

IAS Alert II Sensor

Installation and Operation

Manual (IOM)

Version 1.03 (01-20-14)



Table of Contents

IAS Alert II™ Family of Products	2
I) General Overview	. 2
II) Installation and Mounting	. 3
III) Alert II™ Sensor Wiring	. 4
IV) Alert II [™] Sensor Mounting and Installation Guide	. 4
1) "Temperature" (TMP)	. 6
2) "Temperature and Relative Humidity" (TRH)	6
3) "Soil Moisture – Tension" (SMT)	6
4) "Soil Moisture – Volumetric Water Content" (SMD)	. 9
5) "Rain Gauge Bucket" (RGB)	. 9
6) "Wind Speed Anemometer" (WSA)	11
7) "Leaf Wetness Sensor" (LWS)	13
8) "Water Level Hydrostatic" (WLH)	13
9) "Solar Irradiation Sensor" (SIS)	14
10) "Pressure Transmitter Sensor" (PTS)	14
11) "Pressure Transmitter End-of-Line" (PTL)	15
12) "Flow Meter Totalize" (FMT)	15
13) "Dew Point Transmitter (DPT)	15
14) "Wind Direction Transmitter" (WDT)	15
15) "Water Analysis Sensor Family" (WA_)	16



IAS Alert II[™] Family of Products

Thank you for choosing our IAS Alert II[™] Family of products to help protect your highly valuable crop(s) from harmful environmental factors capable of measuring up to five (5) independent parameters. We hope that you will find our IAS products and services the simplest and most reliable wireless monitoring and alerting systems available.

This guide will explain how to connect the supplied sensors to our Alert II[™] Family of wireless alerting/monitoring communication base modules. Each smart sensor is labeled and can be plugged into any port on the AlertII base station using the RJ45 quick-disconnects. The system will ID the sensor type and will show appropriately in your HarvestWatch[™] password protected control page.

I) General Overview:

The IAS Alert II[™] Family of products is our newest generation of wireless cellular solar charged battery powered portable communication module with an internet based data logging software (HarvestWatch[™]) with integral GPS functionality. Our new battery solution allows you to collect valuable data year round not just during the growing season. It is available with either the CDMA or GSM cellular system modems giving you the ability to install the Alert II[™] almost anywhere, world wide. The Alert II[™] family can monitor: Temperature, Humidity (Rh and Dew Point), Soil Moisture (tension & EC), Rain Fall, Wind Speed, Leaf Wetness, Water Level, Solar Irradiation, Line Water Pressure, End-of-Line Water Pressure, Water Flow, along with water quality sensors as standard. The IAS Alert II[™] is customizable and can be supplied with almost any sensor you want. We are not a sensor manufacture, please contact us with the field measurement you want and we can assist with the product selection. The IAS Alert II[™] is not a control system, it is a monitoring and alerting system which alerts you via; a Text Message, Email and/or Voice Message when your programmed set point is exceeded. It logs all measured data providing you the information you need to properly protect and manage your crop.

The set up programming and alarm set points you configure on your HarvestWatchTM website "Farm User" and "Define Alert" pages. The logged information can be read on-line from any device in the world with an internet connection (smart phone, tablet, laptop, PC, etc.). All sensor data can be exported via CSV files into spread sheet programs such as "MS Excel" for the specified date range.

• Easy to set up and use – the units are shipped activated and all you have to do is: A) Remove the (4) cover attachment screws, remove the cover and attach the loose power wire to the free battery terminal lug if the unit was shipped via the mail, or delivered in the off season, and B) Plug in the purchased smart sensors via the quick-disconnect wiring connections. Make sure you tighten up the cable gland nut to seal the RJ45 plug in connector from the elements.

• Place the system in direct sunlight (facing south) for 2 days to fully charge the internal sealed batteries and the system will be transmitting the information immediately.



- Set and send alerts for multiple sensor thresholds providing and easy and meaningful way to implement an escalation strategy based on the severity of the conditions.
- Send multiple email and text messages for each threshold and notification type lets those who are most affected by potential problems know when issues arise and when they are resolved.
- ♦ 24/7 Data logging all year long with cellular connection.
- ◆ Each labeled sensor incorporates an RJ45 weather proof quick-disconnect fitting which is easily attached to any of the ports on the Alert II[™] base module.
- ♦ With the integral GPS functionality, you can easily use the Alert II[™] to "profile" or "scout" your growing area. Assisting in identifying your cold, wet, and dry spots allowing you to; provide frost protection, when to apply fungicides and when to irrigate before your plants become stressed.

