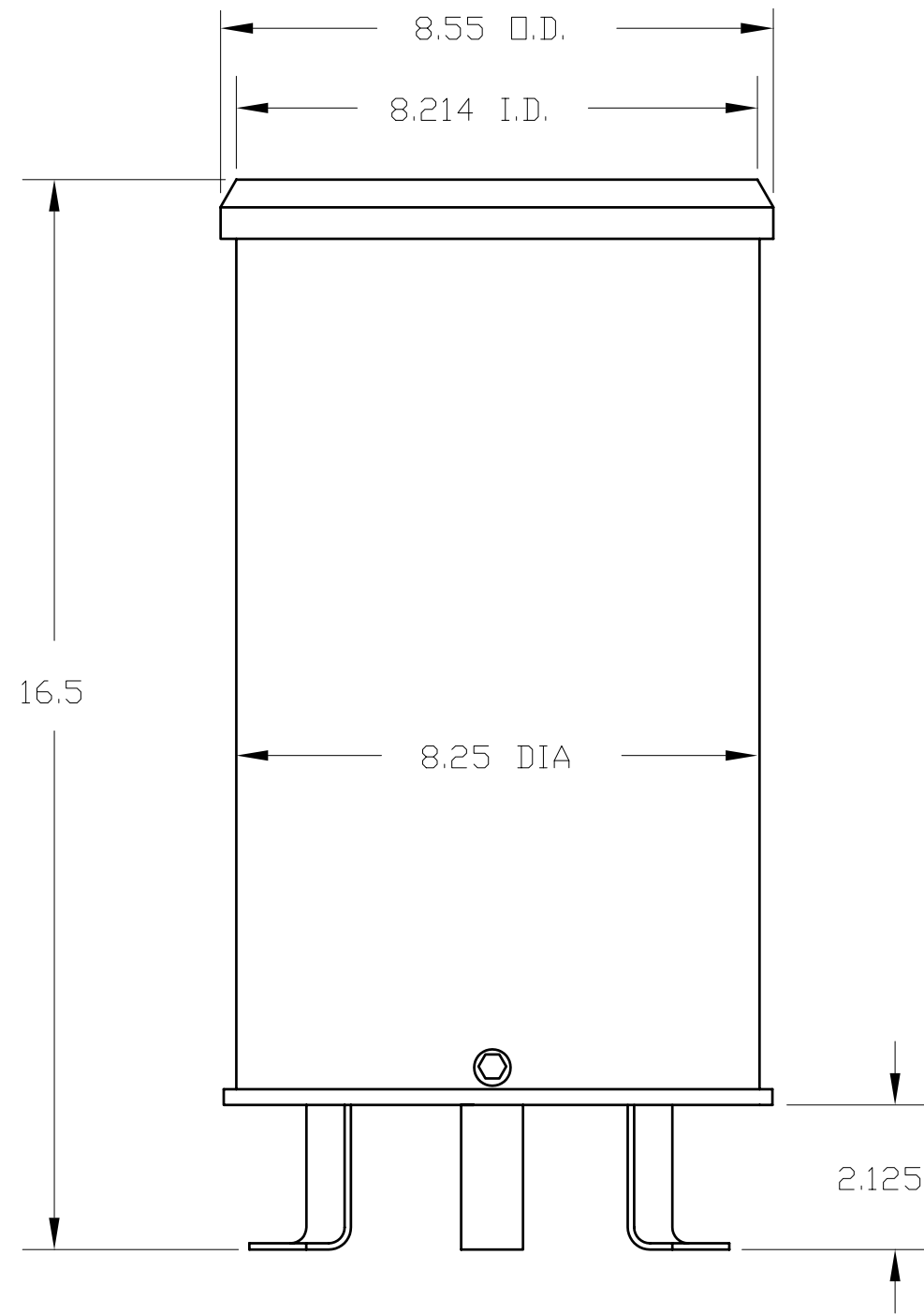
REVISIONS			6011-B-005	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	4145	INITIAL RELEASE OF OUTLINE DRAWING	9-10-92	KH



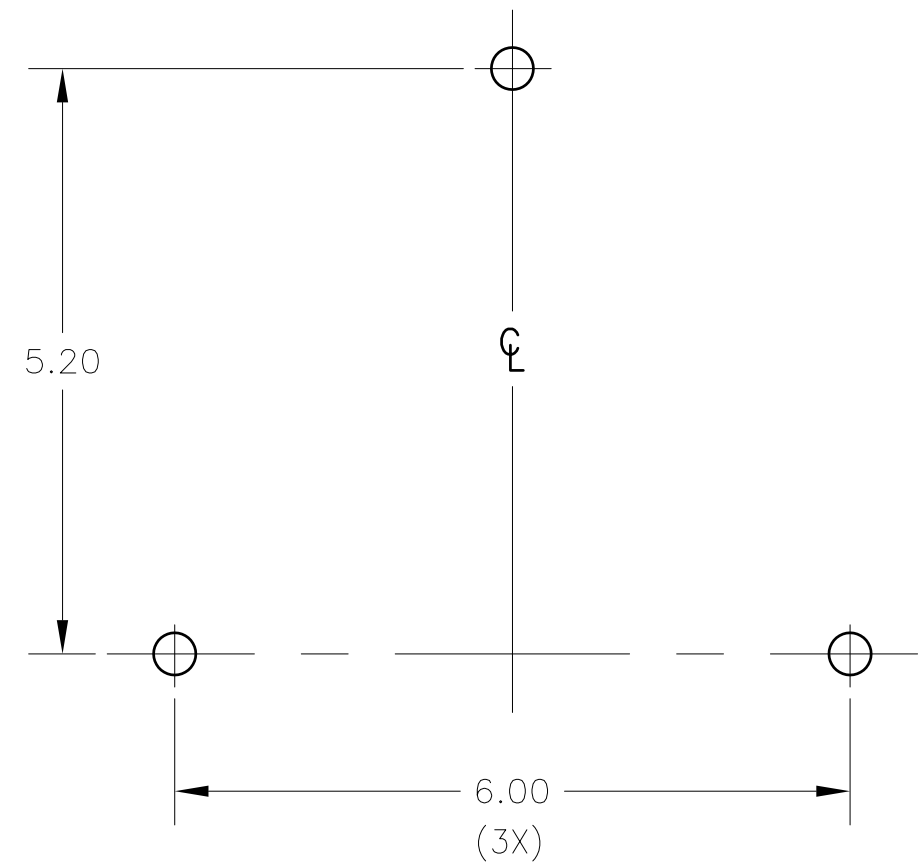
DETAIL OF MOUNTING HOLE PATTERN

EXCEPT AS MAY OTHERWISE BE SPECIFIED BY CONTRACT, THIS DOCUMENT AND THE DATA DISCLOSED HEREIN AND HEREWITH, IS NOT TO BE USED, REPRODUCED OR DISCLOSED, IN WHOLE OR IN PART, TO ANYONE WITHOUT THE WRITTEN PERMISSION OF QUALIMETRICS, INC..

			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2° XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: KEITH HOEK	10SEPT92	TITLE OUTLINE DRAWING, MODEL 6011-B, RAIN GAGE		 allweatherinc	
				CHECKED BY:					
				DESIGN ENGINEER:					
				PROJECT MANAGER:					
			MATL N/A			SIZE B	DWG NO. 6011-B-005		
			FINISH N/A						
NEXT	NEXT ASSY	USED ON	TREATMENT	PROGRAM MANAGER:					
QTY REQD	APPLICATIONS			APPROVALS	DATE	SCALE	NONE	RELEASE DATE	SHEET 1 OF 1



REVISIONS			6021-D-005	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2798	SEE ECN FOR HISTORY	3/9/88	
B	2788	SEE ECN FOR HISTORY	9/88	
C	4148	UNTABED FROM 6021-A05	OCT 1992	PS



DETAIL OF MOUNTING HOLE PATTERN

EXCEPT AS MAY OTHERWISE BE SPECIFIED BY CONTRACT, THIS DOCUMENT AND THE DATA DISCLOSED HEREIN AND HEREWITH, IS NOT TO BE USED, REPRODUCED OR DISCLOSED, IN WHOLE OR IN PART, TO ANYONE WITHOUT THE WRITTEN PERMISSION OF ALL WEATHER INC.

