N-CON Single/Dual Chimney
Atmospheric Precipitation Sampler

INSTALLATION & OPERATIONS
MANUAL

125 GS - Single Chimney

127 TM - Dual Chimney

N-CON Systems Co. Inc.
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SCOPE OF MANUAL

This manual contains a product description, installation, and operating instructions together with maintenance procedures for the single and dual chimney precipitation sampler. A list of replacement parts, electrical schematics and wiring diagrams is also provided.

Purpose Of Equipment

The sampler is designed to collect and composite "wet only" samples of rain, snow and other precipitation. A dry deposition option is available as an add-on.

Description of Operation

An infra-red sensor detects precipitation at the rate of least 5 drops in 50 seconds and closes after 25 seconds of no sensed precipitation. Design of sensor minimizes "Hunting" during marginal precipitation events. An internal drive motor uncovers the sample collector and keeps it open until precipitation stops. Design of the sampler minimizes horizontal surfaces to prevent contamination due to splashing.

DETAILED DESCRIPTION OF EQUIPMENT

Housing

Powder coated white, seam welded aluminum. Heating system 150 Watts with circulating fan and thermostatic temperature control.

Control Panel

Power switch and fuse post are located on a removable panel in the control housing. All electrical connections are keyed, plug-in connections.

Drive Motor

Oil immersed armature and gear train, rated NEMA 4X (IP65)

Moving Cover

Seals sample container when closed. Lid seal pad must be installed to insure proper seal.

Splash Shield

Prevents ground material splashing of material on to under side of cover when cover is open.

Precipitation Sensor

Infra-red sensor triggers opening after 5 drops of precipitation in 50 seconds. Closing initiated 25 seconds after end of sensed precipitation. User programmable for other opening and closing intervals.

Data Output Cable:

Four wire cable connects to keyed fitting on underside of sampler and is secured by a locking ring. One pair provides a unpowered contact when sampler is open. May be connected to a data logger or to the event recorder. Second pair monitors AC power to sampler and data logger

AC Cable

Grounded, 3 wire cable connects to keyed fitting on underside of sampler and is secured by a locking ring.

Power Requirements

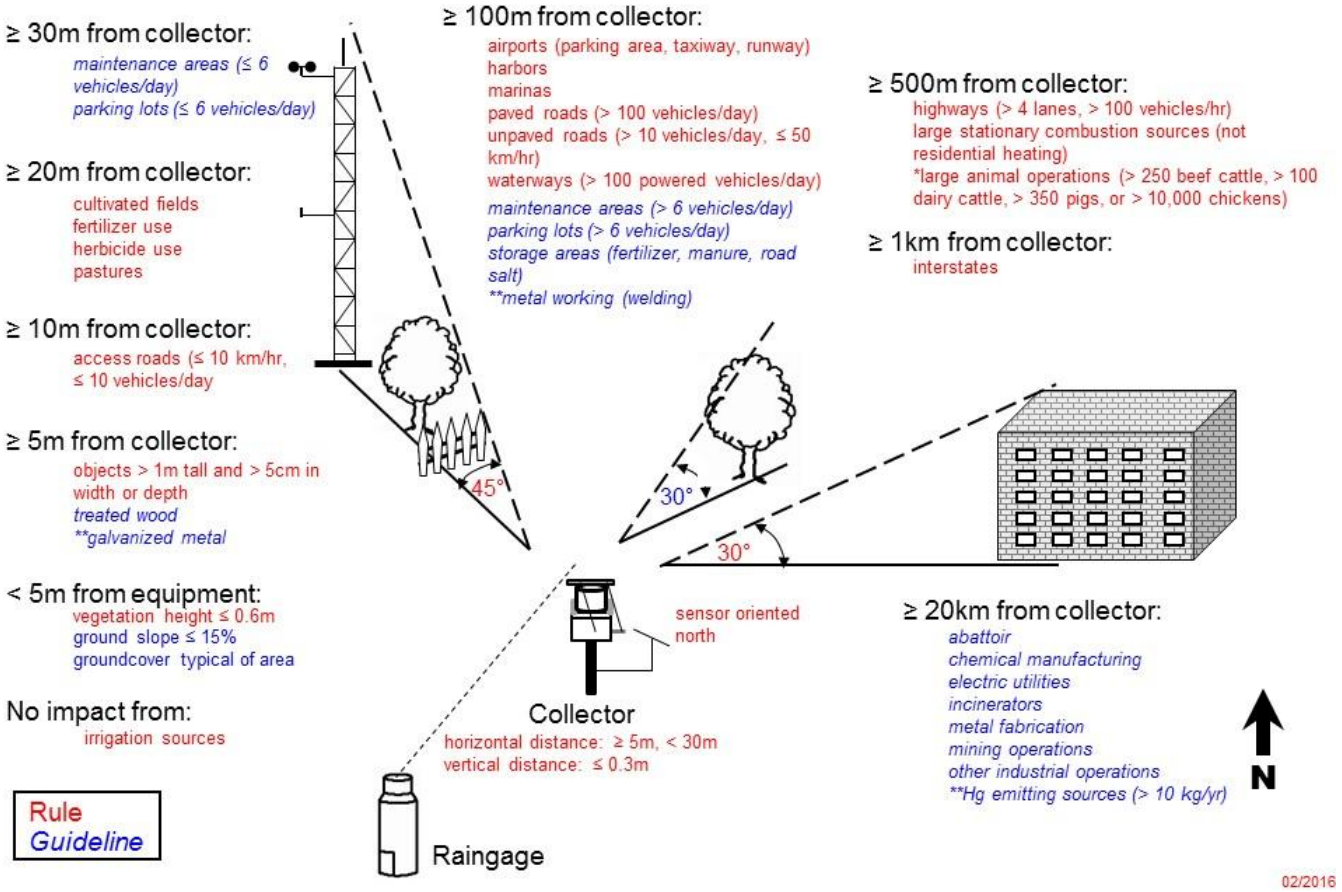
AC (115 or 240VAC, 60Hz) power. GFI circuit required (user installed). 110VAC units supplied with a standard US 3 prong grounded plug. 240VAC units will be provided with the requested country appropriate power plug.