FOR DETAILED IAS Alert II[™] FAMILY PRODUCT SET UP REFER TO THE WEB IOM

II) IAS Alert II[™] Installation and Mounting

- -The IAS Alert II[™] base module is a two component system. The base module and solar panel come with corrosion resistant Aluminum mounting brackets and stainless and treated steel hardware.
- -The brackets are designed to be connected together using the included hardware so they are facing in the same direction.
- The Cell and GPS antennas are mounted inside the base module and it should be placed so no obstructions are above it.
- We recommend the Alert II[™] base module and solar panel be mounted to a secure 4"x4" pressure treated post, 2" pipe or similar and located off the ground to allow for accessibility and away from any curious critters. The assembly should be facing due South to expose the solar panel to direct sun with no shading.



Figure 1



- The IAS Alert II[™] can be mounted using treated steel 2" pipe mounting "U" bolts/brackets which will allows you to easily mount to a 2" schedule 40 pipe post (by others) see figures 2 and 3.
- If you have selected the wind anemometer sensor [WSA] you have to insure the ½" aluminum mounting post (by others) is vertical, otherwise the wind speed measurement won't be accurate.
- -If you have selected the rain gauge/tipping bucket [RGB] you have to make sure it is mounted level. It should be mounted to a wind resistant support with no obstructions above or near it that could alter free falling rain from entering the collection bucket.





Figure 3



The Alert II[™] and its sensors are designed to be mounted in the weather but should be mounted outside of the direct water spray created by the irrigation system. It should also be mounted outside of the direct path of treatment chemicals, and/or located below the boom. It may be necessary to clean the solar panel occasionally and it should not be shaded by plant growth.

III) Alert II[™] Sensor Wiring

The Alert IITM is activated prior to shipment and uses a *true plug and play* sensor/base module wiring method. Our IAS Smart sensors allow you to plug any sensor into any port which will be recognized automatically.

Loosen the cable gland (figure 4a and b) so it easily slides on the sensor cable to expose the RJ45 sensor wiring plug. Simply plug it into any Alert II[™] base module sensor port as shown in "Figure 5". Make sure the RJ45 plugs retention clip clicks into place. Now push up the weather tight fitting and carefully align the threads and screw it into place; hand-tighten only. Now tighten the cable gland to create a weather tight seal around the sensor cable; hand-tighten only. To remove reverse this procedure.





Figure 4a



Figure 4b



IAS Alert II[™] Base Module and Sensor Labels

Sensor	Sensor Part Number
Temperature	AFII-TMP-20
Temperature and Relative Humidity	AFII-TRH-20
Soil Moisture - Tension	AFII-SMT-20
Soil Moisture – Decagon GS3	AFII-SMD-20
Rain Gauge Bucket	AFII-RGB-60
Wind Speed Anemometer	AFII-WSA-20
Leaf Wetness Sensor	AFII-LWS-20
Water Level – Hydrostatic (11.5' range)	AFII-WLH-5-40
Solar Irradiation Sensor	AFII-SIS-20
Pressure Transmitter Sensor	AFII-PTS-100-20
Pressure Transmitter End-of-Line	AFII-PTL-100
Flow Meter Totalizer	AFII-FMT-20
Dew Point Transmitter	AFII-DPT-20
Wind Direction Transmitter	AFII-WDT-20

Table 1



** If you are not using all four (4) ports please make sure the cable gland plugs we supplied with your system located in the glands are snug to create a weather tight seal. Confirm Alert II[™] base station sensor wiring port(s) and the cable gland(s) are tightened up to prevent moisture from entering the RJ45 connector.

IV) IAS Alert II[™] Sensor Mounting and Installation Guide

1) "*Temperature*" (TMP) Sensor should be placed depending on the measurement desired (ie: air – below and above canopy, soil, water, etc.). If you are measuring the air temperature please mount it to insure the sensor is not touching any surface. If you are measuring the air temperature above the canopy you should use our optional sun shield accessory to minimize the solar radiation influences.



2) "*Temperature and Relative Humidity*" (TRH) Sensor is a dual sensor supplied mounted in a protective PVC weather cap isolating it from solar radiation and rain. Use its integral mounting bracket with a 2" "U" bolt to the 2" schedule 40 mounting pipe (by others) or remove the "U" bolt and screw it into the 4'x4" PT post (by others).