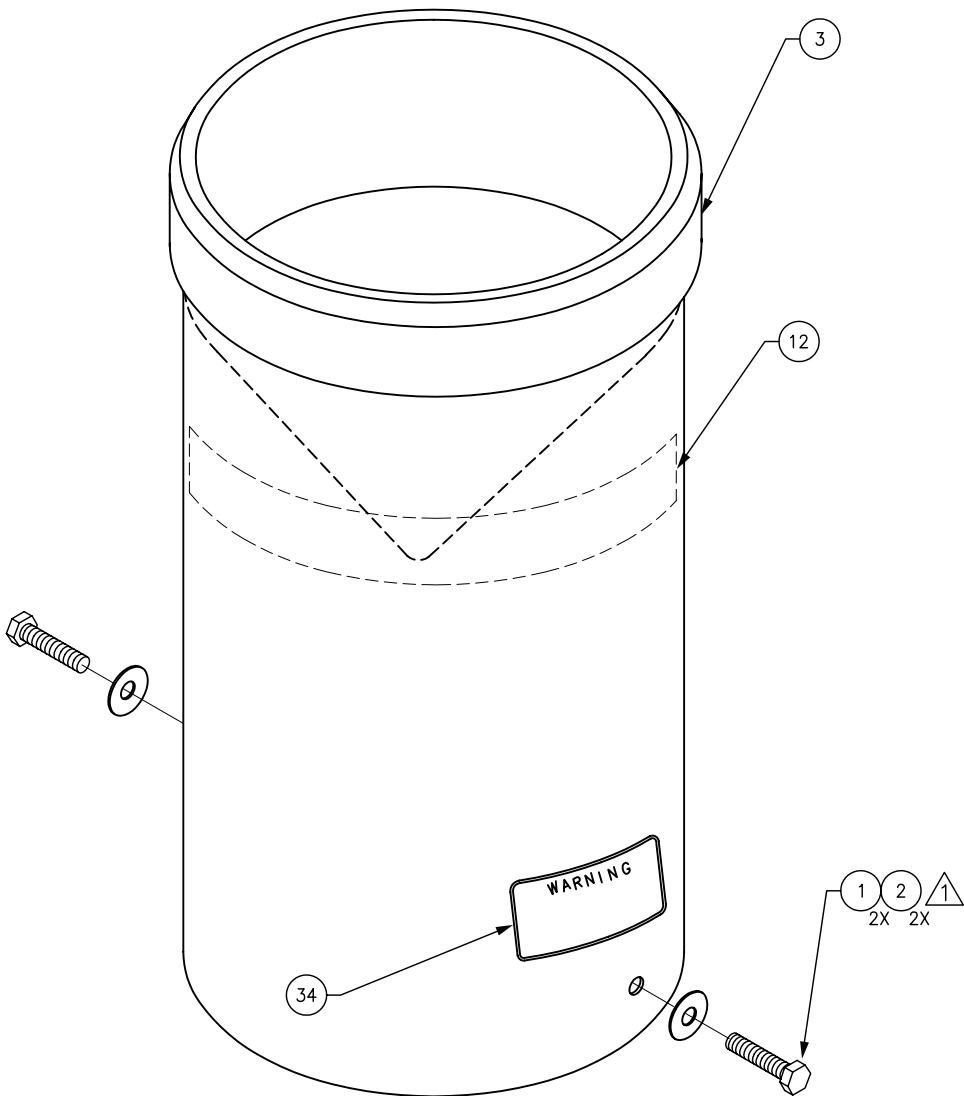
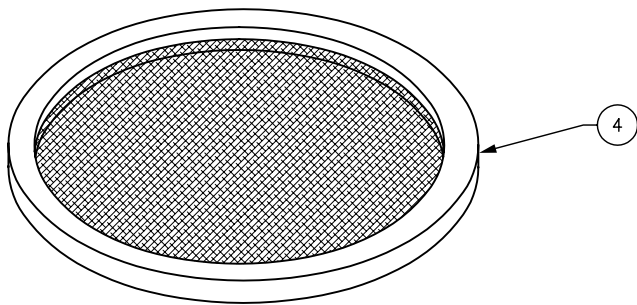
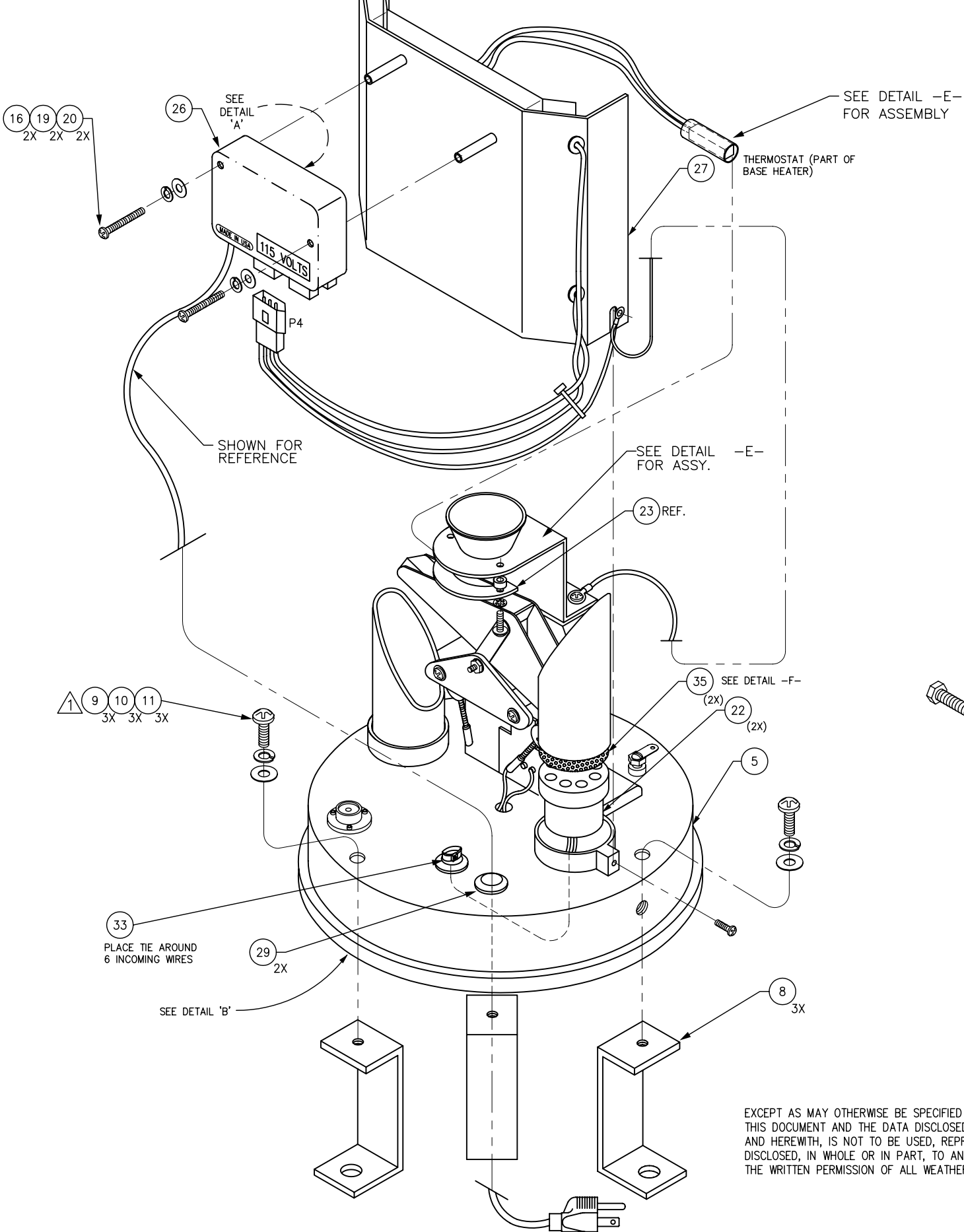
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SIZE
B

DWG NO.
6021-D-005

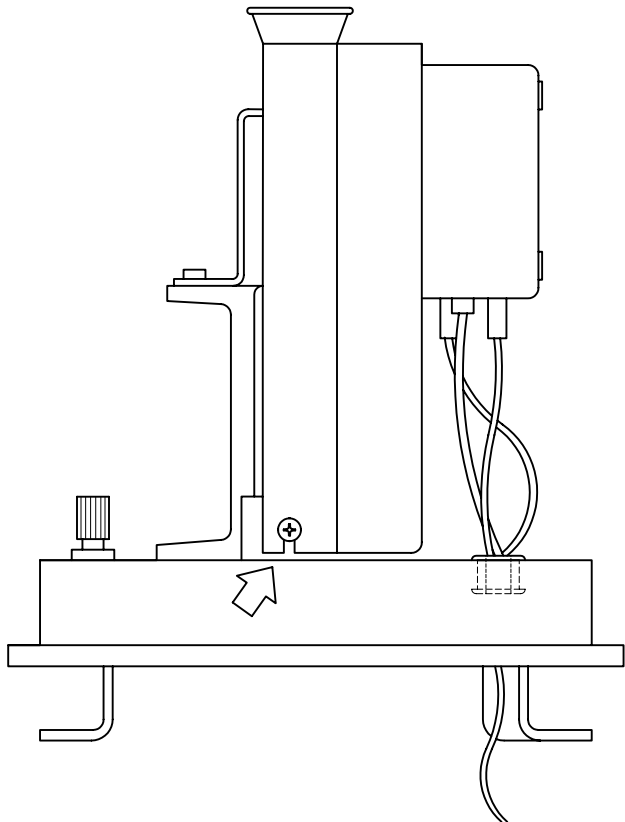
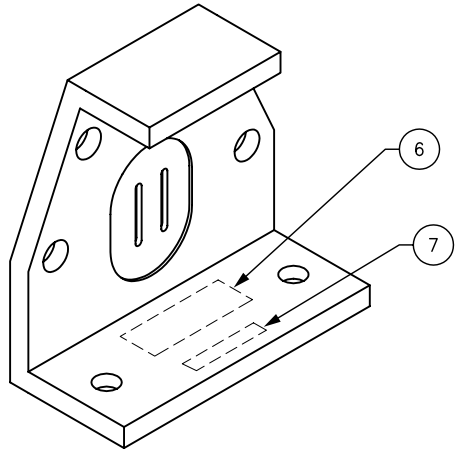
NOTES: UNLESS OTHERWISE SPECIFIED:
⚠ COAT SCREW THREADS WITH
LOCTITE SILVER GRADE ANTI-SEIZE
COMPOUND OR EQUIV.

DETAIL H




DETAIL G

REVISIONS			DWS NO. 6021-A03	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2826	SEE ECN FOR HISTORY	7/14/88	
B	4148	REDRAWN, UPDATE TO CURRENT FORMAT		
C	5227	SHT 2: DETAIL F: REVISED ITEM 35 NOTE	1-26-05	J.CONNER
D	0938	ADDED NOTE 1	3-20-07	J.CONNER

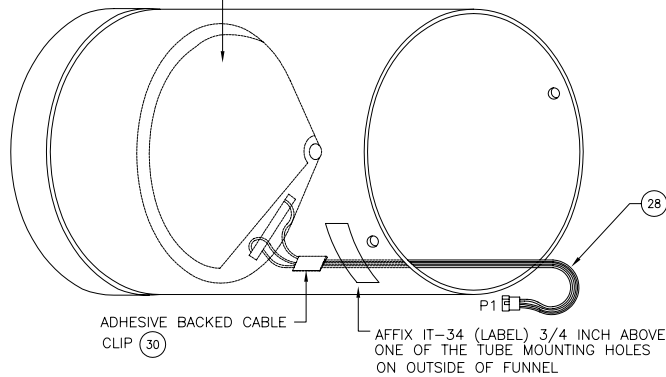


BASE HEATER ASSEMBLY HEATER IS SECURED BY
SCREWS IN DRAIN TUBE BOSSES. SCREWS MUST
ENTER HOLE IN HEATER ASSEMBLY.

C	D	REV	REV STATUS
2	1	SHEET	OF SHEETS

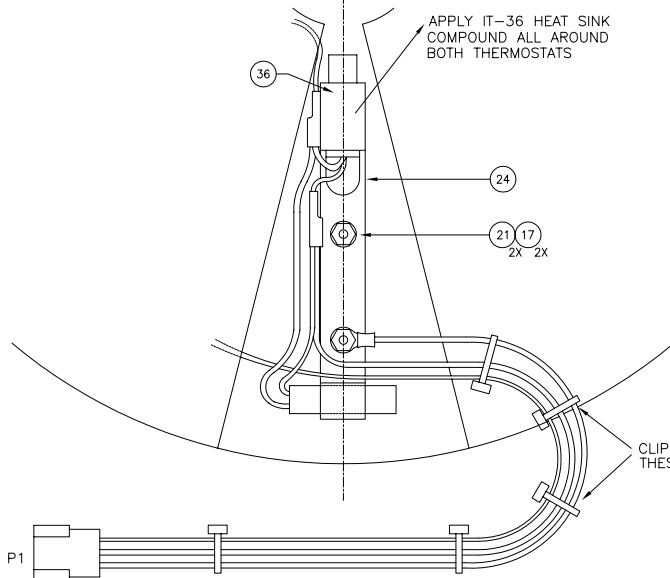
			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2" XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: PETE SANCHEZ	14OCT92	TITLE ASSEMBLY, HEATED TIPPING BUCKET RAIN GAGE		 allweatherinc			
				CHECKED BY:							
				DESIGN ENGINEER:							
				MATL SEE BILL OF MATERIALS	PROJECT MANAGER:		SIZE D		DWG NO. 6021-A03		
				FINISH AS ISSUED	PROGRAM MANAGER:						
				TREATMENT							
NEXT	NEXT ASSY	USED ON		APPROVALS	DATE	SCALE	NONE	RELEASE DATE	7/88	SHEET	1 OF 2
QTY REQD	APPLICATIONS										

PRE-FORM HEATER WITH PAPER BACKING IN PLACE. REMOVE BACKING AND POSITION CAREFULLY, ONCE THE ADHESIVE HAS CONTACTED THE FUNNEL IT IS ALMOST IMPOSSIBLE TO REMOVE. NOTE LOCATION OF CLEAR SPACE, ESSENTIALLY SYMMETRICAL TO THE TWO STUDS. SEE DETAIL -C-



CENTER OF FUNNEL

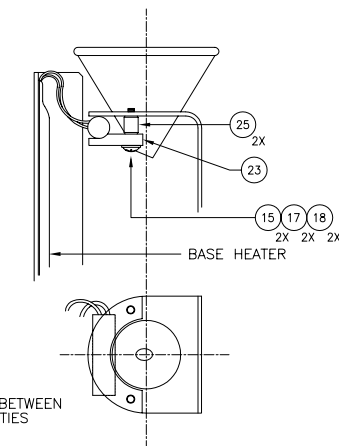
APPLY IT-36 HEAT SINK COMPOUND ALL AROUND BOTH THERMOSTATS



DETAIL -C-

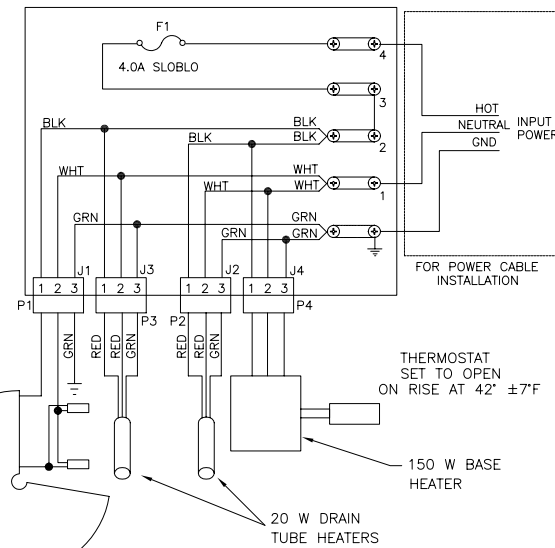
125 W FUNNEL HEATER

TWO THERMOSTATS IN PARALLEL SET TO OPEN ON RISE AT $11^{\circ}\text{C} \pm 4^{\circ}\text{C}$