INSTALLATION & SETUP

SITE RECOMMENDATIONS

NADP siting criteria provided soley as an example. Siting criteria will be dictated by a specific users sampling needs.

NADP Siting Criteria – Wet Deposition



Items recommended for installation

- ❑ Six foot length of 2" NPT Pipe cut to provide approx. 36" above ground level.
- ❑ Post hole digger or suitable boring tool if installing in ground.
- ❑ Quick setting concrete, if soil conditions require setting stanchion in concrete.
- ❑ Heavy mallet and block of wood for top of stanchion.
- ❑ Yardstick or tape measure.
- ❑ Carpenters level

- ❑ Allen Wrench set (including 3/16th & 1/8th) Included in Tool Kit
- ❑ Screwdriver, ¼" straight blade

Stanchion Installation

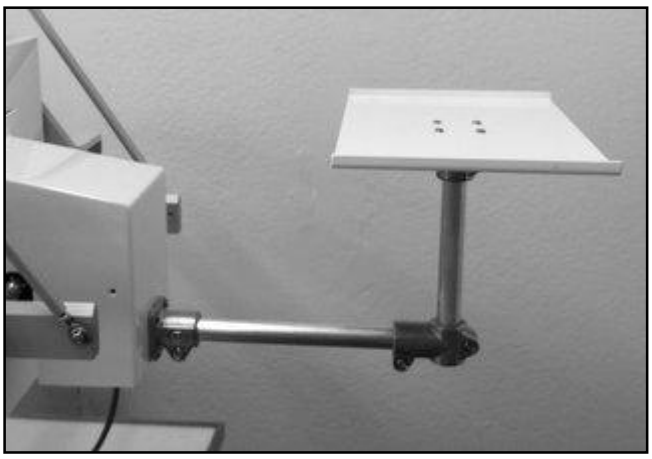
A suitable hole should be dug and the length of pipe set in concrete (as required) with top approximately 36 inches above ground level. Be sure to align pipe vertically. set in concrete, be sure to leave bottom open to permit drainage.

Before beginning final installation, locate the Tool Kit included with your unit. You will need the BLUE 6mm allen key and adjustable wrench to complete your installation.

Place Sampler on Stanchion

Place sampler on top of stanchion and tighten one set screw to prevent rotation.
In areas where there is a high level of snow, stanchion should be placed on a suitable raised platform.

Assemble/Install Splash Shield



Attach the Splash Shield to Splash Shield support with the screws, nuts and washers located on Splash Shield.

Install the LONG end of the Splash Shield tubing in the fitting on the motor cover. Tighten with 6mm BLUE Allen key in tool kit.

Splash Shield should be level. Do not over-tighten at this time as adjustments may be needed at final installation.

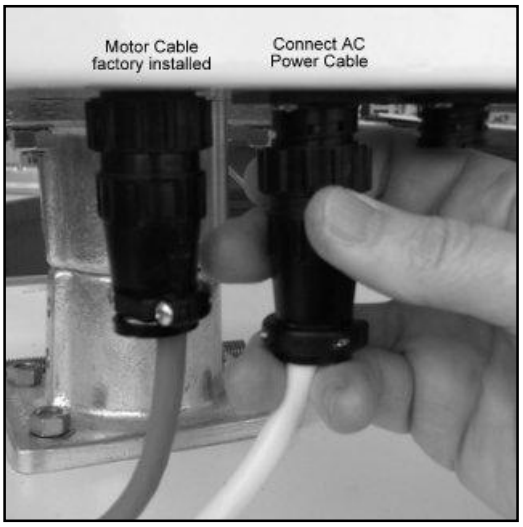
Sensor Installation

Remove the 4 wing nuts on the side of the sampler that will be used to install the precipitation sensor.

