Dynamax

MICRO 2

Weather Station

User Manual

Dynamax

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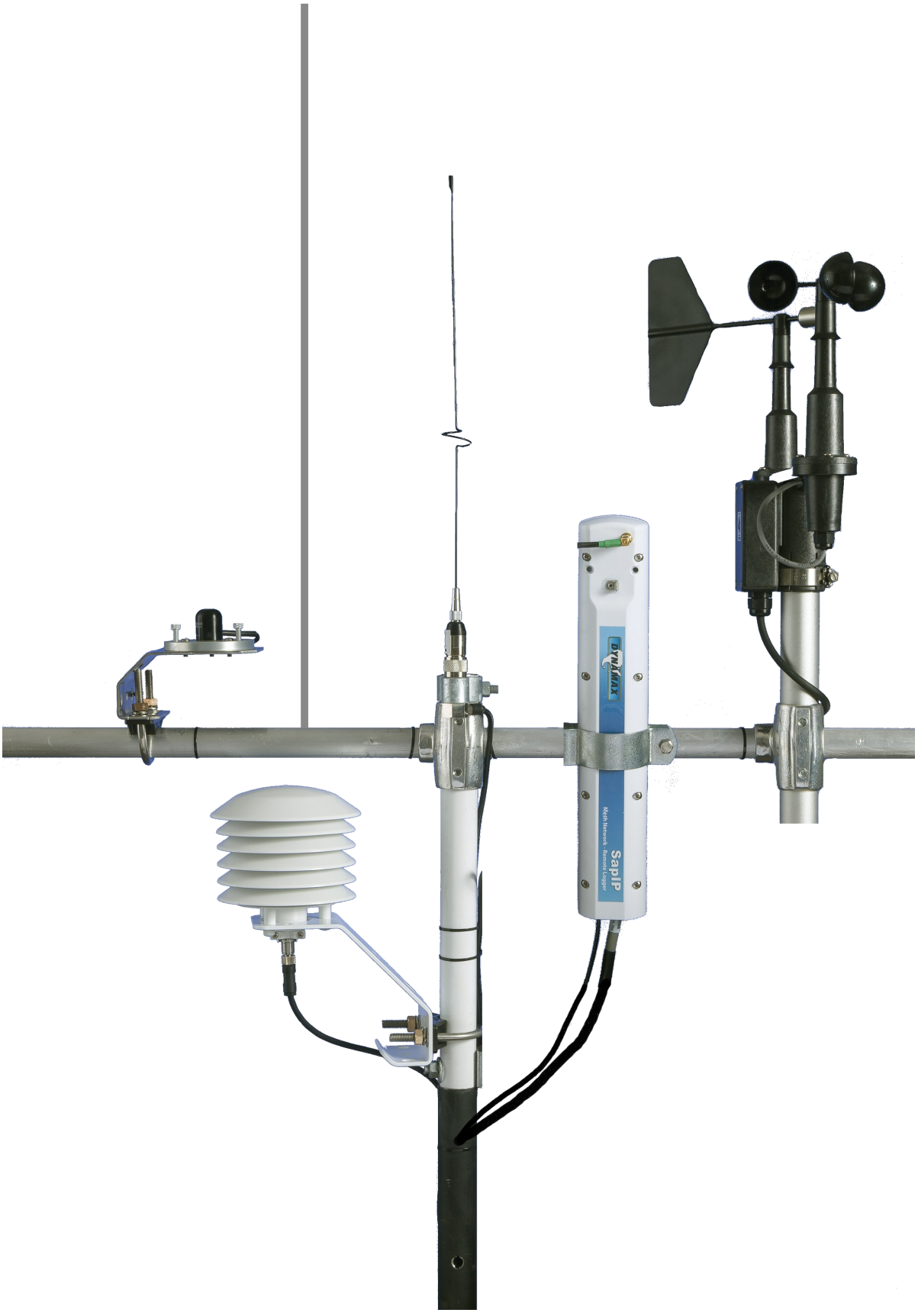

DYNAMAX
SapIP

Single Pole Installation:

The sensor default height is 6 ft or 2m above the ground surface. If you wish to add height to 3m or more, an optional tripod or mast mounting system is required for stability in the field.

The following parts are supplied as part of the field installation kit.