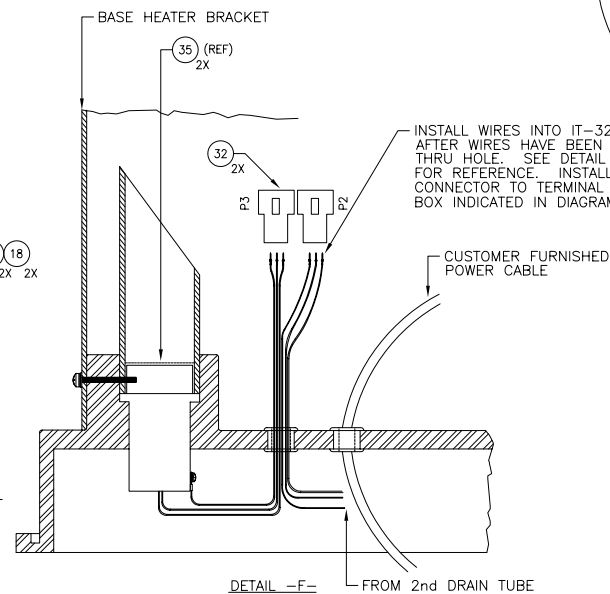


SECURE THERMOSTAT BETWEEN BRACKET AND CLIP AS SHOWN. BRACKET MUST BE REMOVED FOR ASSEMBLY.

DETAIL -E-



WIRING DIAGRAM

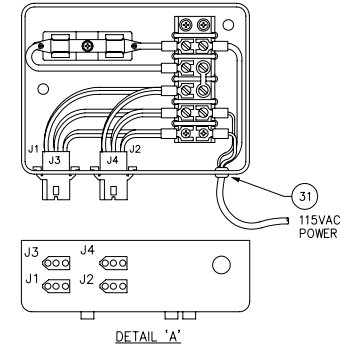


DETAIL -F-

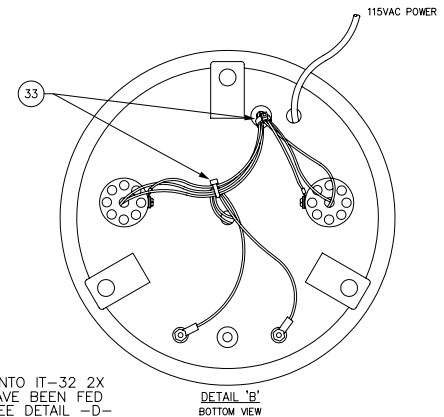
INSTALL WIRES INTO IT-32 2X AFTER WIRES HAVE BEEN FED THRU HOLE. SEE DETAIL -D- FOR REFERENCE. INSTALL CONNECTOR TO TERMINAL BOX INDICATED IN DIAGRAM.

CUSTOMER FURNISHED POWER CABLE

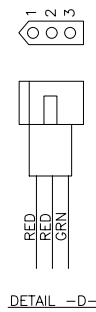
FROM 2nd DRAIN TUBE



DETAIL 'A'



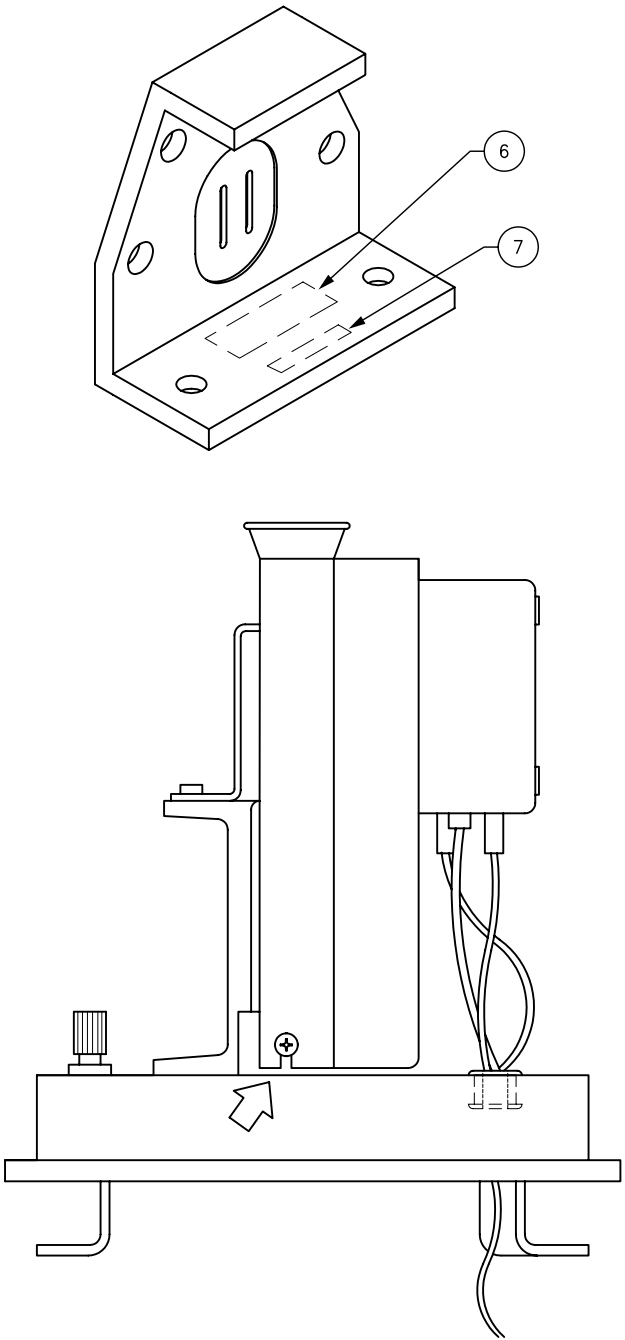
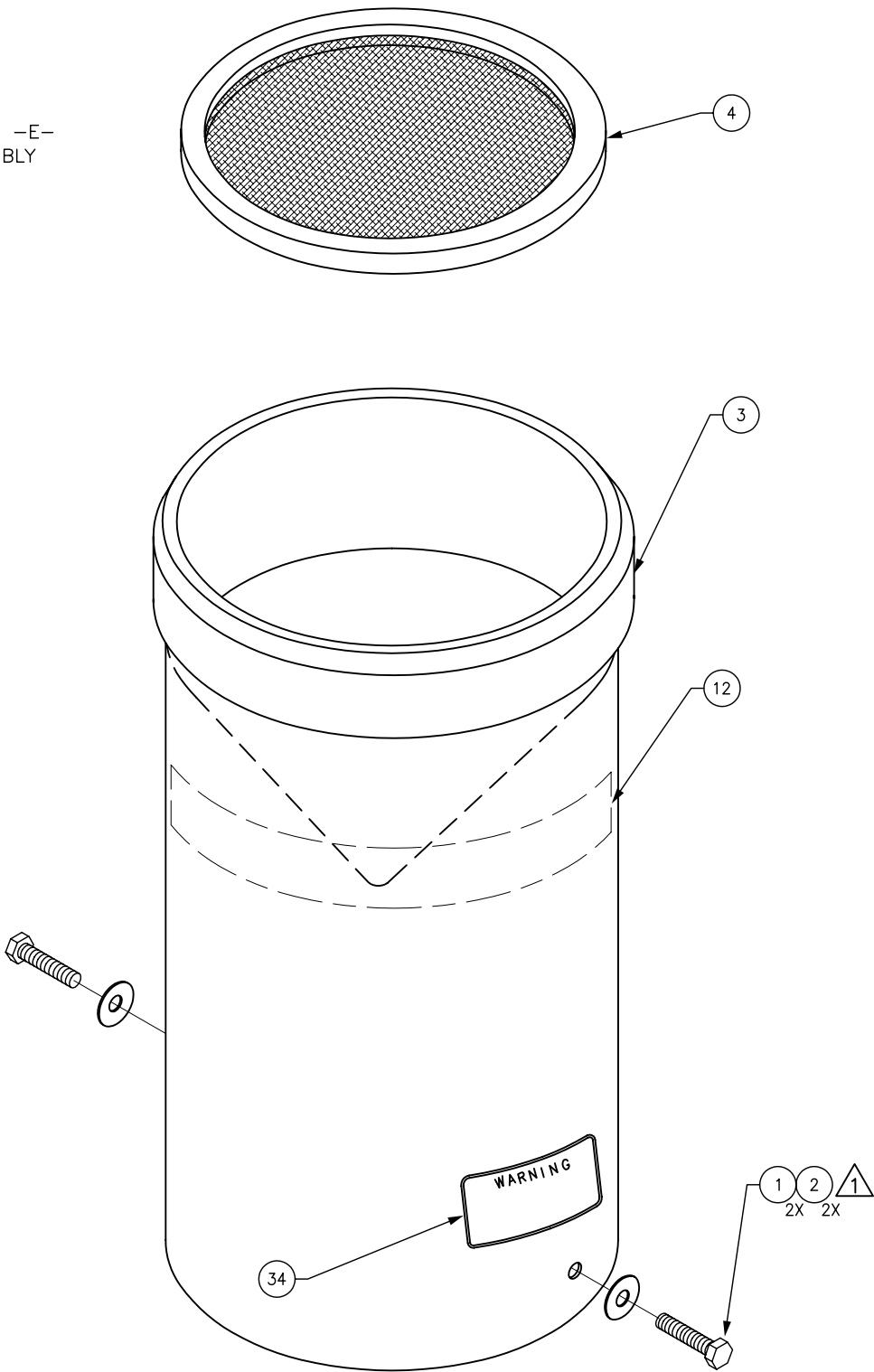
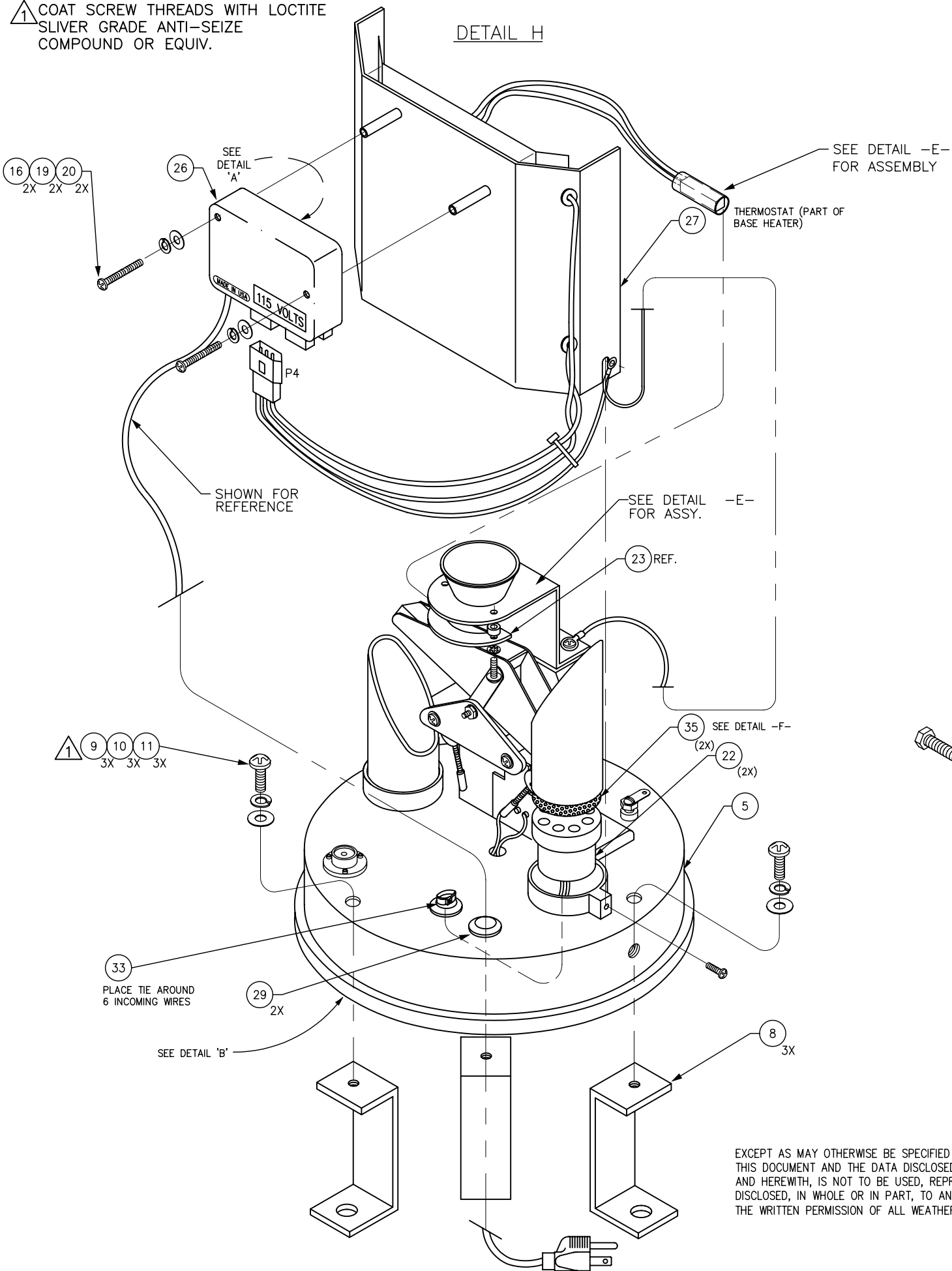
DETAIL 'B' BOTTOM VIEW



