

Installation Instructions for temporary ceilometer mounting pedestal to be used during Ceilometer System Test (ST) and Operational Test and Evaluation (OT&E)

This document contains the list of equipment and procedures required to install a temporary ASOS-like sensor mounting pedestal at those ASOS sensor array locations which do not have an unused mounting pedestal. This procedure provides a bill of material which is to be obtained locally by Forecast Office electronics staff, and setup/installation instructions to be used to assemble the temporary mount. The intention is to place this mount immediately adjacent to the CT-12K mounting pedestal close to the existing raceway, and to connect the sensor to the ASOS Data Collection Package (DCP) or Single Cabinet ASOS (SCA) cabinet using a “spare” 1 inch perforation in the bottom of the cabinet. This procedure assumes this perforation exists. If not, the electrical staff is responsible for punching a 1 inch hole in the bottom of the cabinet using a chassis punch (e.g. –Greenlee punch).

An inventory of equipment follows this section. Prior to going to the site, the electrical staff should verify that:

1. All of the equipment specified in the *Equipment needed* table is available, and
2. The site has ordered and received from NLSC the following
 - a. S100-F/O-20 (20 foot fiber optic cable)
 - b. S100-2A3A1-1 (Fiber optic module)
 - c. S100-2A3A1MP1 (Fiber optic module mounting screw kit) if the site does not have 3-56 mounting hardware for ASOS Fiber Optic Modules
 - d. S100-2A1A3A2 (Ceilometer Power Control module) if installing in a DCP, or a quantity of two S100-FMK75SCA (3 ampere circuit breakers with mounting hardware) if installing in a SCA.

Note that some assembly should take place at the forecast office in order to minimize the time spent on site.

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Equipment needed:

Qty	Description	Figure shown in	Suggested source of supply
1 ea.	24" x 24" aluminum plate, minimum thickness 1/4"	1	McMaster-Carr P/N 89155K26
2 ea.	3" threaded metal pipe flange	1	McMaster-Carr P/N 44705K236
1 ea.	3" schedule 40 metal pipe, 18" long	1	McMaster-Carr P/N 5038K82
1 lot	Hardware to secure flange to aluminum plate. Minimum size 5/16", minimum length 1 1/2" long hex head bolts (4 ea.), flat washers (4 ea.), split lock washers (4 ea.), hex nut (4 ea.),. Galvanized hardware preferred, but zinc plated or stainless also acceptable.	2	Local home remodeling center or hardware store
1 ea.	10' length of 3/4" PVC jacketed flexible conduit (e.g., liquidtite)	3	Local home remodeling center or hardware store
2 ea.	Straight connectors for flexible conduit	3	McMaster-Carr P/N 7119K73
5 ea.	16 (preferred) or 18 (acceptable) ga. Hook-up wire, 15 feet length. Preferable colors are black, white, red, yellow, green but any colors acceptable. Individual wires or cable acceptable.	3	Local home remodeling center or hardware store
5 ea.	Crimp on spade lugs for #6 terminal block screws sized appropriately for the hook up wire used.	3	Local home remodeling center or hardware store
1 ea.	Bare copper ground wire, 14 gauge or higher	2	Local home remodeling center or hardware store
1 ea.	Copper ground wire connector sized appropriately for the ground wire used	2	Local home remodeling center or hardware store
4 ea.	Landscaping spikes, 18" rebar or equivalent. Selected based upon local needs to stake the mounting plate to the ground.	1	Local home remodeling center or hardware store
2 ea.	14" (minimum) Nylon cable tie wrap to secure flexible conduit to mounting pipe and to DCP leg.	3	Local home remodeling center or hardware store

See inventory figures on next two pages

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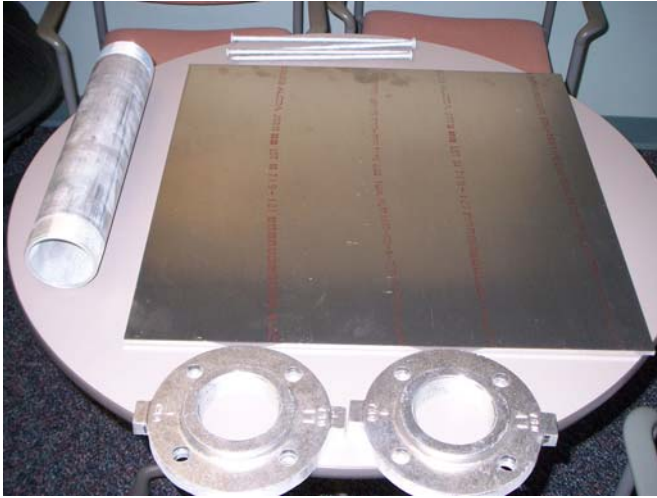