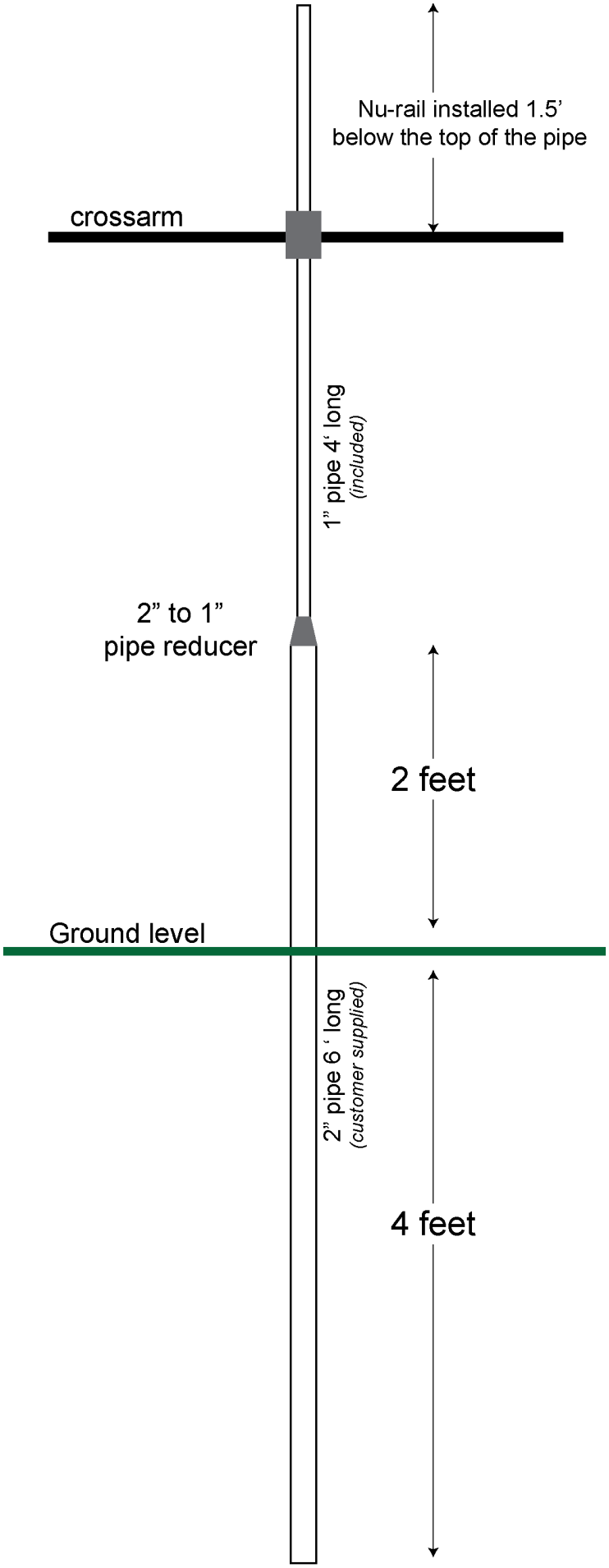
- 1" steel pipe, 4' long
- ¾" aluminum pipe, 3' long cross arm
- Nu-rails (qty 2)
- Lightning Rod with Clamp
- Grounding Rod with Clamp
- 10', 12AWG wire ground wire
- Cable ties

In addition the user must supply the following materials:

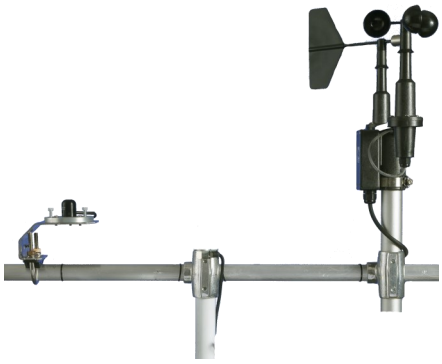
- 2" metal pipe, 6' long, threaded on one end for 2 in pipe thread
- Concrete (quick set) mix to secure the vertical pipe, and fill a 4 ft hole (1-2 bags). 2-4 gals water as recommended by concrete mix
- Wooden stakes, and tape to position and hold pipe while setting concrete
- Tools listed in the previous sections
- Pipe for rain bucket mount (see separate instructions for more details)