DETAIL -D-


1 COAT SCREW THREADS WITH LOCTITE
SLIVER GRADE ANTI-SEIZE
COMPOUND OR EQUIV.

REVISIONS			DWG NO. 6021-B03	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2826	SEE ECN FOR HISTORY		
B	4148	UNTABED FROM 6021-A03		
C	5127	SHT 2: DETAIL F: REVISED ITEM 35 NOTE	1-26-05	J.CONNER
D	0938	ADDED NOTE 1	3-20-07	J.CONNER

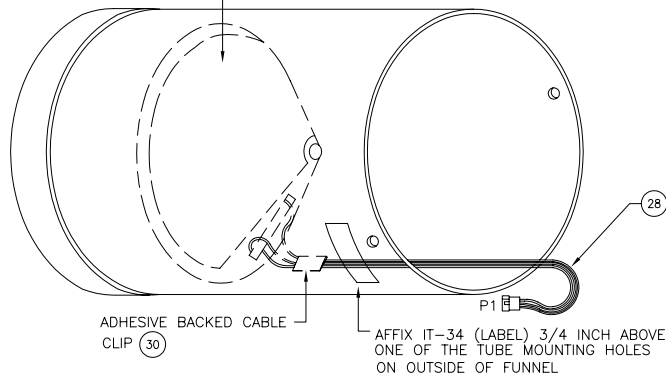


BASE HEATER ASSEMBLY HEATER IS SECURED BY SCREWS IN DRAIN TUBE BOSSES. SCREWS MUST ENTER HOLE IN HEATER ASSEMBLY.

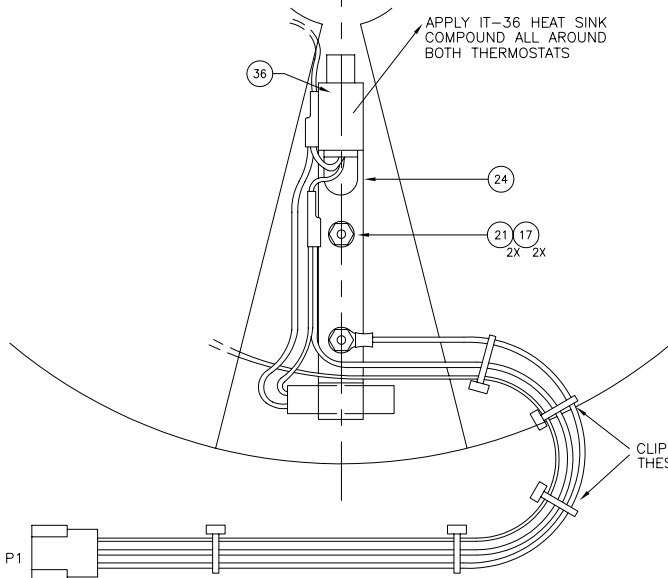
C	D	REV	REV STATUS OF SHEETS
2	1	SHEET	

			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES	DRAWN BY: PETE SANCHEZ	140CT92	TITLE ASSEMBLY, HEATED TIPPING BUCKET RAIN GAGE		 allweatherinc
			TOLERANCES XX=±.010 ANGLES ±1/2" XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	CHECKED BY:				
			MATL SEE BILL OF MATERIALS	DESIGN ENGINEER:				
			FINISH AS ISSUED	PROJECT MANAGER:				
NEXT	NEXT ASSY	USED ON	TREATMENT	PROGRAM MANAGER:		SIZE D	DWG NO. 6021-B03	
QTY REQD	APPLICATIONS			APPROVALS	DATE	SCALE NONE	RELEASE DATE	SHEET 1 OF 2

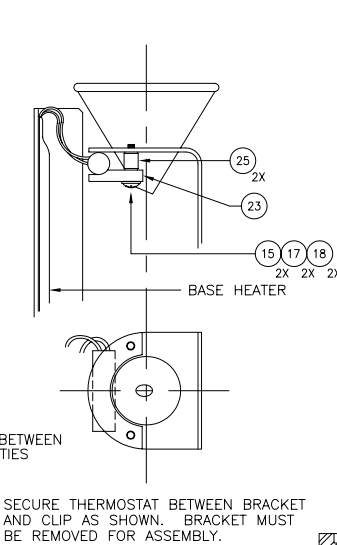
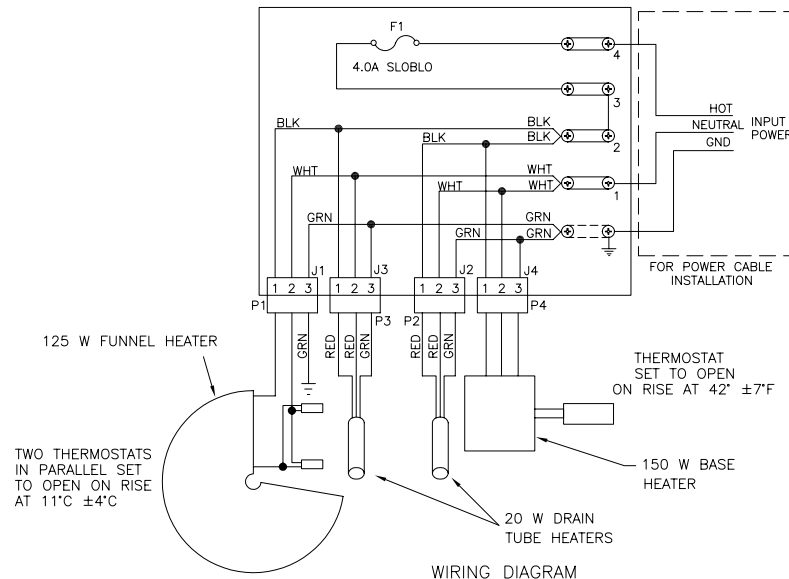
PRE-FORM HEATER WITH PAPER BACKING IN PLACE. REMOVE BACKING AND POSITION CAREFULLY, ONCE THE ADHESIVE HAS CONTACTED THE FUNNEL IT IS ALMOST IMPOSSIBLE TO REMOVE. NOTE LOCATION OF CLEAR SPACE, ESSENTIALLY SYMMETRICAL TO THE TWO STUDS. SEE DETAIL -C-



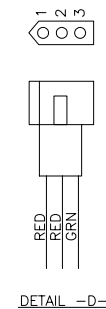
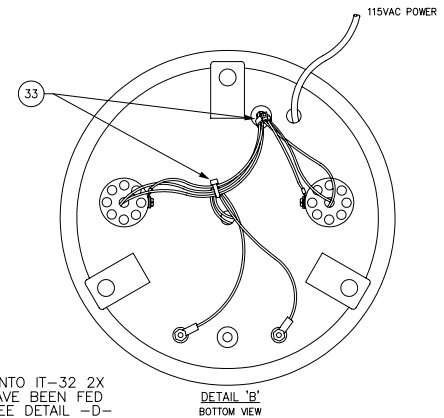
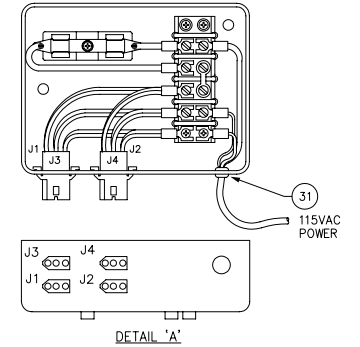
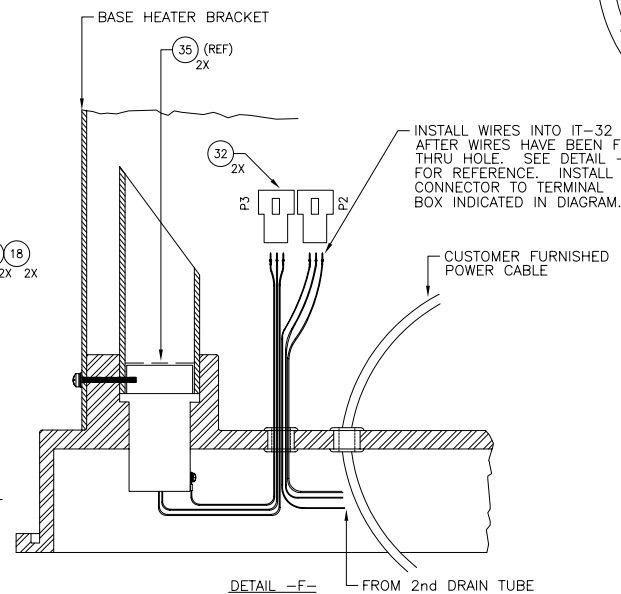
CENTER OF FUNNEL