3) "Soil Moisture – Tension" (SMT) is an Irrometer Tensiometer:

The *Soil Moisture- Tension Sensor* directly measures the soil water tension (or matric potential) in "Centibars" indicating the physical forces at work which have to be overcome for the plant to move water into its root system. The soil water tension is the energy (vacuum) applied to the soil by the plant as it draws in water for nutrition. The Tensiometer acts as a dummy root,

1 Main St, Box 10, Bldg 13 Suite 1-2

Whitinsville, MA 01588

(800) 549-4551



allowing the soil moisture to interact with the instrument through the porous ceramic tip. Soil water tension outside of the instrument tries to remove the water from it, which creates a measurable tension inside the column. This tension is read with either a mechanical gauge or a transducer attached to the instrument. While this is the most accurate and proven method available, there is some maintenance required periodically to keep them full of water, and they must be removed from the field during the winter months to avoid freezing.



Figure 8

Tensiometer Specifications:

- Butyrate Body, 1/2" diameter ceramic tip, neoprene stopper, ABS weatherproof transmitter enclosure
- 6" sensor standard (other depths available up to 60" dictated by irrigation method and root depth)
- Replaceable threaded White Ceramic tip with O-ring seal
- Factory calibrated, no field calibration required
- Integral refillable reservoir sufficient for several irrigation cycles
- 4-20mA 12-24VDC loop powered transducer
- Calibrated Range 0 93 kPa (Centibars)
- 32°- 150°F operating temperature range
- -Includes IAS Alert II[™] Family cable with
- RJ45 quick connect jack total length 20' (up to 100' cable lengths available)

Use the following readings as a general guideline:

- 0-10 Centibars = Saturated soil
- **10-30 Centibars** = Soil is adequately wet (except coarse sands, which are beginning to lose water)
 - 30-60 Centibars = Usual range for irrigation (most soils)
 - 60-100 Centibars = Usual range for irrigation in heavy clay
- **100-200 Centibars** = Soil is becoming dangerously dry for maximum production. Proceed with caution!

	Morning tension	Midday tension	Water table level	Table 2
	cbars		in below	
Too wet	0 to 2	0 to 2	0 to 6	
Adequate	>2 to 5	>2 to 10	>6 to 18	
Too dry	>5 to 80	>10 to 80	>18	

Table 1. Critical levels of tension for irrigation scheduling on cranberry beds

"A tensiometer reading in the 2 to 6 cbar range should be expected as long as the water table is between 8-18 inches" The chart above shows possible adequate ranges which may vary with your bog/marsh design and soil types.

[per the UMass Cranberry Chart Book 2011]



"Perhaps the most important soil moisture reading is the difference between today's reading and that of 3-5 days ago. That is to say, how quickly is the reading going up? A slow increase means the soil is drying out slowly. But a big jump means the soil is losing water very rapidly. By analyzing such trends in the readings, you will determine WHEN to irrigate. A graph of readings over time makes it easier to see the trends, thereby making interpretation simpler. Your own situation may be unique because of differences in crop, soils and climate. You can use the logged data shown on the website to generate a report with a graph that you can use to interpret historical information which will allow you to more accurately irrigate your crop."

Location/Operation:

The sensor location is dependent on many factors: how you will be using the measured data, soil type, the heterogeneity within the soil, drainage, the type, coverage and orientation of your sprinkler system, the geometry of your growing area, the bog/marsh dyke configuration, capillary rise/water table level, bed contour, etc. As with the placement of the temperature sensors needing to be at the coldest part of the bog/marsh to provide the earliest warning for frost protection you want to locate the soil moisture sensor where it will give you a repeatable indication of soil moisture you can use to control the irrigation system to prevent plant stress. See the following guide:

"Monitor soil moisture in the appropriate area of the bed. "Perhaps the most important soil moisture reading is the difference between today's reading and that of 3 – 5 days ago. That is to say, how quickly is the reading going up? A slow increase means the soil is drying out slowly. But a big jump means the soil is losing water very rapidly. By analyzing such trends in the readings, you will determine WHEN to irrigate. A graph of readings over time makes it easier to see the trends, thereby making interpretation simpler. Your own situation may be unique because of differences in crop, soils and climate. You can use the logged data shown on the website to generate a report

Installation/Care:



Whitinsville, MA 01588

(800) 549-4551





4) "Soil Moisture – Volumetric Water Content" (SMD) is a Decagon GS3 sensor to measure water content, electrical conductivity and soil temperature primarily for the Greenhouse market. See specific IOM for detailed installation requirements and operational details.



5) "Rain Gauge Bucket" (RGB) is an accurate self-emptying rain gauge tipping bucket.