- Select site for installing weather station. The site should be away from obstructions and sprinklers. A flat ground is recommended for installation, even though the unit can be installed in many different terrains with some professional help
- Prepare an area of 10' diameter for installing mounting pole with little disturbance to the ground surface or vegetation
- Dig a posthole of 6 - 8 in diameter and 4 ft deep with a shovel or with a posthole digger. Mix two bags of quick set concrete mix and pour into the hole. Insert the 2" pipe in the pit and fix the pole position vertically with wooden stakes and tape
- The 2" pipe should extend only two feet above the ground surface
- You may also tap the pole into the bottom of the hole with a hammer as long as the threads are protected. Then pile rocks or bricks around the pole to hold the position vertical. Check the vertical pole with a level to make sure it is vertical before leaving for the day. Wait for about 24 hours while the concrete sets.
- Apply pipe dope or Teflon tape to threads on the threaded pipes. To prevent cross threading, hand thread the bell reducer and then tighten with a pipe wrench. Then hand thread the 4 ft X1" pipe mast into the threaded reducer and then tighten with a pipe wrench
- Install Nu-rail (3/4 X 1") on the end of 4'X1" diameter pipe, both supplied with the weather station. Adjust the Nu Rail to 1 ft 5 in below the top of the mast, so the cross arm will point roughly east and west. Tighten the setscrews
- Insert cross arm in the horizontal bore of Nu-rail (3/4'). Center the cross arm, and tighten using set screws

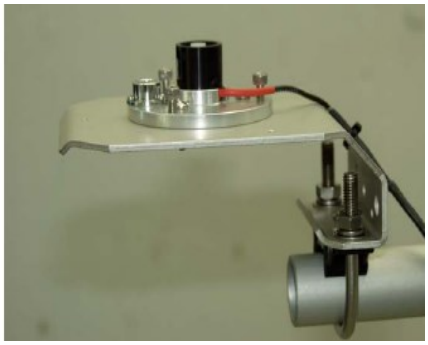
See diagram on following page.

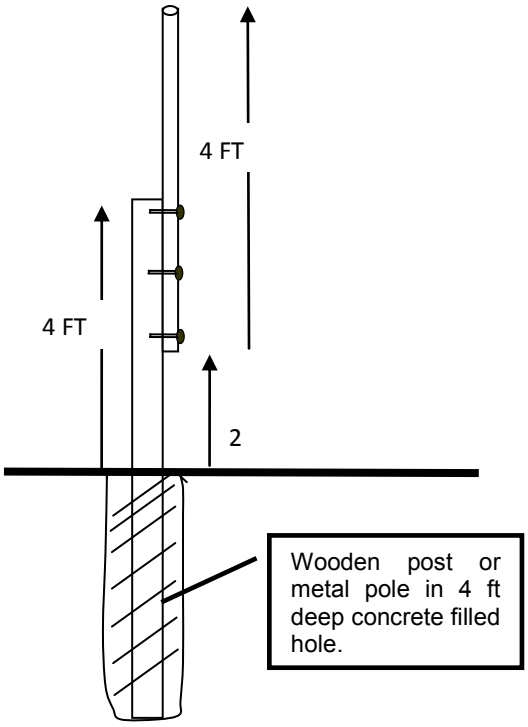

Nu-rail installed 1.5’
below the top of the pipe
crossarm
1” pipe 4‘ long
(included)
2” to 1”
pipe reducer
2 feet
Ground level
2” pipe 6 ‘ long
(customer supplied)
4 feet

- Install the second Nu-rail (3/4 X ¾) with the short ¾ " vertical mounting pipe on one end of the cross arm
- Now install wind speed & direction set on vertical mounting pip you just installed



- Install Pyranometer leveling base (CM225) on the other end of the cross arm as shown in the picture using U-bolts and nuts supplied



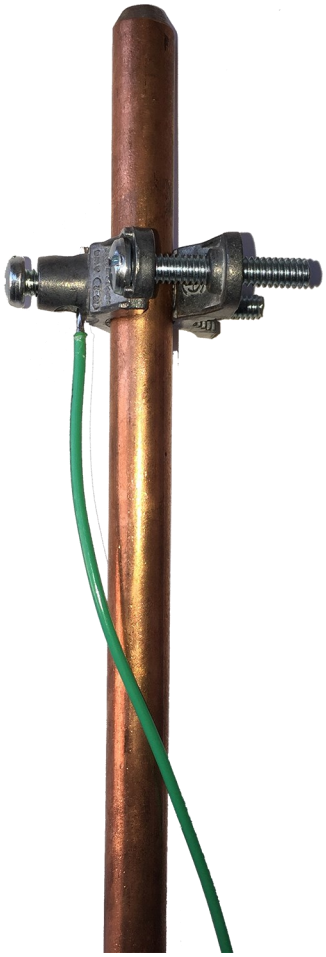


POST ALTERNATIVE:

Alternative mounting without a 2" diameter -mounting pole is possible for a permanent position. Dig a posthole and mount a base pole or post that is made from an 8 ft long pipe with at least 2 in inside diameter or a wooden post with 4" or greater size O.D. Then drill three holes in the lower ½ of the 1" pipe (supplied as the mast) along the same line in the center. With mounting bolts, you then attach the mast to the post or pipe, and align the assembly vertically. Then pour the concrete and fix the position until the concrete has set.

If the post is wooden, a grounding wire should be run from the metal pipe to the copper grounding rod.

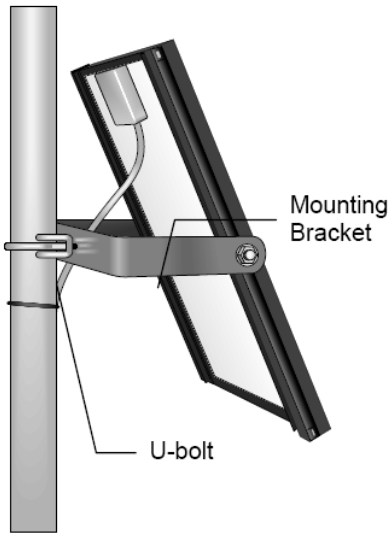
- Install pyranometer sensor on the leveling plate and secure with bottom screw.
- Install pyranometer leveling plate on top of the mounting bracket, leave the inner screws loose for now.
- Install leveling assembly and bracket onto the cross arm. The u-bolts can be tightened after you level the plate roughly. Now adjust the Allen (hex) set screws to level the bubble in the leveling plate, then tighten the inner fixing screws with a screwdriver.
- Install lightning rod (if applicable) on the pole mast.
- Rotate the threads and make sure the reducer coupling is holding both 2” and 1” pipes firmly.
- **Lightning Rod:** Position the lightning rod 4” down from the top of the mast, attach lightning rod to the mast and make sure the lightning rod set screw is tight.
- **4’ Grounding Rod:** Slide the clamp down the ground rod before driving it in the ground. Drive Ground rod close to the mounting pole using a fence post driver or sledgehammer. In hard soils use water to prime the soil and hole to make driving the rod easier.



Loosen bolt that attached clamp to the ground rod. Draw Ground wire (Green) from the Microclimate enclosure and insert it between the rod and the clamp. Tighten the clamp bolt.

Solar Panel Installation

A 15’ cable is attached to the solar panel and the other end of the cable must be connected to the pigtail hanging from the MicroClimate cable gland labeled “Solar Panel”. Mount solar panel to the mast, facing south (in northern hemisphere) Position solar panel mounting at the top of the 1 ¼” diameter section of the mast. Install U-bolt muffler clamp and nuts. Solar panel should be oriented to receive maximum insolation over the course of the year. Below table lists tilt angles at various latitudes. Once the tilt angle is determined, loosed two bolts that attach mounting bracket to the panel. Adjust the angle and finally tighten the bolts as shown below.



(For MSX10, MSX20 Setup)

(For MSX5 Setup)

Install MicroClimate Enclosure

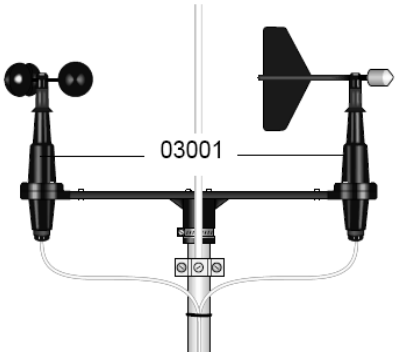
MicroClimate weather station enclosure contains data logger, and other storage or communication peripherals if any. Digimesh Network Node Module is assembled inside the enclosure with surge protector outside. Sensor cables, Power cables, Communication cables connected to the data logger or any peripherals routed out of the enclosure through one cable gland marked outside on the cable itself. So it is not necessary for an end-user to make any wiring inside the enclosure. All the connectors are accessible out of the box. Position enclosure on the north side of the mast or tower (northern hemisphere). Secure enclosure as shown in the figure using mounting brackets. Route the 12AWG wire from the Ground Lug on the enclosure to the tripod-grounding clamp. Tighten the screws. Grounding is critical not only for the accuracy of data/ reduce signal noise but also to protect equipment from any lightening surges.