Hold sensor up to mounting studs and connect the keyed Molex connector to the Molex connector. Push the connected Molex assembly back into the housing.

Align the holes in the sensor mounting with the studs on the housing and secure the mounting to the housing with the 4 wing nuts provided. Tighten firmly.

Orient the collector so the sensor points SOUTH and tighten set screws on collector mounting flange to prevent rotation.



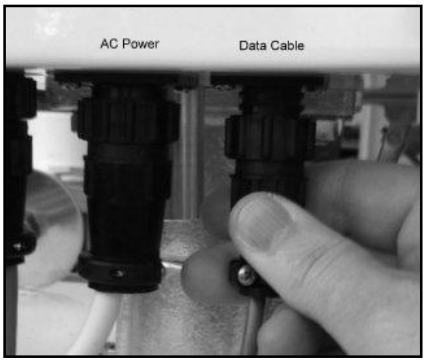
Power Connection AC

Provide a grounded, GFI controlled outlet . Connect the AC power cable to the socket on the underside of the sampler. Leave some slack in the cable and secure the cable to the stanchion with suitable tape, so that if will not fall on the ground when disconnected.

DO NOT CONNECT TO POWER OUTLET
AT THIS TIME.

System Grounding

To insure proper operation, the sampler must be connected to a zero resistance earth ground. In most installations it is advisable to ground the mounting stanchion to a copper clad earth-grounding rod.



Recorder/Data Logger Output Cable Installation

Connect output cable to fitting on underside of the sampler. Black and white wires provide an unpowered contact while the sampler is open, and second unpowered pair, red and green indicates that power is on.

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Check Splash Shield Alignment

Plug the power cable to the power source and turn on unit (power switch located inside housing). Allow at least one minute for sensor to warm up.

Open sampler Moving Cover by waving fingers between sensor heads. (Movement is required. Stationary object will not open sampler cover.) Moving Cover will open after approximately 20 seconds. Allow cover to come to a stop at fully open position.

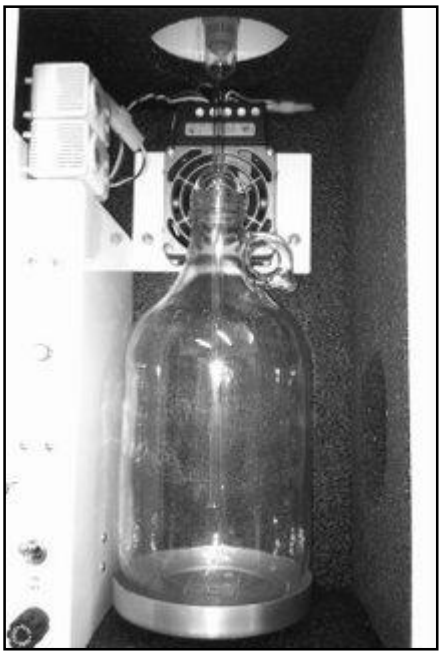
Turn off system so that cover will not close.

Adjust the Splash Shield to a level just below the moving cover (no contact). Insure that the shield is level and tightened completely to prevent rotation.

Power the unit on and the cover will return to the normally closed position.

Sample Train Installation

NOTE: If Sample Train/Bypass Funnel is not purchased from N-Con Systems, follow the installation protocol provided by your supplier.



Glass Sample Train (Optional)

Open cover (wave fingers through sensor to simulate **precipitation). Turn system** switch off once the moving cover has cleared the chimney(s) so cover will stay open while the sample train is installed.

Place the bottle on the bottle support (style may vary depending on the option purchased).

Connect the funnel and thistle tube with the Keck clip provided with the sample train option.

Insert the thistle tube down through the open chimney. The edge of the glass funnel should meet with the edge of the white funnel support when properly in place. (Lower the bottle/bottle support as needed).

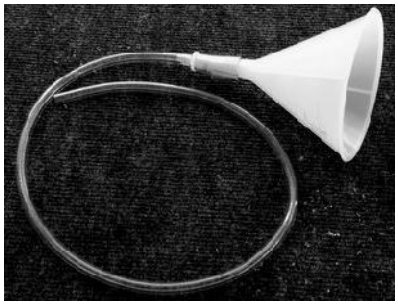
When funnel is installed, turn power on to close the cover to retain the funnel in place.

Rotate the bottle support/bottle counter-clockwise to raise the bottle until it just contacts the capillary bulb.

Repeat the process for second sample train if two chimney unit.

Bypass Funnel ~ Two Chimney Units using only one sample train (Optional)

If only one chimney is being used for sampling, it is critical that a bypass funnel be installed in the open chimney to prevent water damage.