Description:

This self-emptying, tipping bucket style rain collector utilizes an 8" diameter opening to meet NWS specifications for statistical accuracy. Rainfall is gathered in the collecting bucket and funnels through a small opening into a tipping mechanism. When the mechanism has 1/100th of an inch of water in it, it tips. A count is then transmitted to an indicator and the water empties from the tipping mechanism, through the bottom of the collector bucket to the outside. Requires no manual emptying.

1 Main St, Box 10, Bldg 13 Suite 1-2 Whitinsville, MA 01588 (800) 549-4551



Location:

The rain collector must be mounted on a stable level surface with as much unobstructed exposure to the sky as possible. Depending on your locale *you may have to periodically remove leaves and other debris that falls into the collector*, keeping the collector near the ground makes this task much easier. The final factor is exposure to the wind, the less wind the better. However, this factor does not appear to have a large impact on accuracy.

Installation:

Mount on a level flat surface that is resistant to moisture. It has to allow the tipped rain to drain through the drainage ports on the perimeter of the base.

Specifications:

Rainfall sensor tipping bucket, self-emptying rain collector. Sends a pulse per tip $(1/100^{\text{th}})$.

- 8" diameter opening meets NWS specifications for size and accuracy.
- Range: 0 to 99.99 inches of rain
- Accuracy: +/- 0.01 inches/inch of rain
- Dimensions: 8.63" OD x 7.88" deep
- Pre-wired with 50' of 22AWG, 2 wire, UV protected cable.
- Weight: 1.77 lbs





Select a level surface in an open area above ground to mount the collector. Some examples would be a deck or tree stump. 2 Rotate the collector to remove the cover from the base. Taped to the base you will find the necessary mounting screws to secure the base to your chosen mounting surface.

Whitinsville, MA 01588





6) *"Wind Speed Anemometer"* (WSA) is an AC Voltage generating, polycarbonate, 3-Cup anemometer producing linear frequency output. Maximum 3-cup anemometers have proven themselves in wind tunnel tests, mountain-top tests and in hundreds of thousands of household and institutional installations, to be rugged, reliable and accurate.

Location:

Ideally wind sensors should be mounted 30' higher than any object within 100 yards of the site. However, it is almost never practical to mount them like this. So as a minimum you should mount them 8 to 10 feet above the highest point of your building roof or plant canopy. It is usually easiest to use a TV antenna mast system for the installation using a $\frac{1}{2}$ " diameter (OD) plastic or aluminum rigid pipe.

For field mounted installations locate the sensor as high as practical farthest away from any obstructions such as field wind breaks.

Specifications:

- AC Voltage generating, polycarbonate, 3-Cup anemometer that is calibrated to a master to be interchangeable.

- Utilizing a single coil (approx. 2.02 VAC at 60 cycles), the #400 is a frequency counting sensor that is suitable for applications where voltage output is not important.

Wind speed measurement range: 0-100mph Accuracy: +/- 3% of full scale & mid scale Swept Diameter: 7.5" Diameter Housing: 2.0" Overall Height: 3.2" Weight: 3.1 oz







Installation:

A ¹/₂" OD rigid plastic or aluminum pipe can be inserted into the mounting socket. Drill a hole the same size or slightly larger than cotter pin hole included to allow the holes to line up. Use the cotter pin included to secure the stationary part of the wind speed sensor to the vertical pipe/mast. Level the sensor using necessary adjustment of the mounting post to insure long bearing life and wind speed measurement accuracy.

Use pipe clamps or band clamps to support pipe/mast onto a secure 4" x 4" post or 2" (sch 40) galvanized pipe post which can maintain a level and rigid mount. Locate it in an area free from nearby obstructions (wind breaks) that will affect the wind speed measurement. After installation make sure the protective boot is in place and protecting the wiring from the weather.







7) "Leaf Wetness Sensor" (LWS) is an innovative easy to use Dielectric Leaf Wetness Sensor which determines the presence and duration of wetness on a leaf's surface, enabling the grower to forecast disease and to protect plant canopies. "It approximates the thermal mass and radiative properties of leaves to closely mimic the wetness state of a real leaf." This data can be used to assist in determining when fungicide applications should occur minimizing rot which should lead to increased yield.