Figure 1 - Mounting plate (center), 4 each landscaping stakes (top), 18" length of 3" schedule 40 pipe (left), 2 each 3 inch mounting flanges(bottom)



Figure 2 - Plate mounting hardware consisting of 4 each of the following: hex head bolts, hex nuts, flat washers, split lock washers (top), Connector for bare copper safety wire (bottom right), bare copper safety wire (bottom left)

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Figure 3 – 2 each 14 inch cable tie wraps (top left) Flexible Conduit (top center), 5 each spade crimp lugs (center), 2 each flexible conduit connectors (bottom left), 18 gauge 5 conductor wire cable (bottom right)

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Required Tools:

Drill (portable hand drill or drill press)

Drill bits

- Appropriate bit for flange mounting hardware
- Appropriate bit for stakes (typical landscaping stakes require 7/16 inch)

Center punch

Pencil

Yardstick or measuring rule

Wrench (or socket and driver) sized for mounting hardware hex nuts

Small flat blade screwdriver (for DCP AC power distribution terminal)

Terminal lug crimper

Wire stripper

Hammer

Electrical tape

5/32 inch nut driver (if new fiber optic module is to be installed in DCP)

Small Phillips screwdriver (if new fiber optic module is to be installed in DCP)

7/16 inch drill bit (if a new 1 inch hole is needed in the bottom of the DCP)

1 inch chassis punch (if a new 1 inch hole is needed in the bottom of the DCP)

Appropriate wrench for chassis punch (if a new 1 inch hole is needed
in the bottom of the DCP)

#2 Phillips screwdriver

10 inch adjustable wrench

Slip joint pliers (to tighten flexible conduit connectors)

Level (spirit level or digital level)

Electrician's knife

Digital Voltmeter with resistance measurement capability (e.g., Fluke DMM)

Note: This procedure requires that the aluminum plate be leveled following installation. If adequate stone will not be available at the site to accomplish this, it is recommended that pea gravel (or equivalent) be taken to the site for this purpose.

Instructions for Preparing Temporary Ceilometer Mount for System Test and Operational Test & Evaluation (OT&E)

Prior to leaving the office:

A. Terminate hook up wire and prepare flexible conduit

1. If cable is being used, strip 6" of insulation from each end of the cable.
2. Ensure that the 5 wires are identifiable as to color. Colored electrical tape or labels are appropriate for marking colors on uncolored wire. The figure below shows black electrical tape used to indicate that the blue wire is hot.
3. Strip ¼ inch of insulation from both ends of each hook up wire. See Figure below.

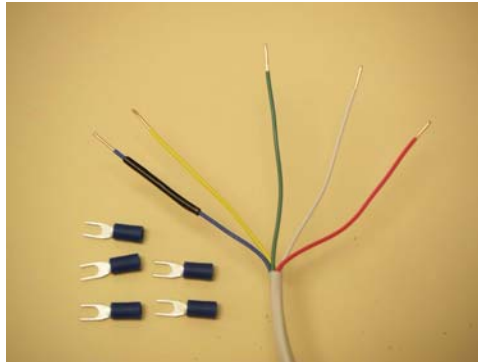


Figure 4 : Stripped wire and terminal lugs

4. If individual wires are used, bundle the wires together by placing a wrap of electrical tape approximately 6 inches from the end on each side of the bundle.
5. Using a crimp tool, crimp one terminal lug onto each wire on one end of the hook up wire bundle/cable.
6. Verify the integrity of the crimp by measuring the resistance between the lug surface and the corresponding wire on the opposite side of the hook up wire bundle. (Approx.0 ohms)
7. Ensure that the fiber optic coupler ends are protected on the fiber optic cable. Fish the hook up wire and the fiber optic cable into the flexible conduit.
8. Assemble a flexible conduit connector on each side of the flexible conduit. Figure 5 below shows assembly of individual components on flexible conduit (right), and final assembled connector (left).

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Figure 5 : Flexible conduit connector installation

B. Drill mounting plate and mount flange

Eight holes must be drilled in the aluminum mounting plate. Four holes will receive the stakes (or rebar) anchors, and four holes will be used for the mounting bolts for the flange which forms the bottom of the mounting pedestal. The following diagram shows approximate location of holes which will be drilled in the mounting plate to accommodate flange mounting hardware and stakes.