Open cover (wave fingers through sensor to simulate precipitation). Turn system switch off once the moving cover has cleared the chimney(s) so cover will stay open while the sample train is installed.

Insert the Bypass Funnel and tubing down through the open chimney. The plastic funnel should seat well on the white funnel support when properly in place. Power the unit on to close the cover.

Open the door to the unit. Remove the bottle support which will not be used and set aside. Run the Bypass Funnel hose down through the threaded hole and lead away from the base of the unit to avoid creating a puddle in front of the door to the unit.

Check Alignment of Moving Cover

Turn on power and check that moving cover seats properly. Funnel(s) should rest evenly on the white chimney supports. Lid seal should completely and evenly seat on the chimney(s).

Close and Latch Sampler

Close and latch unit. Two chimney units have two latches to insure even seal. Be sure to close latch on underside of unit.

Final Check Out

- ❑ Make sure the power cord is connected and secured to underside of sampler or stanchion
- ❑ Make sure the System switch is turned on. (System LED will be on).
- ❑ Wave your fingers between sensor heads to simulate precipitation.
- ❑ Observe cover opening and resting evenly just above splash shield.
- ❑ In about 2 minutes cover should return to the closed position.
- ❑ Check that the cover seats uniformly on the chimney(s) and seal is complete.

OPERATION

Note: Use the standard protocol provided by the NADP or other program as required. The suggested protocol should be used only in lieu of a specified protocol.

Change Sample Train

Approach unit from downwind to avoid contamination

Open sampler Moving Cover by waving fingers through sensor.

Open sampler door and turn power off once Moving Cover has cleared the chimney(s).

Remove funnel and capillary assembly carefully through the chimney opening and return with sample bottle to the laboratory. Handle sample train in accordance with applicable protocols.

Rotate support clockwise to lower at least one inch.

Install clean glass funnel and capillary assembly in top and place clean bottle on support. There will be a gap between the top of bottle and capillary bulb.

Turn on power and allow cover to close so it seats firmly on chimney.

Raise the bottle support assembly by turning counter-clockwise until bottle top just contacts the capillary bulb.

Check that cover opens and closes by waving fingers in the precipitation sensor path.

Provisions for Overflow

Depending on the sample bottle used and the frequency of site visits, provisions should be made for possible overflow.

A variety of bottle supports and drain pans are available from N-Con Systems. An overflow basin with drain is recommended for all settings where heavy precipitation is expected and site visits may be infrequent.

Bulk Sample Operation

This procedure is recommend in the event of a power failure or failure of the sampler to open automatically.

Note: Use the standard protocol provided by the NADP or other program as if provided to insure project compliance.

1. Turn off power.
2. Loosen the four 1/4-20 socket cap screws in motor drive (lower end of drive arm).
3. Move the cover to fully open position manually and allow it to rest on splash shield.

DO NOT RETIGHTEN THE SOCKET CAP SCREWS until ready to return to automatic operation.

When power is restored, motor will automatically return to closed position, but cover will not rise.

Returning to automatic operation

1. Insure that the power on. Wait one minute to insure that the motor has returned to the closed position.
2. To return to automatic operation, return the moving cover to the closed position manually.
3. Press cover down firmly and retighten the socket cap screws on the motor drive end of the arms.
4. Test the operation of the Moving Cover by waving fingers through the sensor until opening is initiated. Insure that the return position has the Moving Cover seated properly.

ROUTINE MAINTENANCE

Sensor maintenance (weekly)

1. Check that there are no bird droppings, spiders, webs or leaf particles on sensor.
2. Wipe with a clean cloth or tissue, as required.

General Cleaning

1. Check that there is no build up of bird droppings or other material on the splash shield and moving cover. Wipe clean.
2. Spray clean or wipe off dirt or dust streaks as needed.

Use DI or distilled water only to clean collector housing and splash shield to avoid contaminating samples.

Change Lid Seal (annually or as needed)

1. Open sampler about half way and turn off power.
2. Loosen, but do not remove wing nuts on one side of lid seal clamp and pull out one side of lid seal.
3. Loosen and remove wing nuts on other side and remove lid seal.
4. Smooth out new lid seal and secure with clamp on one side. Tighten wing nuts.
5. Press the lid seal toward other side and push edge under clamp until seal is smooth.
6. Tighten all wing nuts.
7. Clean the new lid seal with a clean cloth and de-ionized water and dry.
8. Turn on the power and allow sampler to close on top of funnel.
9. Check that lid seal rests evenly on funnel(s).

Adjust Closed Position of Moving Cover

1. Open sampler by waving fingers between sensor heads. When opened a few inches, turn off the system switch to stop the lid.
2. Turn system switch back on, turn off again when lid is about ½ inch above funnel(s).
3. Loosen the 4 cap screws holding the drive arms to the motor axles so lid comes down on top of funnel.
4. Hold the lid firmly on top of the funnel and retighten the cap screws firmly to secure drive arms.
5. Repeat opening and closing to assure that lid seals the funnel when closed.