DETAIL -C-



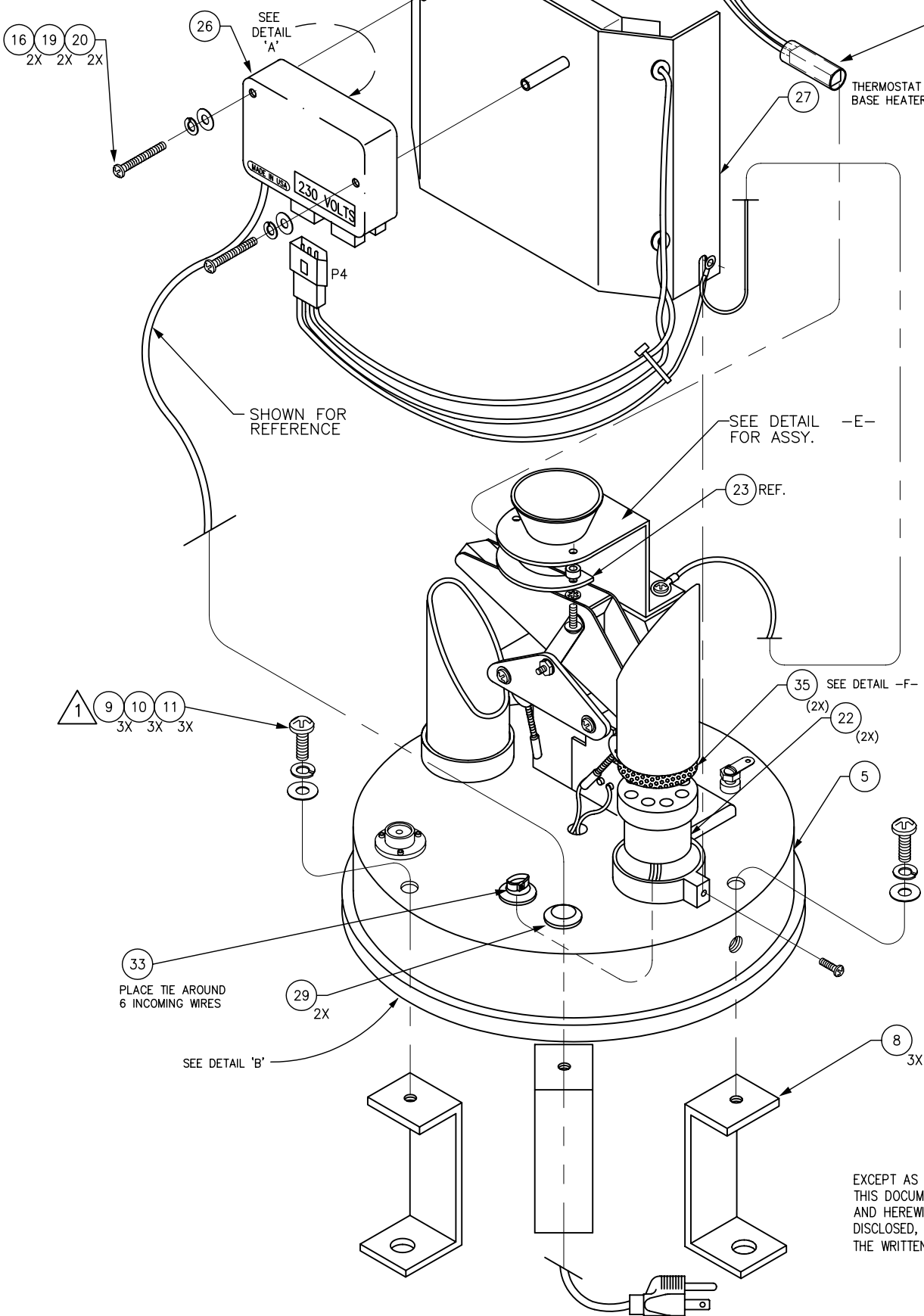
DETAIL -E-



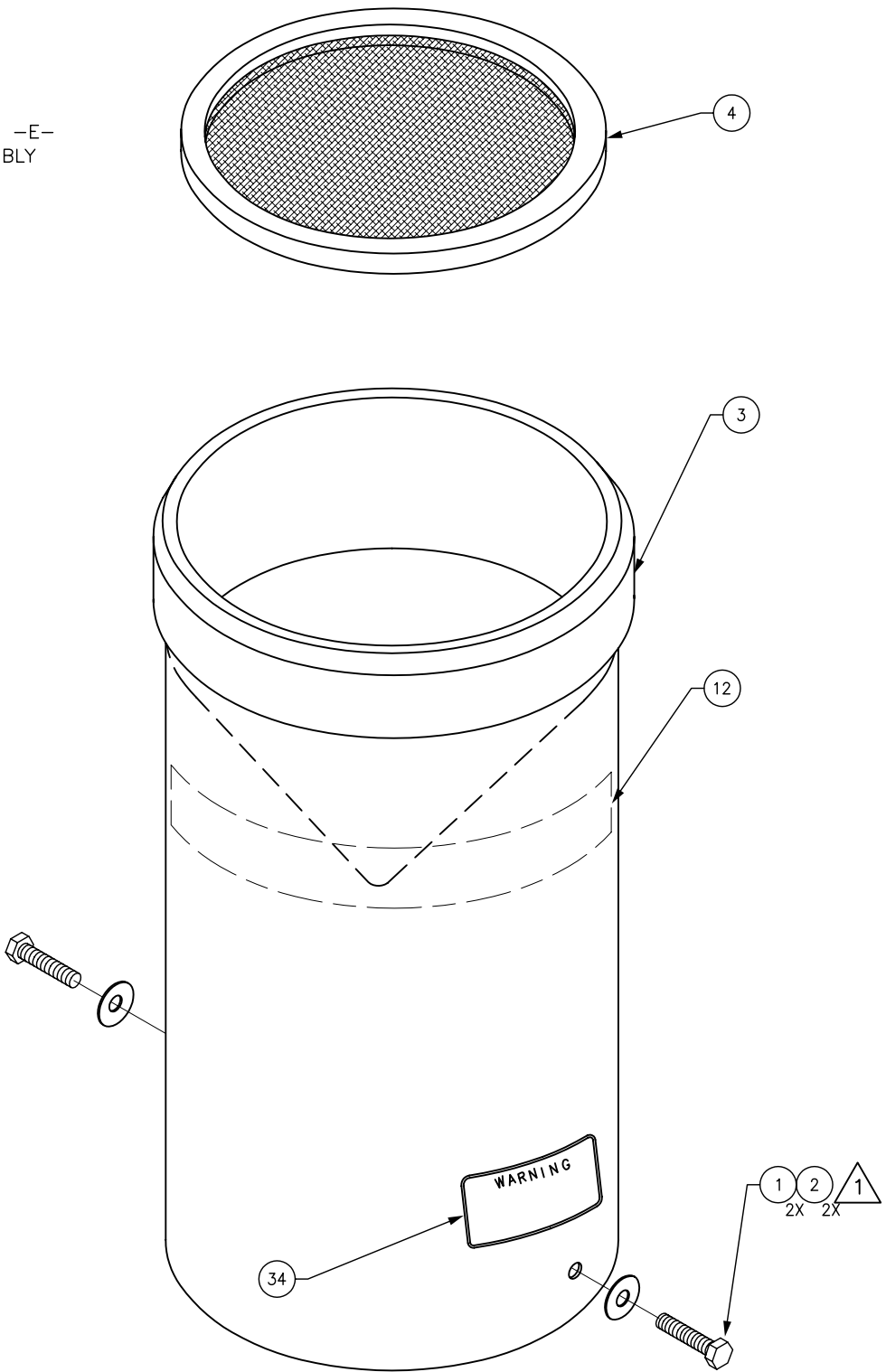
NOTES: UNLESS OTHERWISE SPECIFIEC:

1 COAT SCREW THREADS WITH
LOCTITE SILVER GRADE ANTI-SEIZE
COMPOUND OR EQUIV.

DETAIL H

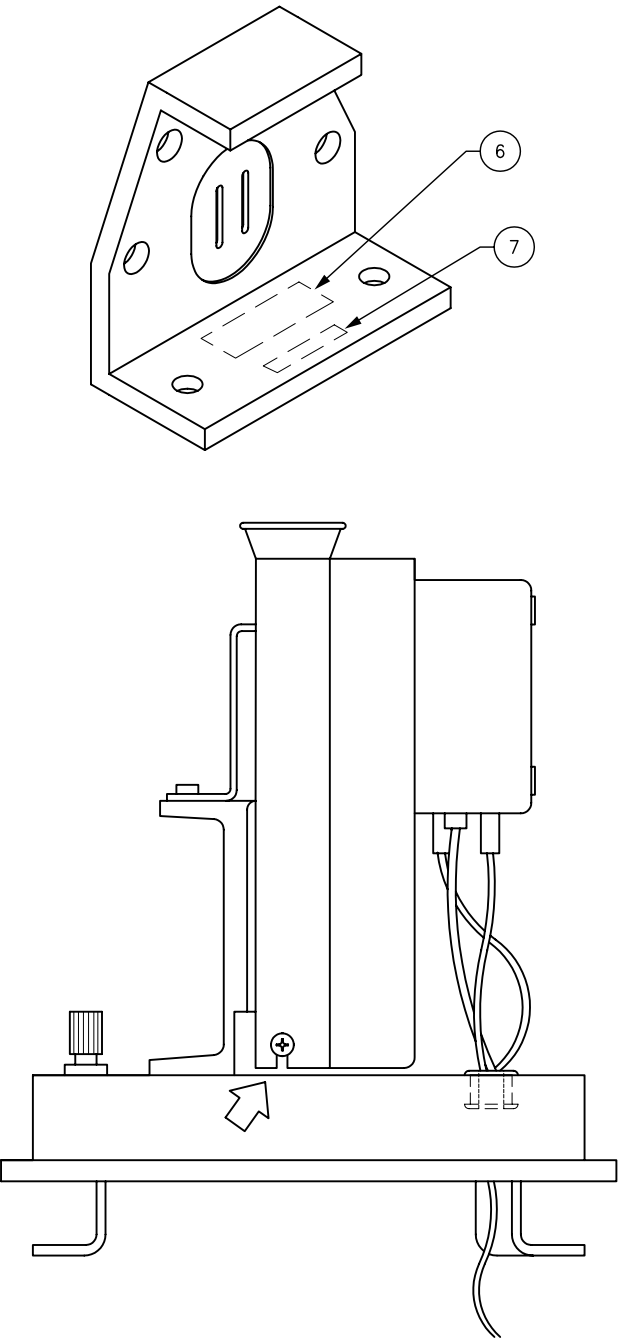


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THE WRITTEN PERMISSION OF ALL WEATHER INC.



DETAIL G

REVISIONS			DWG NO. 6021-D03	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2826	SEE ECN FOR HISTORY	7/14/88	
B	4148	UNTABED FROM 6021-A03		
C	5227	SHT 2: DETAIL F: REVISED ITEM 35 NOTE	1-26-05	J.CONNER
D	0938	ADDED NOTE 1	3-20-07	J.CONNER



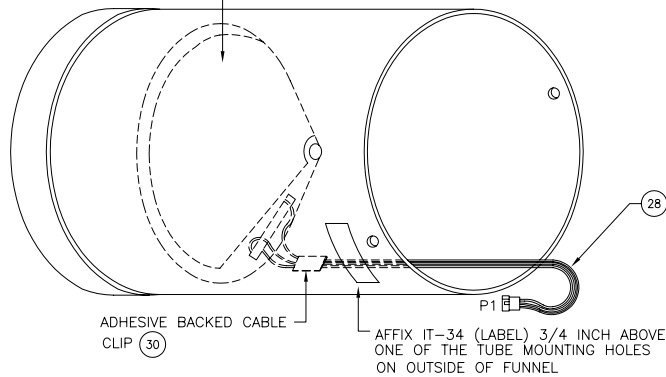
BASE HEATER ASSEMBLY HEATER IS SECURED BY
SCREWS IN DRAIN TUBE BOSSES. SCREWS MUST
ENTER HOLE IN HEATER ASSEMBLY.