CAUTION

Protective eyewear is required to be worn during center punching and drilling operations described in this section

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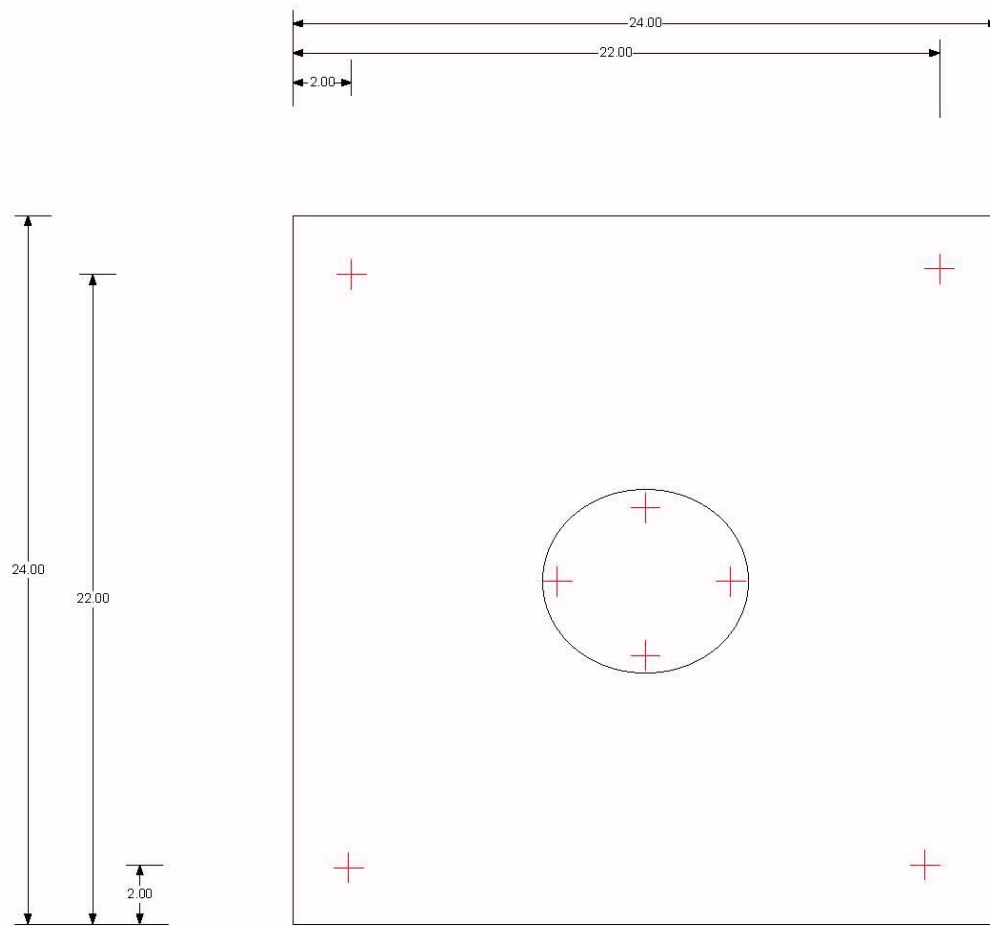


Diagram 1 : Hole locations for drilling the aluminum mounting plate

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1. Place one flange in the approximate center of the aluminum mounting plate and mark each of the four mounting holes. Centering the flange will leave approx. 8.5 inches from the outside circumference of the flange to any edge of the plate. See Figure 6 below.

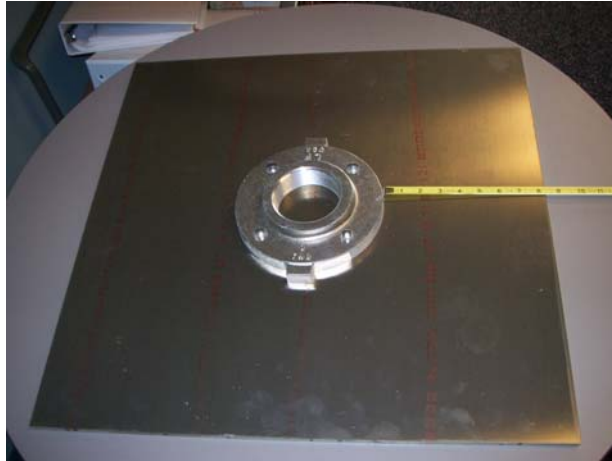


Figure 6 : Locating the flange on the aluminum mounting plate

2. Center punch the four marked holes on the plate, and drill the plate using an appropriate drill bit. (e.g., for 5/16 inch fasteners drill a 5/16 inch hole). See Figure 7 below.