Wind Sentry (03002)

03002 RM Young wind sentry can be mounted directly to the mast, or to the cross arm. Wind sensors must be located away from obstructions. A distance of at least ten times the height of the near by buildings/ obstructions is recommended.

Mounted to the Mast:

- Slide the cross arm-mounting bracket on to the mast. Orient the cross arm so the vane end points north, and tighten the band clamp.
- Attach the cup assembly to the anemometer shaft using the allen wrench provided.
- Attach the wind vane to the shaft and secure using the allen wrench. Orient wind vane such that counter weight points south using the procedure mentioned below, tighten the setscrews.



CALIBRATION FORMULAS

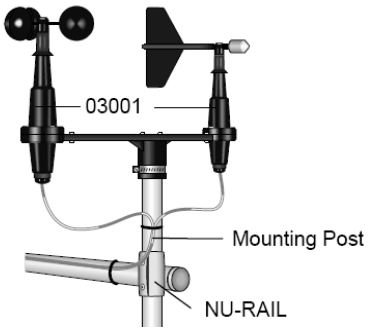
Model 03102 Wind Sentry Anemometer

WIND SPEED vs CUP WHEEL RPM

m/s	=	(0.01250 x rpm) + 0.2
knots	=	(0.02427 x rpm) + 0.4
mph	=	(0.02795 x rpm) + 0.4
km/hr	=	(0.04499 x rpm) + 0.7

Mounted to the cross arm

- Position the top of the mounting post 5” above the ¾” NU-RAIL and tighten the setscrews.
- Slide cross arm-mounting bracket onto the mounting post. Orient the cross arm so that the vane end points north, and tighten the band clamp.
- Attach the cup assembly to the anemometer shaft using the allen wrench.
- Attach the wind vane to the shaft and secure using the allen wrench. Orient wind vane such that counter weight points south using the procedure mentioned below, tighten the setscrews.



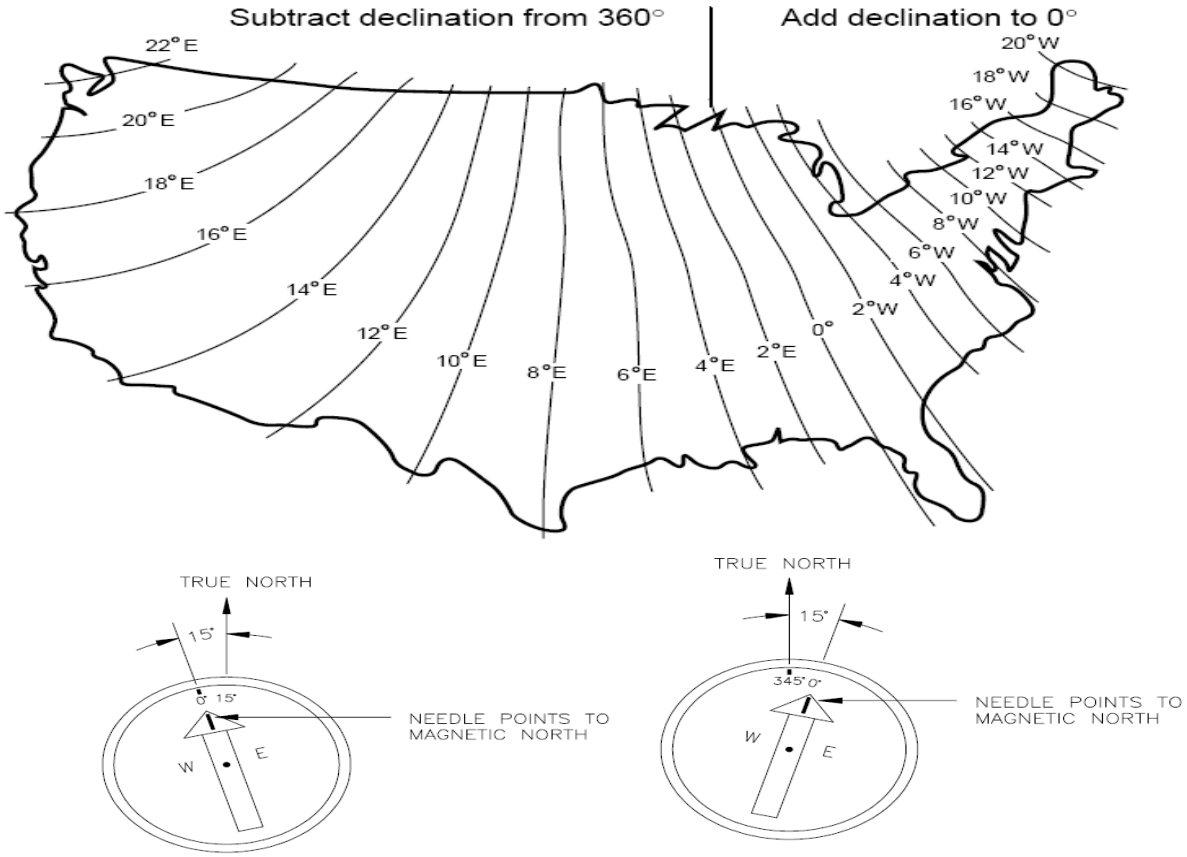
Connect sensor leads from the MicroClimate weather station to the anemometer and wind direction sensor. Apply a small amount of lithium grease to the threads of the connector to prevent problems due to corrosion.