C	D	REV	REV STATUS
2	1	SHEET	OF SHEETS

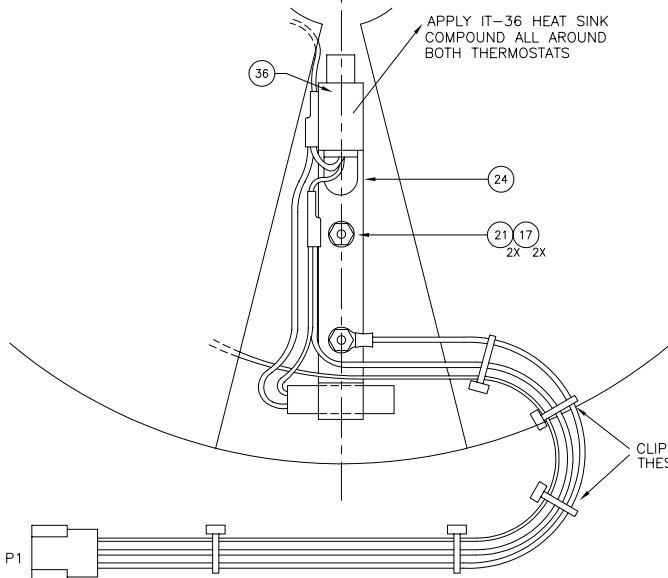
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2" XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING			DRAWN BY: PETE SANCHEZ	140CT92	TITLE ASSEMBLY, HEATED TIPPING BUCKET RAIN GAGE		allweatherinc	
MATERIAL SEE BILL OF MATERIALS			CHECKED BY:					
FINISH AS ISSUED			DESIGN ENGINEER:		SIZE D		DWG NO. 6021-D03	
TREATMENT			PROJECT MANAGER:					
NEXT QTY REQD	NEXT ASSY	USED ON APPLICATIONS	PROGRAM MANAGER:		APPROVALS	DATE	SCALE NONE	RELEASE DATE



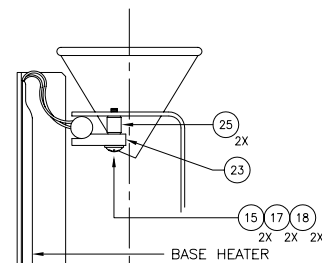
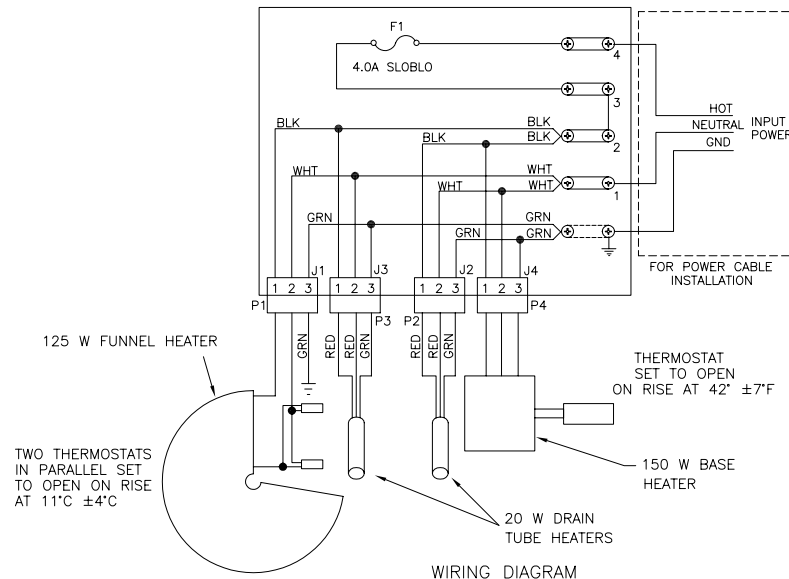
PRE-FORM HEATER WITH PAPER BACKING IN PLACE. REMOVE BACKING AND POSITION CAREFULLY, ONCE THE ADHESIVE HAS CONTACTED THE FUNNEL IT IS ALMOST IMPOSSIBLE TO REMOVE. NOTE LOCATION OF CLEAR SPACE, ESSENTIALLY SYMMETRICAL TO THE TWO STUDS. SEE DETAIL -C-



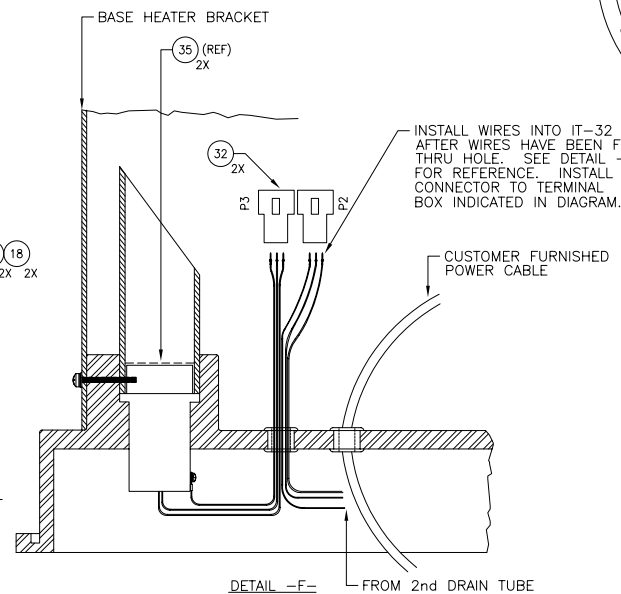
CENTER OF FUNNEL



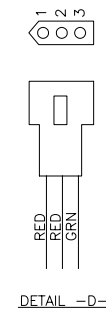
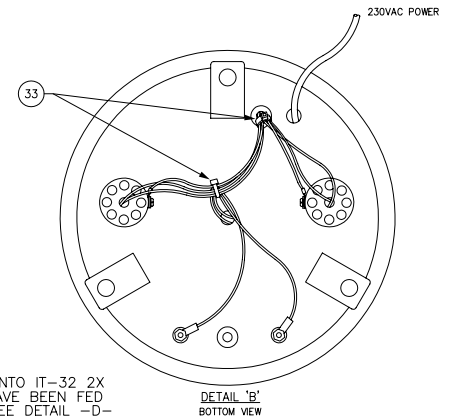
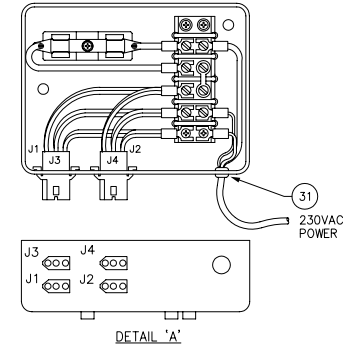
DETAIL -C-



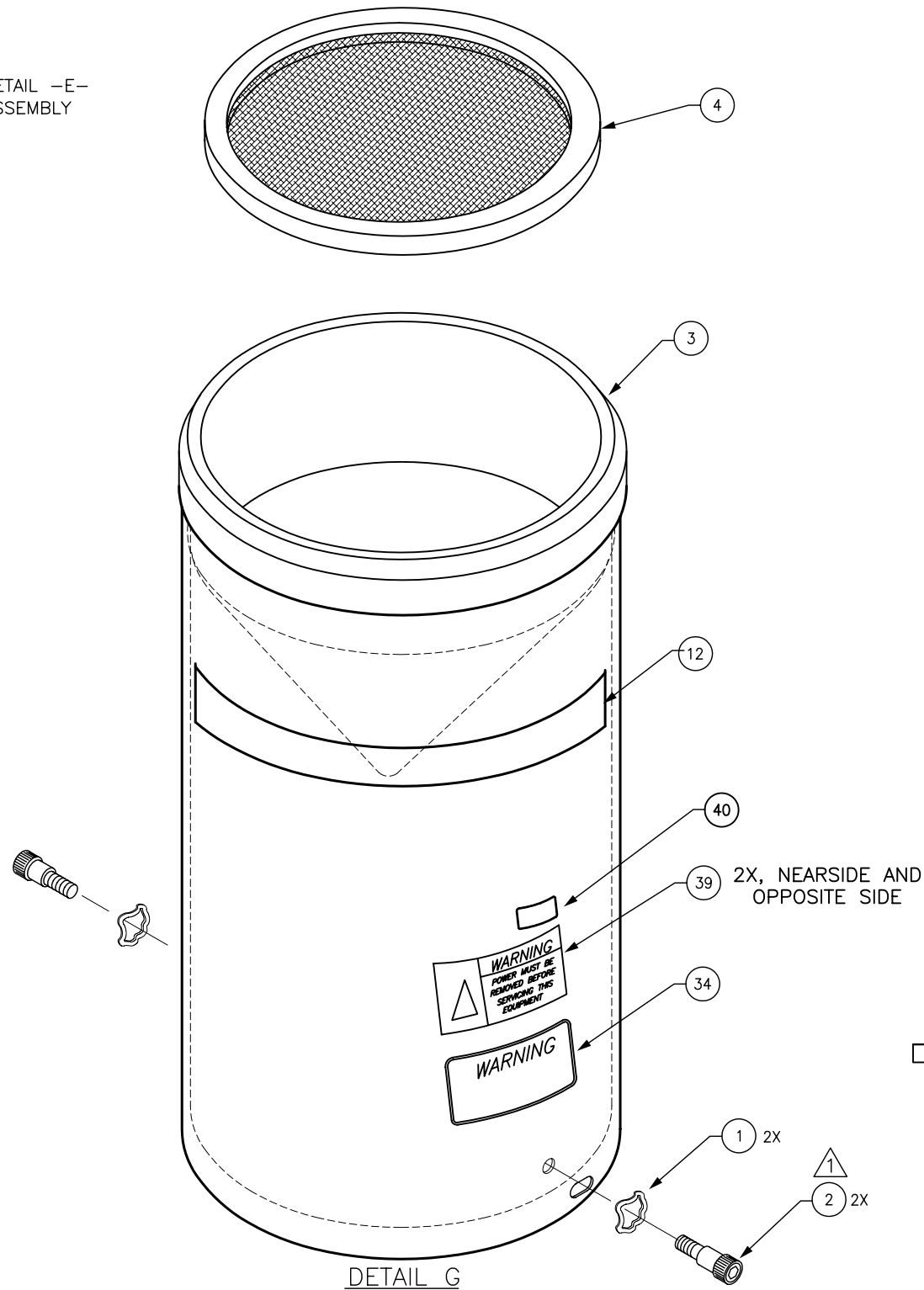
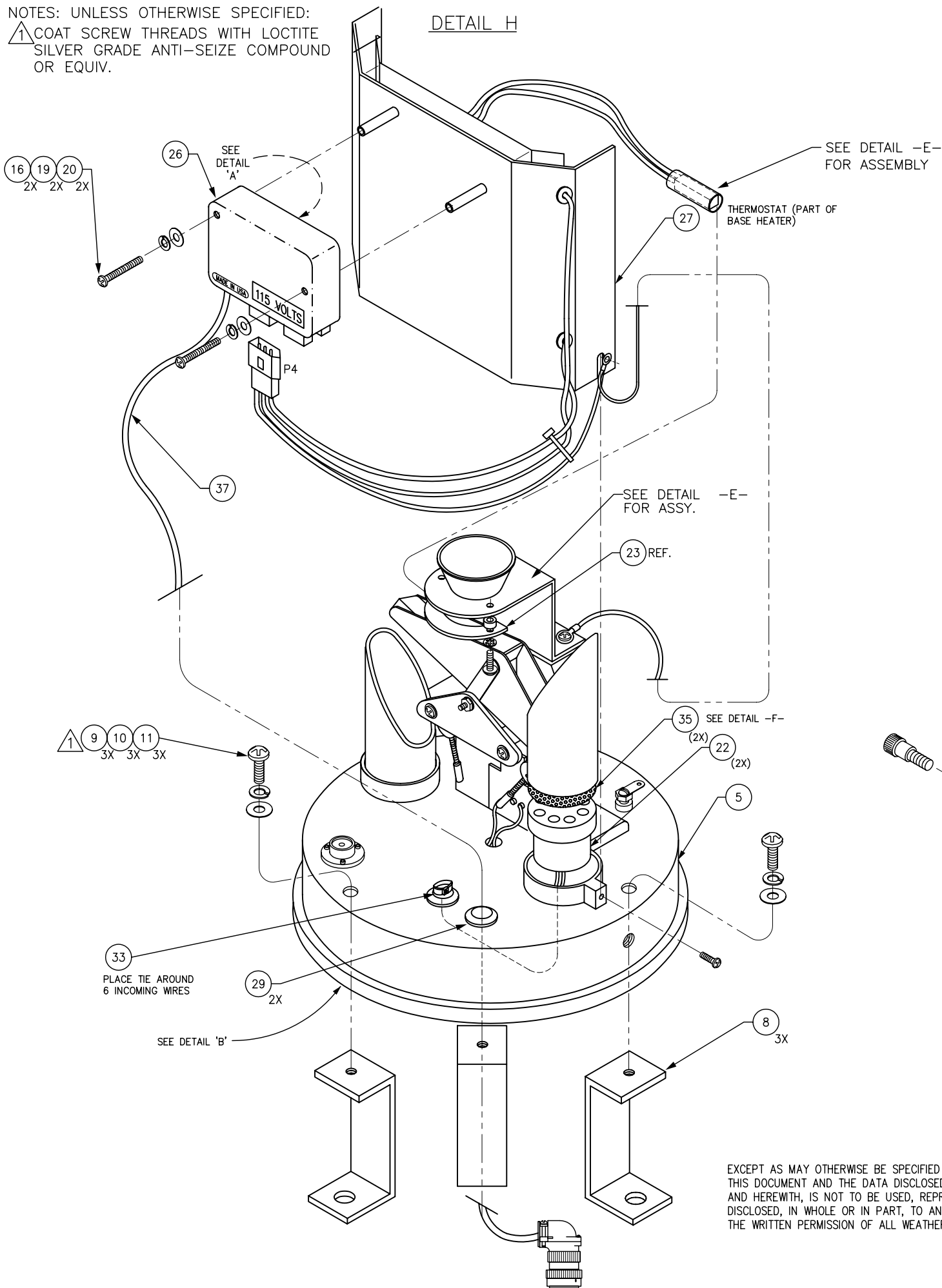
DETAIL -E-