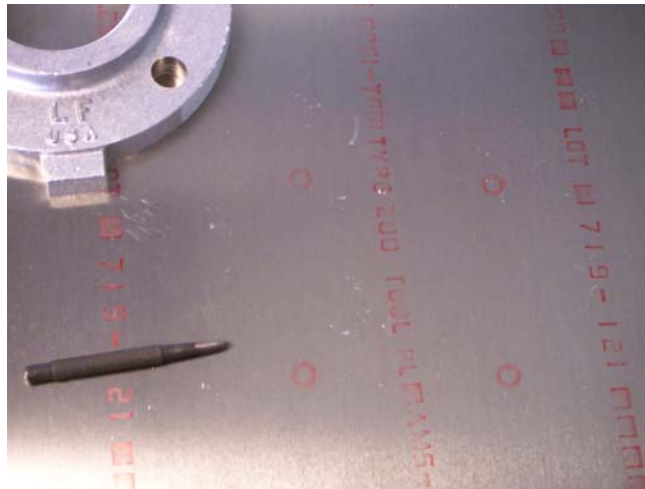


Figure 7 : Center punch flange mounting holes

3. Mark each corner of the aluminum mounting plate 2 inches from each side. See Figure 8 below.

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Figure 8 : Mark and punch the stake holes

4. Center punch the four marked holes on the plate, and drill the plate using an appropriate drill bit. (e.g., for landscaping spikes drill a 7/16 inch hole.
5. Mount the flange to the plate using the hex head bolt, flat washer, split lock washer and hex nut. Install the hex bolt with the head on the bottom of the mounting plate. Refer to Figure 9 below.



Figure 9 : Mounting the flange to the plate

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At the installation SITE:

1. Notify the appropriate personnel that the system will be out of service for modification.
2. Remove AC Power from the DCP. Figure 10 below shows a typical AC electrical disconnect box and circuit breaker panel.



Figure 10 : Typical AC disconnect box and breaker panel

- a. Locate and open the electrical power distribution box which provides AC power to the DCP or SCA.
 - b. Locate the circuit breaker which supplies AC power to the DCP or SCA and set the main breaker to the OFF position.
 - c. Open the front door of the DCP or SCA.
 - d. For DCPs which have a UPS installed:
 - i. Place the circuit breaker for the UPS to the OFF position
 - ii. Place the on/off switch on the UPS to OFF
3. Install the Flexible Conduit (assembled) in the DCP
 - a. Remove the screws securing the Faraday box to access the interior.
 - b. If the 1 inch penetration to the left of the ACU to DCP communication radio antenna cable feed-thru is in use, it will be necessary to add a 1 inch hole for the temporary sensor installation. See Figure 11 below for location of existing 1 inch penetration in the Faraday box.
 - i. Mark and center punch a location 4 inches to the left of the existing 1 inch hole.
 - ii. Drill a 7/16 inch pilot hole for the punch.
 - iii. Punch the hole using a 1 inch chassis punch.

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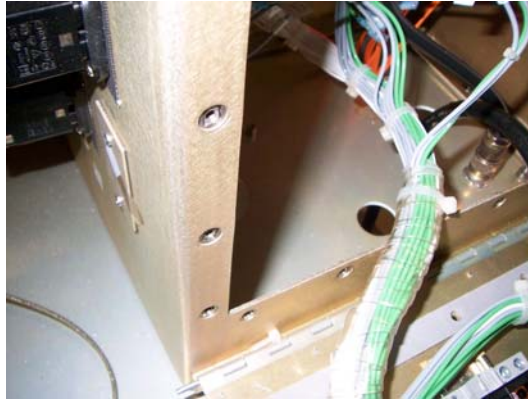