Sensor Settings

Factory settings:
Switch-Off Delay = 25 sec.
Drop incidences = 5 in 50 seconds

If you require modified sensor settings, please contact Technical Support BEFORE making any attempt to modify your sensor to avoid voiding your warranty.
800-932-6266 or support@n-con.com

BASIC TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CHECK	REQUIRED ACTION
Sampler will not open	No power to sampler Switch is Off	Fuses and ground fault interrupter (GFI) Power cords properly connected.	Replace as necessary. Reconnect.
Sampler power is on but will not open	Faulty sensor	Sensor	**WITH SENSOR SIMULATOR**: Disconnect the black CPC connector from base of sensor. Attach Sensor Simulator (located in toolkit). Power on unit and activate simulator switch. If unit opens, sensor is faulty. **WITHOUT SENSOR SIMULATOR** CONTACT FACTORY FOR ASSISTANCE 800-932-6266
Sampler power is on and sensor triggers motor but will not open	Drive Arm socket head cap screws loose	Moving cover can be moved manually	Power on unit and trigger motor by waving fingers. Wait until motor returns to the closed position and turn off. Tighten Drive Arms with Allen wrench supplied in toolkit.
No output to rain gage or recorder	Cable not connected or a broken wire Defective contact in 2CR relay	Check connections and continuity Check continuity	Connect or replace cable

Note: The motor cable must be properly connected to the base of the unit for the instrument to power on.