Wind Direction sensor Orientation

Using a magnetic compass determine the magnetic north, apply magnetic correction for the declination to determine the direction of True North at the installation site. Magnetic declination is the number of degrees between true north and Magnetic North. Magnetic declination for a specific location can be obtained from USFA map, Local airport or through the USFS website. A general map of the magnetic declination for the United States is shown below. Declination angles east of TRUE north are negative, and are subtracted from 0 (360^0). Declination angles west of true north are positive and are added to 0 (360^0) to get True north. For example,

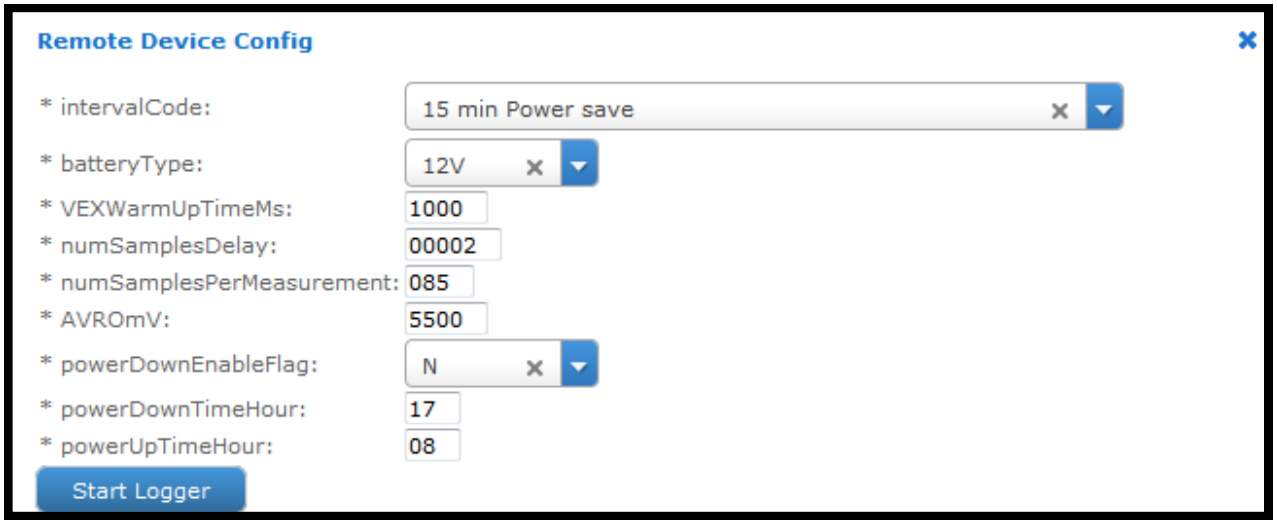
Declination for Logan, Utah is 16^o East. (From the map)

True North = 360 – 16 = 344^o (as read on the compass)



To orient the wind direction sensors one-person must hold, aim and adjust the sensor and the other person to observe the wind direction displayed by the data logger. Establish a reference point on the horizon for True North. Aim the nose cone/ counter weight at the True North. Read the output of wind direction sensor displayed in the agrisensors website. Loosen the band clamps set screws that secure the base of the sensor to the mast or cross arm. While holding the vane in position slowly rotate the sensor base until the data logger indicates 0 degrees. Tighten the band clamps or set screws and secure the sensor base in position and vane free to rotate.