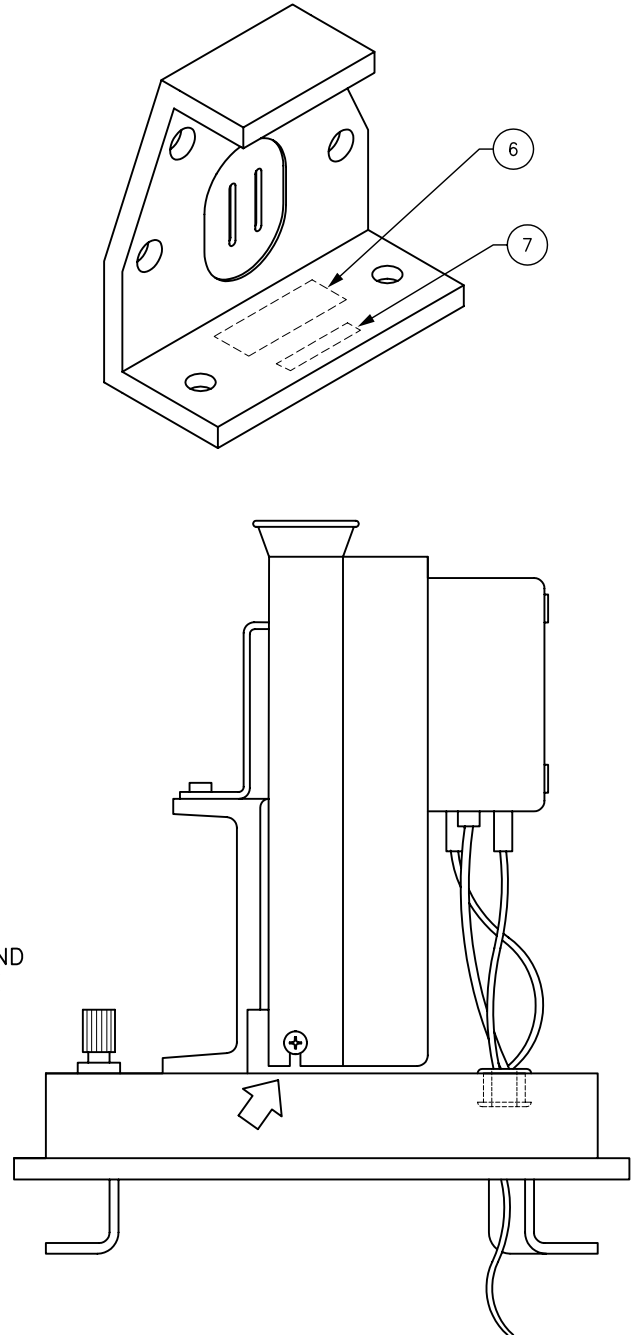
DETAIL -F-



NOTES: UNLESS OTHERWISE SPECIFIED:
1 COAT SCREW THREADS WITH LOCTITE
SILVER GRADE ANTI-SEIZE COMPOUND
OR EQUIV.




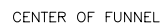
REVISIONS			DWS NO. 6021-E03	
REV	ECO	DESCRIPTION	DATE	APPROVED
A	4886	INITIAL RELEASE	3/23/01	PK
B	4927	IDENTIFY WIRE COLOR ON P4 (SHT 2)	4/12/02	CSP
C	4973	ADD PWR/SIG CABLES		
D	5018	ADD NSN LABEL ITEM 40.	12/03/04	PK
E	5227	SHT 2: DETAIL F: REVISED ITEM 35 NOTE	1-26-05	J.CONNER
F	0938	ADDED NOTE 1	3-20-07	J.CONNER

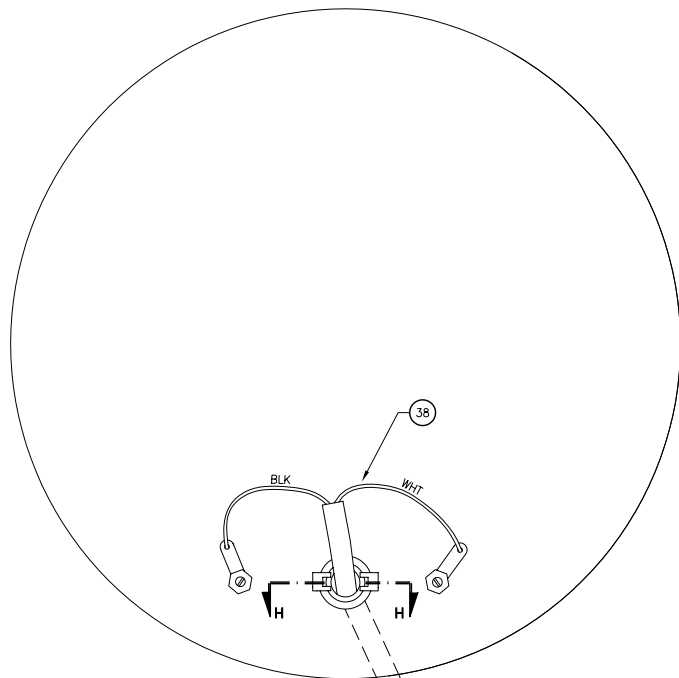


BASE HEATER ASSEMBLY HEATER IS SECURED BY
SCREWS IN DRAIN TUBE BOSSES. SCREWS MUST
ENTER HOLE IN HEATER ASSEMBLY.

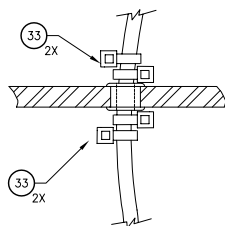
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			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2" XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: P KOOYMAN	260CT00	TITLE ASSEMBLY DWG, RAIN/SNOW GAGE 115V .01 IN/TIP, AWSS		 allweatherinc	
				CHECKED BY: PK	10/02/03				
				DESIGN ENGINEER:					
				PROJECT MANAGER:					
				PROGRAM MANAGER:					
			MATL SEE BILL OF MATERIALS			SIZE D		DWG NO. 6021-E03	
			FINISH AS ISSUED						
NEXT	NEXT ASSY	USED ON	TREATMENT			SCALE NONE		RELEASE DATE 3/23/01	SHEET 1 OF 3
QTY REQD	APPLICATIONS			APPROVALS	DATE				





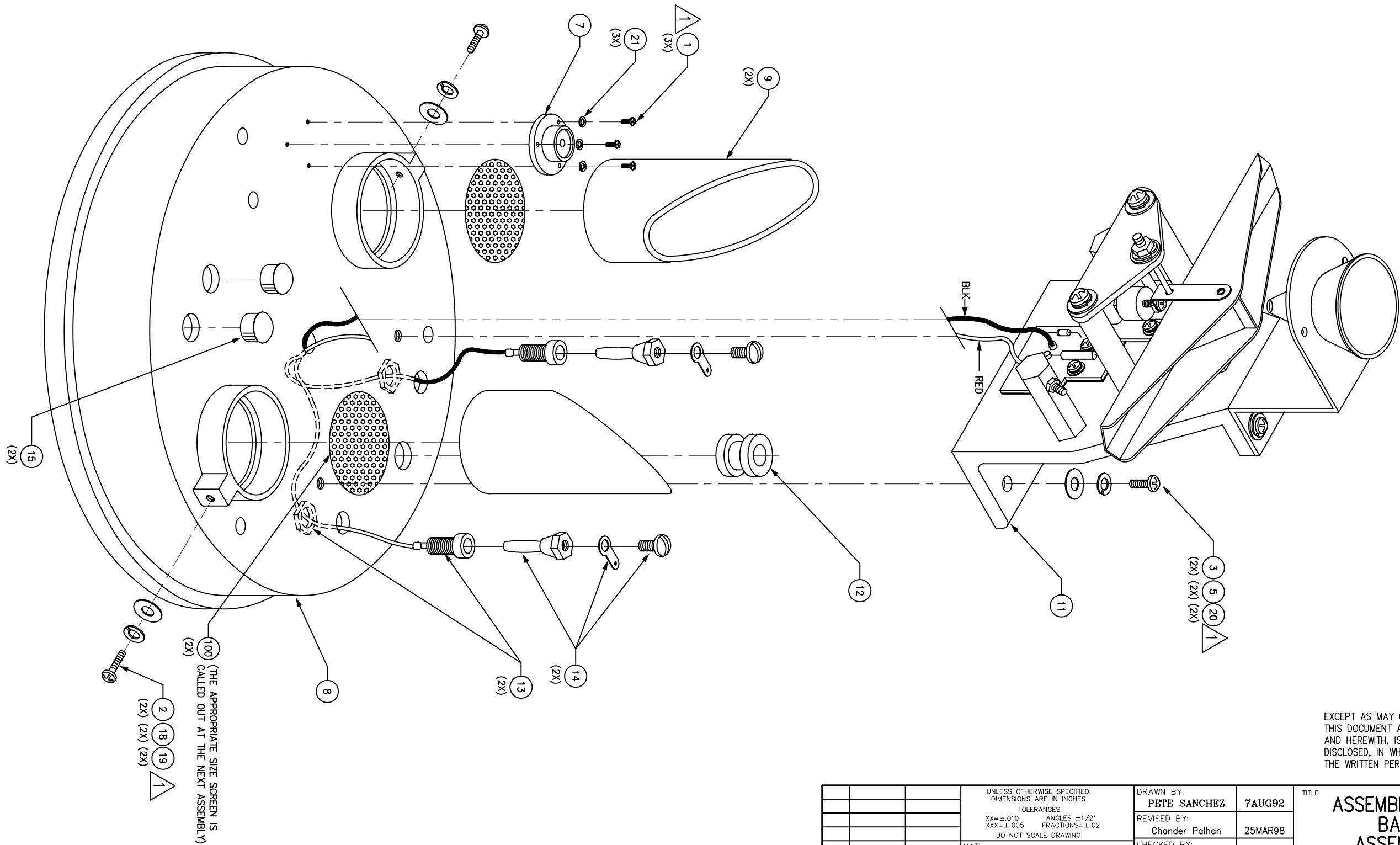
DETAIL 'H'
TOP VIEW




SECTION H-H

NOTES: UNLESS OTHERWISE SPECIFIED:
1 COAT SCREW THREADS WITH ANTI-SEIZE COMPOUND, LOCTITE SILVER GRADE ANTI-SEIZE OR EQUIV.