N-CON Systems Technical Support: 800-932-6266

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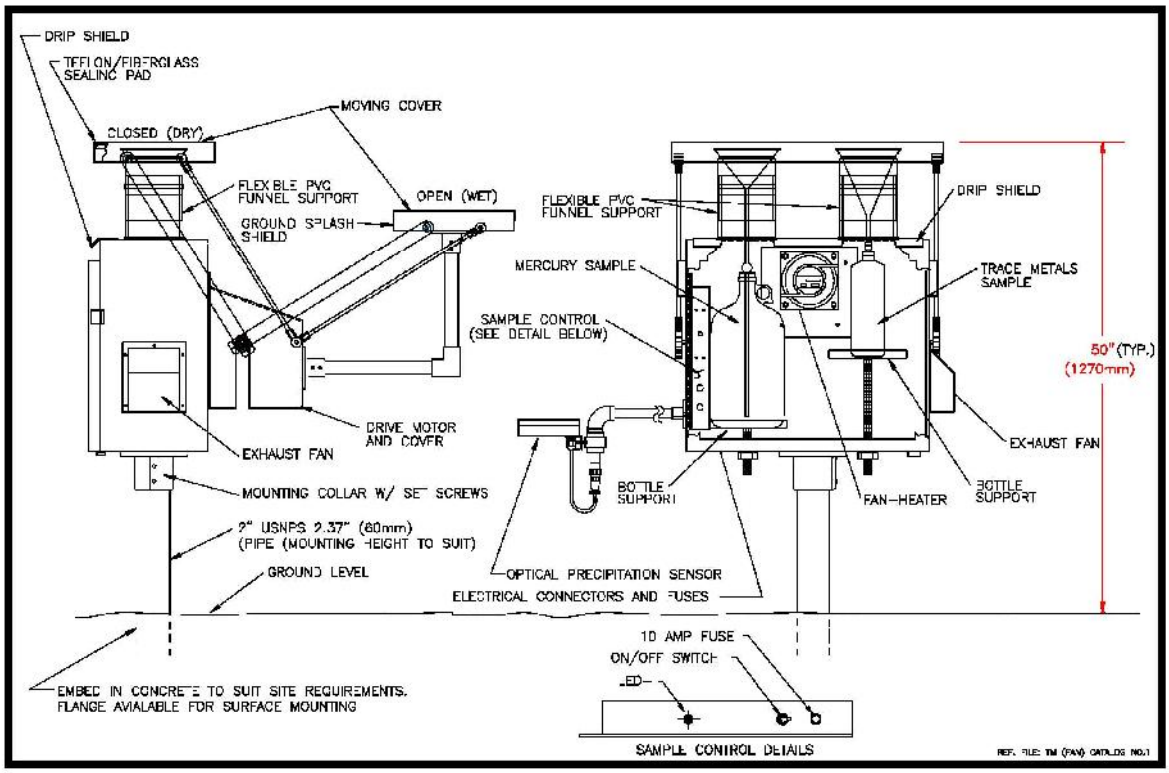
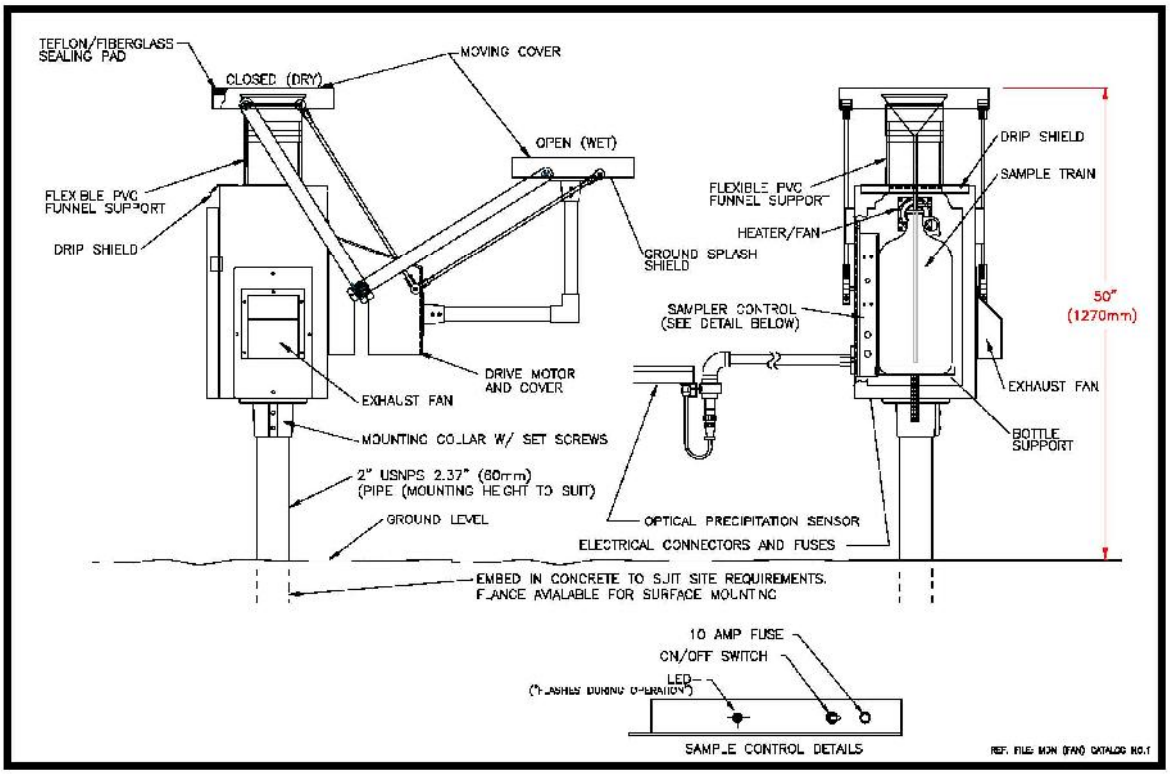
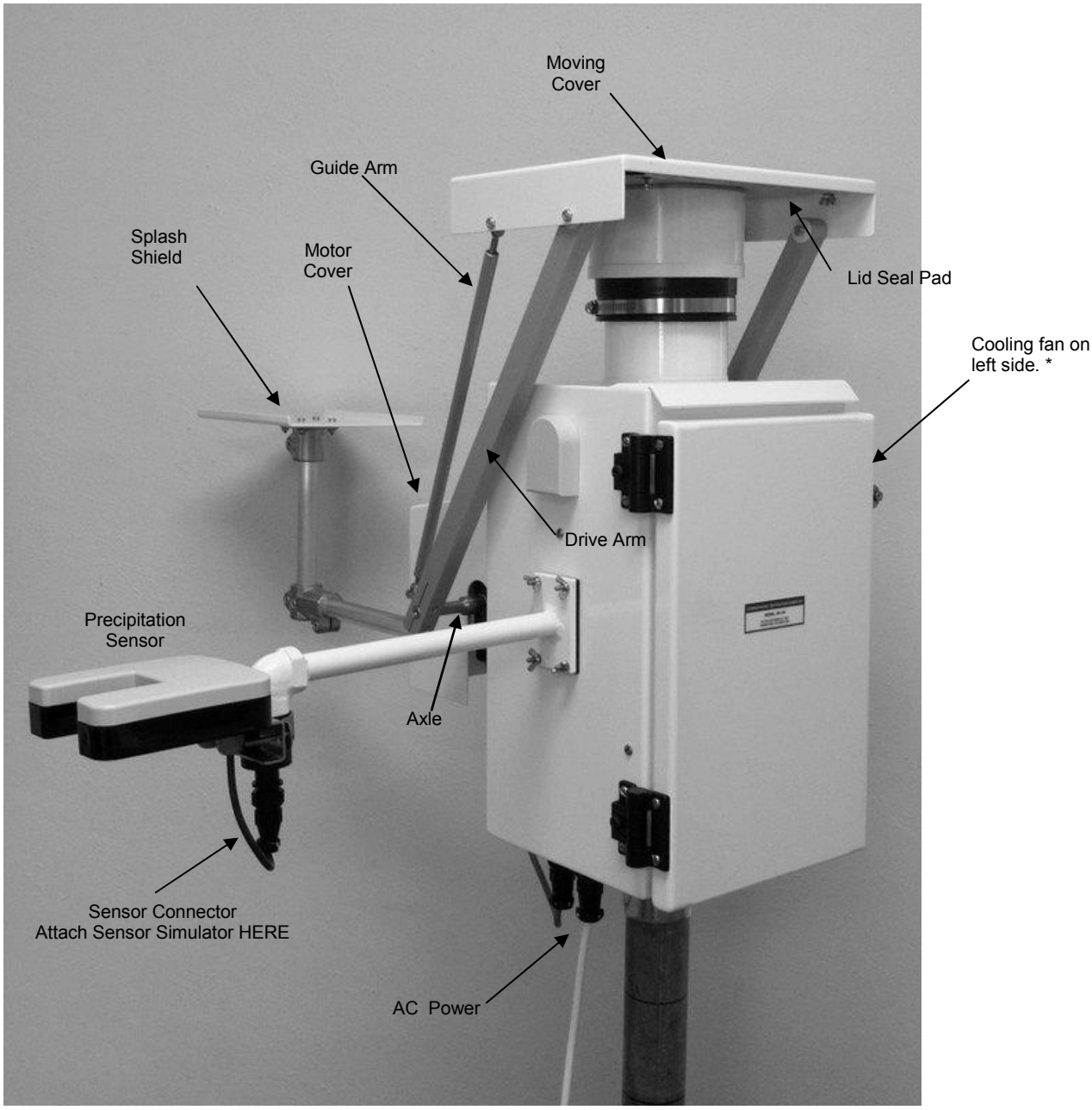
DRAWINGS & ILLUSTRATIONS