Figure 11: Location of “spare” hole in DCP Faraday box

- c. If the existing 1 inch hole is not currently used, remove the plug from the 1 inch opening in the bottom of the Faraday box. Save the plug for future use.
 - d. Install the flexible conduit connector (hook up wire side without lug terminations) in the bottom of the DCP, and tighten the connector nut. Note that the side of the cable with the crimp lugs connects to the sensor end. Ensure that after installation a minimum of 18 inches of fiber optic cable and hook up wire bundle are available at the sensor end.
4. If this installation will require the addition of a power control module for the CL31, determine an unused power control module location capable of supplying both electronics and heater power. Note that the bottom two power control module locations (A1, A10) are dedicated for UPS power control, and the four power control modules immediately above the UPS location (A2-A5, A11-A14) are capable of supplying both electronics and heater power control. Insert a ceilometer power control module into the location selected.
5. Connect the hook up wires for the CL31 ceilometer to the appropriate AC power distribution locations on the AC distribution terminal blocks. Note that Electronics Hot (Black) and Heater Hot (Red) are connected to terminal block A17, for electronics and and Ground (Green), Electronics Neutral (White) and Heater Neutral (Yellow) are connected to terminal block A18. Appendix A contains a table indicating the correspondence between Power Control Module location and terminal block connections in the DCP, and between Circuit Breaker location and terminal block connections in the SCA.
6. If this installation will require addition of a fiber optic module to the DCP:
 - a. Remove the aluminum plate and EMI gasket from the next available fiber optic module location. A 5/32 inch nut driver used on the captive nut should be used.
 - b. Install a new fiber optic module into the selected location. Attach the module using 3-56 machine screws provided in the fiber optic module hardware kit.
 - c. Attach the RS-232 connector corresponding to the selected fiber optic module location to the fiber optic module and secure the mounting screws.

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7. Connect the fiber optic cable for the CL31 to the fiber optic module. Note that the fiber optic cable RX and TX ends are connected to the RX and TX connection locations on the fiber optic module.
8. Close the Faraday box and secure with screws.
9. Locate the mounting plate on the ground as close to the CT12-K ceilometer as the flexible conduit length will allow, but no closer than 5 feet away from the CT-12K, and within 4 feet of a ground grid wire running along the top of the raceway. Refer to Figure 14 below for desired location.
10. To the maximum extent practical, level the mounting plate using loose stone or gravel.
11. Using the landscaping spikes or equivalent, stake the plate to the ground.
12. Connect the 18" length of 3" schedule 40 pipe to the flange mounted on the aluminum plate.
13. Connect the second flange to the 18" pipe installed in the step above. Refer to Figure 12 below for the assembled mounting plate and pedestal.



Figure 12 : Assembled mounting plate and pedestal

14. Connect the bare copper ground to the existing sensor array ground grid using the ground connector provided. See Figure 13 below.



Figure 13 : Ground connector installation

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15. Secure the flexible conduit to one of the existing DCP flexible conduit runs using one of the nylon cable tie wraps. Secure the other end of the flexible conduit to the temporary mount pipe. Refer to Figure 14 below.



Figure 14 : Completed installation showing nylon tie wrap location

16. If the CL31 will not be installed at this time, remove and store the CL31 power control module. Wrap the exposed fiber optic cable and hook up wire in a plastic bag and secure with electrical tape
17. If the DCP contains a UPS, set the UPS switch to the ON position.
18. Set the circuit breaker which supplies AC power to the DCP or SCA to the ON position.
19. Close and secure the electrical power distribution box which provides AC power to the DCP or SCA.
20. Observe the OID to verify that the system has returned to correct operation.

Appendix A

Correspondence between Power Control Location, AC Distribution Location, and SIO Board and Port number
in the DCP

Power Control Module Locn.	Electronics Hot (Black)	Electronics Neutral (White)	Heater Hot (Red)	Heater Neutral (Yellow)	SIO Board/Port number
A2	A17-3	A18-3	A17-19	A18-19	SIO 1-2
A3	A17-4	A18-4	A17-20	A18-20	SIO 1-3
A4	A17-5	A18-5	A17-21	A18-21	SIO 1-4
A5	A17-6	A18-6	A17-22	A18-22	SIO 2-1
A11	A17-11	A18-11	A17-23	A18-23	SIO 3-3
A12	A17-12	A18-12	A17-24	A18-24	SIO 3-4
A13	A17-13	A18-13	A17-25	A18-25	SIO 4-1
A14	A17-14	A18-14	A17-26	A18-26	SIO 4-2

Correspondence between Circuit Breaker Pair, AC Distribution Location, and Local Sensor position
in the SCA

Circuit Breaker Pair	Electronics Hot (Black)	Electronics Neutral (White)	Heater Hot (Red)	Heater Neutral (Yellow)	Local Sensor number
CB1/CB2	A17-3	A18-3	A17-19	A18-19	1
CB3/CB4	A17-4	A18-4	A17-20	A18-20	2
CB5/CB6	A17-5	A18-5	A17-21	A18-21	3
CB7/CB8	A17-6	A18-6	A17-22	A18-22	4
CB13/CB14	A17-11	A18-11	A17-23	A18-23	9
CB15/CB16	A17-12	A18-12	A17-24	A18-24	10
CB17/CB18	A17-13	A18-13	A17-25	A18-25	11