Agrisensors START LOGGING default settings



Temperature and RH Sensor (HPM60)

Position the radiation shield on the side of the mast that face the prevailing wind, with the top of the black plastic mounting base against the bottom of the bell reducer. Secure the radiation shield.

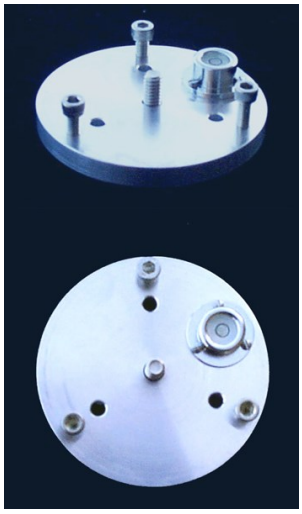
- Mount the radiation shield to the mast using U-bolts and secure the bracket to the mast.
- Loosen the split plastic nut on the base of the shield. Insert the probe and tighten the nut.

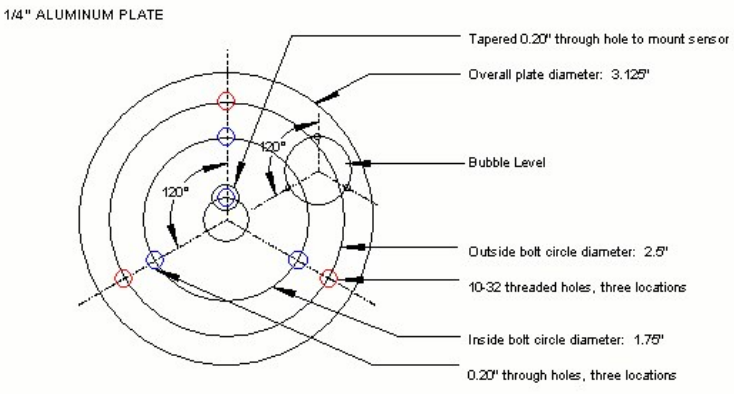
Solar Radiation (SP110)

SP110 solar radiation sensor is supplied with Leveling plate LEV and mounting fixture(CM225). The base includes a bubble lever, sensor holding screw and three adjustment screws for level setting.

- The LEV leveling plate is set on top of the mounting fixture (CM225) and the mounting fixture is attached to cross arm as shown below using u-bolt and nuts.

- Position the base of the sensor in the leveling plate and tighten the mounting screw from the bottom. Mount the leveling plate on the mounting plate stand, and loosely attach using the three inner screws through the top holes with about 4 turns each. Now, adjust the three Allen (hex socket) leveling screws such that the bubble is in the center showing the sensor and leveling plate are horizontal. Tighten the three inner set screws to fix the position. Remove the red protective cap when ready to use.
- The PYR-P sensor comes pre-wired to the data logger. Simply route the cable from data logger to the sensor and secure with tie straps.





Soil Moisture Sensor (SM150T)

SM150T soil moisture sensor measures volumetric soil moisture content by the principle of dielectric constant of the medium changes with water content. The change in dielectric constant is measured in mV DC voltage. Weather station reads the DC voltage and converts to volumetric soil content in %. Soil moisture sensor SM150T can be wired to the MicroClimate weather station. Select the location for installing the SM150T sensor, usually close to the sprinkler fall area or under the drip nozzle. Push the sensor in to the soil until the rods are fully covered. Route wire to the station and secure it from any damage. Based on the type of soil in which measurements are made, identify the constants slope and offset parameters. Enter these values in CR200 program to calculate soil moisture for either organic or mineral soil using polynomial equation.

Linear constants		
	a0	**a1**
Mineral Soil	1.6	8.4
Organic Soil	1.3	7.7

Rain Gauge

Select a location about 10’ from the mast installation, install the rain gage on the provided shelf attached to a customer supplied pole. (as seen in image below)

- Mount the rain gauge to a customer supplied vertical pipe
- Alternatively the rain bucket can be set on a level ground away from the mast