General System Configuration





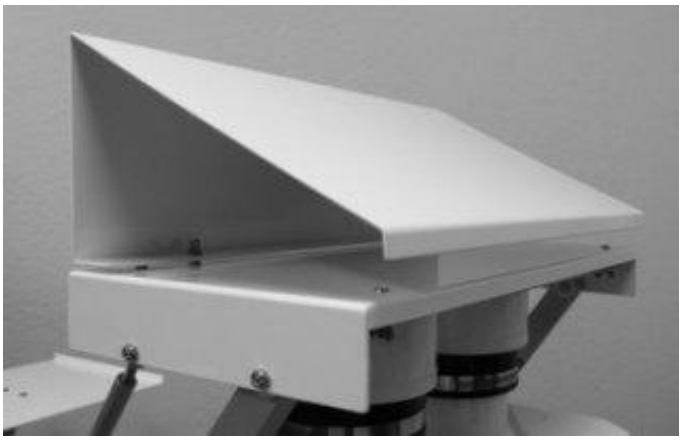
COMPONENT IDENTIFICATION



* Thermo-electric chiller may be supplied in place of standard cooling fan.

SYSTEM OPTIONS

SNOW ROOF



A removable Snow Roof is available for both the 00-125 and 00-127 Precipitation Samplers. The Snow Roof can remain installed year-round.

Retrofit of the Snow Roof may require removal of the Moving Cover to drill appropriate holes. A template is provided with retrofit kit. Units ordered with the Snow Roof option will not require modification.

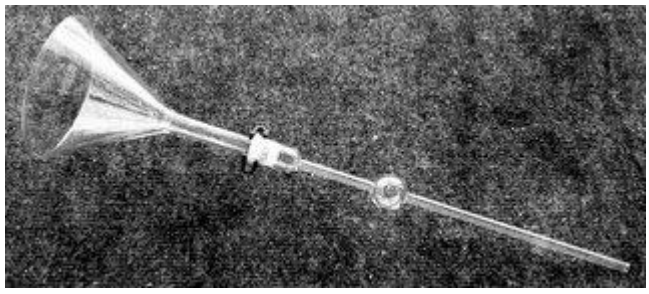
01-487	Snow Roof – 00-125 (One Chimney)
01-488	Snow Roof – 00-127 (Two Chimney)

Snow Roof Installation

Remove the two wing nuts from the moving top of the moving cover.
Install the Snow Roof with the two wing nuts. Wing nuts should be finger tight.