Leaf Wetness Sensor Specifications

- Output:: 250 to 1500 mV
- Operating Environment: -10°C to 60°C
- Probe Dimensions: 11.2cm x 5.8cm x 0.075cm

Applications:

- Disease forecasting and modeling
- Ecological and Agricultural Research
- Modeling for blight
- No user manipulation or painting required
- High resolution detects trace amounts of water or ice on the sensor surface
- No calibration necessary; factory calibration set at standard wetness threshold
- Expected Lifetime 2+ years continuous use
- Low power requirements enable long term leaf wetness monitoring Benefits
- 8) *"Water Level Hydrostatic"* (WLH) is a hydrostatic submersible water level transmitter. It measure the hydrostatic pressure on exerted on the sensor and transmits this analog signal which is converted to a level measurement in feet.



Specifications:

Wetted materials: 316Lss, Buna-N, PVC and Polyurethane cable Accuracy: +/- 0.4% of full scale (0-11.5' or 0-23') Compensated Temp Range: 0 – 140F Cable Length: 40' (custom lengths over 100' available) Lighting and surge protection: Included Mounting connection: ½" MNPT Mounting orientation: vertical, suspended from above





Installation:

The "WLH" needs to be mounted in some form of stilling-well, typically 1.5" in diameter PVC pipe or larger. A number of holes need to be drilled in the pipe or use perforated pipe. The stilling-well prevents movement of the sensor making sure its elevation doesn't change effecting the measurement. The end and the holes should be covered with a porous cloth such as landscape fabric and can be attached using "zip-ties" especially if you are using the sensor to measure water table level in soil. This prevents mud/silt from plugging the sensor tip access holes. You need to create a hole and then make sure the fabric is not dislodged when placing the covered stilling well in the hole. It also creates a fixed stopping point for the sensor you can use to verify its zero point.

Once you install the stilling-well you gently lower the sensor into it until it contacts the fabric at the end of the stilling-well, this is your zero point. The water proof cable has a small breather tube incorporated into it which can not be crimped. Coil the extra cable carefully making sure it does not crimp (maintain a bend radius of 8" min) and make sure you mount the cable preventing abrasion against the edges of the stilling-well.

- **9)** "*Solar Irradiation Sensor*" (SIS) is a fully potted weatherproof self-cleaning pyrometer accurately measuring the suns intensity at your location in W/m² which you can use with wind speed, temperature and humidity if you wish to monitor evapotranspiration. This sensor is easily mounted to a flat level rigid surface.
- **10)** "*Pressure Transmitter Sensor*" (**PTS**) is a heavy duty highly stable corrosion resistant stainless steel water pressure transmitter. Designed to mount (by others) on the discharge line of the irrigation pump. It has a 1000g shock rating which helps it handle most water hammer, but it is recommended a pressure snubber be used to further protect the sensor from pressure shocks. It should be mounted 10 pipe diameters downstream perpendicular to the flow. The pump should be designed and operated to prevent cavitation through its operational range.



Specifications:

Range: 0-100psig (other ranges available) Accuracy: +/- 0.4% of full scale Overpressure: up to 600% Temperature Range: -20 to 160F Mounting Connection: ¼" FNPT RFI Protection: IEC 801/BS EN 50081-1992 Voltage Surge Protection: up to 600V spike IEC60-2 Vented cell: for measurement < 1000psi Electrical Rating: UL for Class I, Div 2 Groups A-D



- **11)** "*Pressure Transmitter End-of-Line*" (**PTL**) is a heavy duty highly stable corrosion resistant stainless steel water pressure transmitter to be mounted on the end-of-line of typically the furthers irrigation pipe leg (by others). This measurement allows the grower to confirm water is reaching the end of his irrigation system and the value can be used to also confirm if all heads are operating properly. It has a 1000g shock rating which helps it handle most water hammer, but it is recommended a pressure snubber be used to further protect the sensor from pressure shocks. See picture and specs above (Sensor 10).
- 12) "*Flow Meter Totalize*" (FMT) is an inline sensor measuring instantaneous flow rate, located downstream of the pump, requiring 10 diameters of straight run upstream and 5 diameters downstream (from 90degree elbow). The actual sensor will be determined by the line size and the growers preference. We recommend a full bore obstructionless magnetic flow meter technology be used. It has no moving parts, and has negligible pressure drop. Inline Turbine meters are typically the next choice. Insertion Turbine meters and Clamp On Ultrasonic meters are also available, let us know your preference or if you have an existing flow meter we need to integrate.
- **13)** *"Dew Point Transmitter* (DPT) is an accurate field mounted temperature compensated dew point sensor mounted inside radiation shield, a post mounted (by others). This measurement when used with the air temperature is the best way to forecast the potential for a frost and other weather events.
- **14)** *"Wind Direction Transmitter"* (WDT) is a standard 8 position (N, NE, E, SE, S, SW, W, NW) wind direction sensor with black plastic 7.5" wind vane, ½" rigid plastic or aluminum pipe/post mounting by others. See Wind Speed sensor (#6) for more detailed mounting recommendations.