REVISIONS			DWG NO. M102690-003	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2826	INITIAL RELEASE	9/88	
B	3495	SEE ECN FOR HISTORY	2/90	RB
C	4133	CHANGE TO REFLECT AS BUILT	10/92	JMA
D	4771	ADD LOCK WASHERS		
E	5227	ITEM 100 WAS ITEM 10	1-26-05	J.CONNER
F	0938	ADDED NOTE 1	3-20-07	J.CONNER



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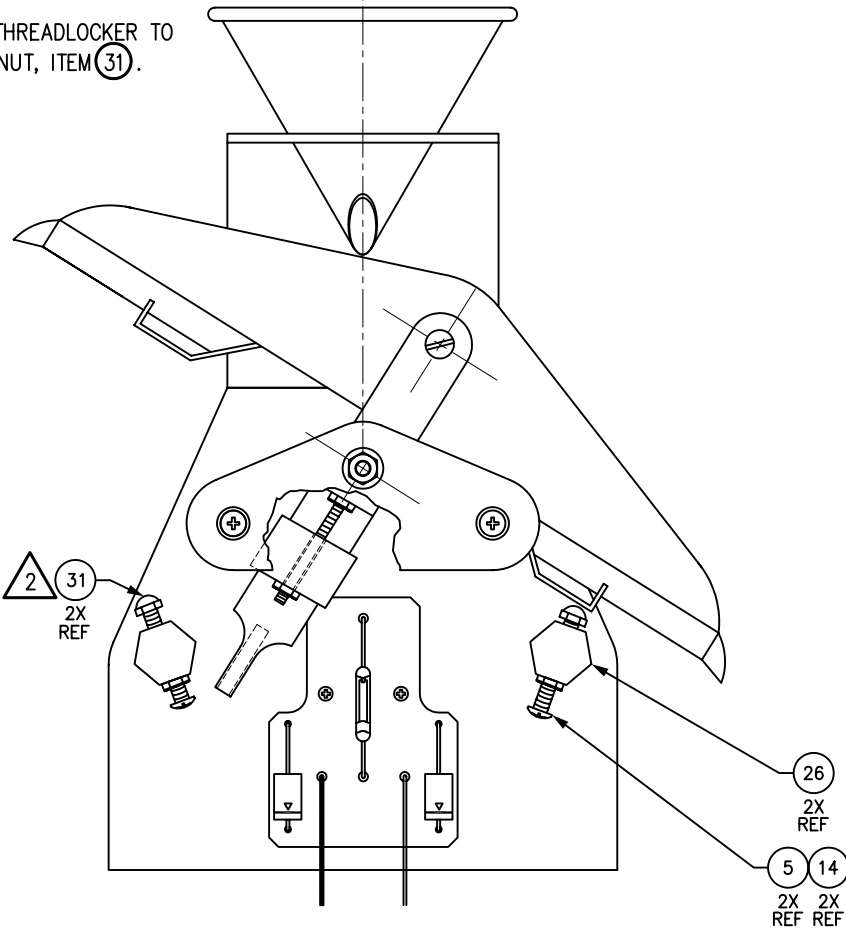
			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2' XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: PETE SANCHEZ	7AUG92	TITLE ASSEMBLY DWG, BASE ASSEMBLY, RAIN GAGE		 allweatherinc		
				REVISED BY: Chander Palhan	25MAR98					
				CHECKED BY:						
				DESIGN ENGINEER: J. CONNER	20CT92					
		MATL			PROGRAM MANAGER: JMA	100CT92	SIZE D		DWG NO. M102690-003	
		FINISH			APPROVALS	DATE	SCALE NONE		RELEASE DATE 10/16/92	SHEET 1 OF 1
		TREATMENT								
NEXT	NEXT ASSY	USED ON								
QTY REQD	APPLICATIONS									

NOTES: UNLESS OTHERWISE SPECIFIED;

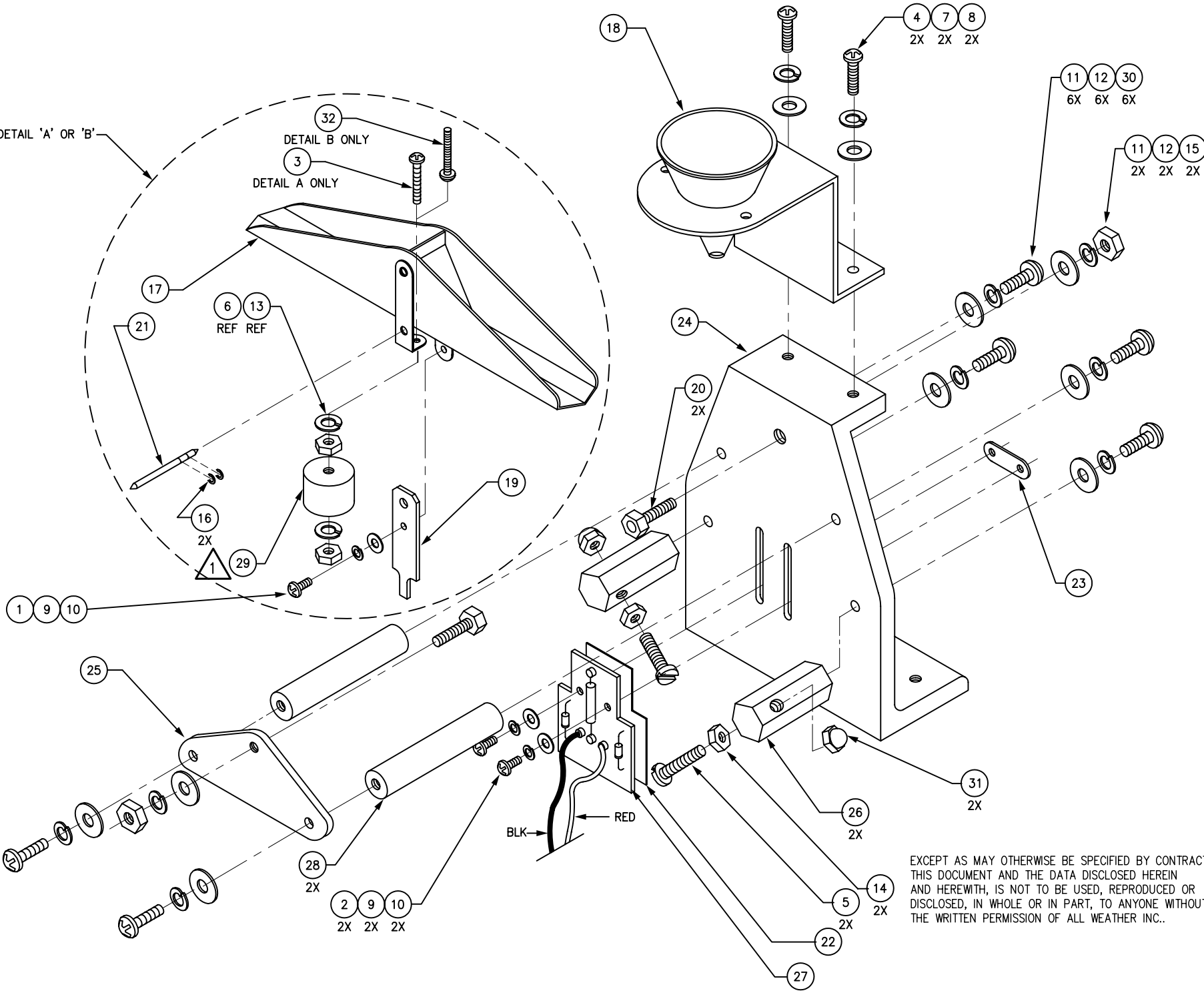
1 THE POSITION OF THE WEIGHT, ITEM 29, RELATIVE TO ITS LOCKING HARDWARE, ITEM 6 AND ITEM 13, DEPENDS ON THE TOP ASSEMBLY USAGE; SEE DETAIL 'A' AND 'B'.

2 APPLY LOCTITE 222 THREADLOCKER TO THREADS OF ACORN NUT, ITEM 31.

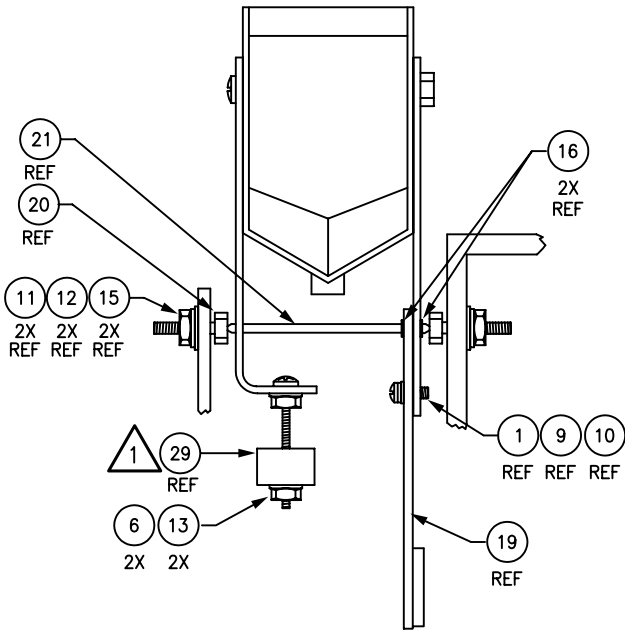
REVISIONS			DWG NO. M104705-003	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	4127	INITIAL RELEASE TO REPLACE M102520	10/92	JMA
B	4771	ADDED NOTE 1 AND DETAIL B	3/31/98	CSP
C	4795	ADDED ITEM-31 AND NOTE 2	7/22/98	CSP
D	4886	ADDED MODEL 6021-E TO DETAIL 'A'		
E	5155	REVISE DETAIL B COUNTER WEIGHT LOCATION	12-15-04	J.CONNER



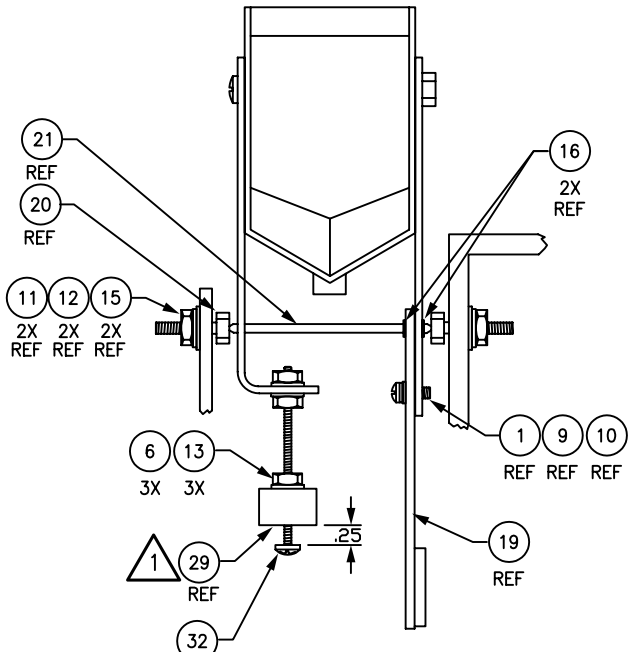
SEE DETAIL 'A' OR 'B'




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DETAIL 'A'
SIDE VIEW OF ASSEMBLED TIPPING BUCKET
FOR MODELS 6011-A,C AND 6021-A,C,E



DETAIL 'B'
SIDE VIEW OF ASSEMBLED TIPPING BUCKET
FOR MODELS 6011-B,D AND 6021-B,D

			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2' XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: PETE SANCHEZ	3AUG92	TITLE ASSEMBLY DWG, BRACKET ASSY, INNER FUNNEL			 allweatherinc		
				REVISED BY: P KOOYMAN	2/12/01						
				CHECKED BY:							
				DESIGN ENGINEER: J.CONNER	10/16/92						
			MATL SEE BILL OF MATERIALS			SIZE	DWG NO.	M104705-003			
			FINISH AS ISSUED			D					
			TREATMENT	PROJECT MANAGER: JMA	10/21/92						
NEXT	NEXT ASSY	USED ON		APPROVALS	DATE	SCALE	NONE	RELEASE DATE	10/21/92	SHEET	1 OF 1
QTY REQD	APPLICATIONS										



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Rev. M
ECO 1454
March, 2008