15) "Water Analysis Sensor Family" Specific installation and operation manuals will be provided depending on the smart sensor type selected. Almost any measurement can be made our standard sensors are: pH, Turbidity, DO, Nitrate, Specific Conductivity, and Salinity, let us know what you need.

Appendix:

I)

	lectrical damage can be caused by many different factors. Below are some of the more common causes and
	ome suggested methods of minimizing potential problems.
4.	ommon Causes: Storm Activity – lightening in your area can do damage to your instruments in different ways. The obvious way is due to a direct or nearby strike. In addition, lightening storms, dust storms, dry snowstorms and strong dry winds can all cause static electricity to build up on and around your external sensors. Regardless of the cause this built up electricity can discharge itself through the cable connecting the external sensors to the instrument.
•	Power Surges – A surge may come from the electric company's switching generators or power grids, from local industries or after power interruption when accumulated power suddenly surges back through AC lines. Even the on-and-off switching of large electrical appliances, such as refrigerators or clothes dryers can create damaging fluctuations. This is especially true with sensitive weather recording devices.
•	Yourself – Are you constantly giving and/or receiving a shock every time you touch a doorknob or another person? If so you have a great deal of static electricity in your environment. Depending on where you live, static electricity may be a year round problem or only a seasonal problem. In either case, it is possible for a person to carry enough of a charge to damage an instrument.
. 5	Incommended Prevention: Ground Your Mounting Mast – IMPORTANT: PVC and fiberglass are not recommended mast materials as they can store high amounts of static electricity within themselves. It is recommended that you follow the grounding instructions that came with your mounting mast, while also maintaining accordance to your local Electric Code. In the absence of instructions for your mast system, the following generic guidelines from the Bational Electric Code may be helpful.
1) The NEC requires that the antenna mast and mount be grounded directly. No splices or connections are allowed in the result and mount and the ground and the second and
2	Attach one end of a No. 8 (or thicker) copper or aluminum ground wire to the antenna mast. Note: As static electricity issues are more common for weather sensors than direct lightening strikes, consider installing the ground wire as physically close to the wind sensors as possible to best combat static electricity issues. For
1	multi-piece (or telescoping) masts, consider connecting the ground to each separate section of the mast.
1	will ensure a good, solid connection. (Once the ground is attached to the mast, any scraped off portion that is exposed should be recoated with paint or other sealant.)
4	Next, run the ground wire to ground as directly as possible. Standard wire stagles can be used to secure the ground wire against the side of the house. Avoid making 90° or sharper turns with the ground wire. A lightning charge has difficulty making such a turn and therefore may discharge into the house. Make ground wire bends as smooth and as credual as possible.
5	The ground wire must be connected to a ground rod. Water pipes or plumbing fixtures are not acceptable. A good copper-coated steel ground rod driven at least 3 feet into the ground is required. Special clamps that provide a solid connection between the ground wire and ground rod should be used.
•	Use Surge Protectors – For the AC adapter, a UI, 1449 rated surge protector with EMI/RFI filtering is recommended. This rating will be clearly listed on the packaging of any good quality surge protector.
	Discharge Yourself – If the instruments are located in an environment where static electricity is a problem, make sure that you discharge yourself before touching the instrument(s). The shock that you get from touching a doorknot or another person can often be sufficient to damage an instrument.



II)

Lightning Static Tips for Commercial Masts

Introduction

Lightning storms, dust storms, dry snowstorms and, strong dry winds can all cause static electricity to build up on a mast structure. If this static electricity discharges through a weather instrument, it can cause the instrument to latch-up or fail.

Prevention Tips

• **Ground your mounting mast**. It is best to follow the grounding instructions that came with your mounting mast. The grounding of masts is required by most local building codes (ask your local building department about local regulations). Generally, the National Electric Code produced by the National Fire Protection Association is used by most localities.

If you do not have instructions for the mast system that you purchased, the following generic instructions may be helpful:

- Connect an 8AWG (American Wire Gauge) or larger bare metal wire to the metal of the mast so that it makes a good electrical connection
- Run the wire from the mast to the ground using the shortest possible route.
- At the ground, connect the 8AWG wire to an eight-foot long ground rod that has been driven into the earth.