GLASS SAMPLE TRAIN

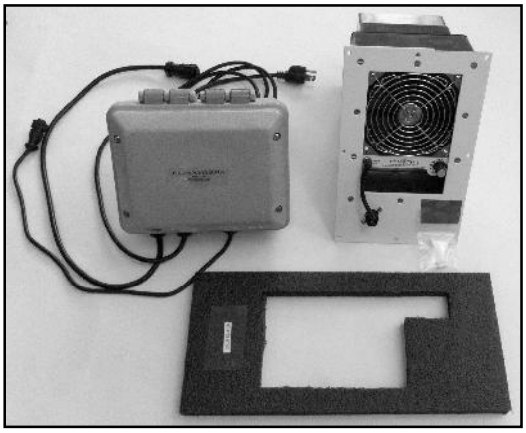
N-Con Systems offers a complete Glass Sample Train for Single and Dual Chimney Precipitation Samplers. Borosilicate glass. The standard glass sample train is specifically designed to be used with the Pan Bottle Support (with or without drain); however it will work with other bottle support options.



19-128	Complete Glass Sample Train
19-128F	Sample Train Funnel
19-128C	Capillary/Thistle Tube
19-128B	64oz. Sample Container with Lid
19-129	Keck Clip – Funnel/Thistle Tube Connector

CHILLER – THERMOELECTRIC

Part #	Description
17-125	Thermoelectric Chiller with Power Supply



Chiller Option Includes:

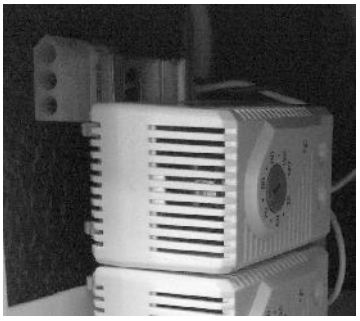
Power Supply with Mounting Bracket
(replaces standard AC Power cord)
Chiller Unit
Insulation Insert (replaces standard insert)

Chiller Installation

1. Insure that the unit is turned off and unplugged to begin installation.

2. Remove the eight (8) cap nuts holding the fan panel (if installed) Remove the fan panel and disconnect internal Molex connector.

Note: The connector fixed in the housing will not be used while the Chiller is installed. Tuck the Molex connector behind the thermostats to avoid interference with the sample collector.



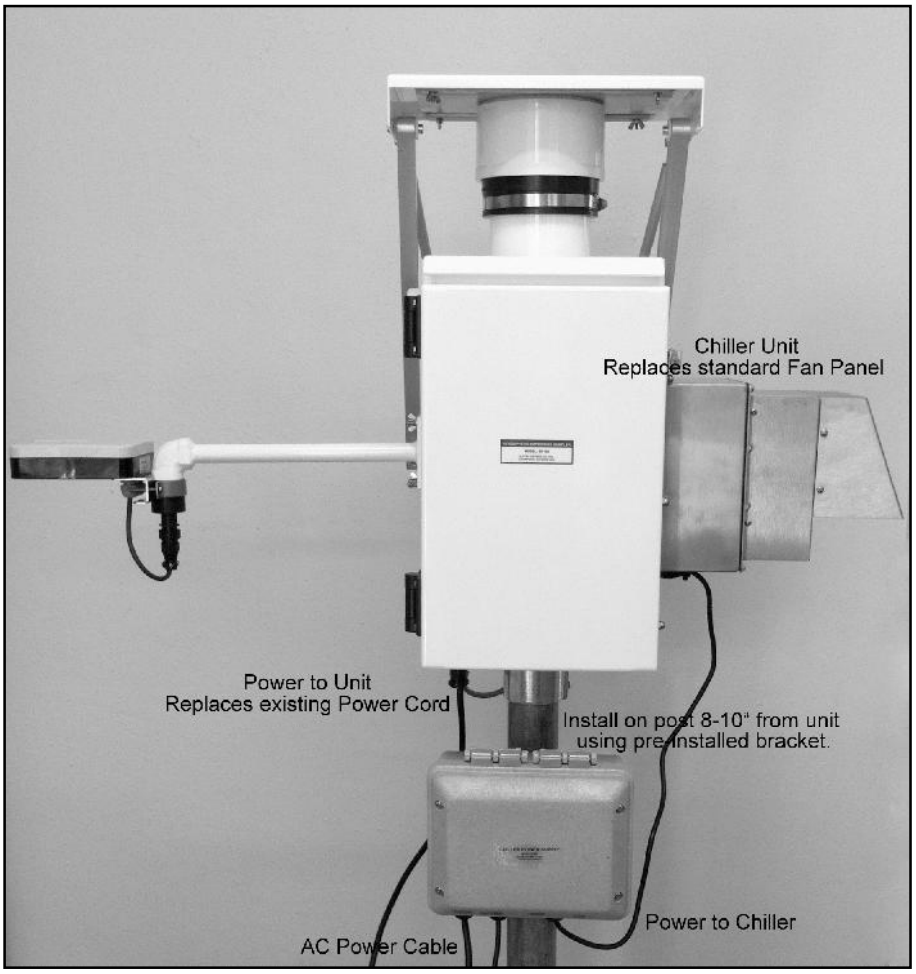
3. Remove the insulation insert and retain for reinstallation when fan panel is reinstalled. If only the Chiller panel was ordered, the correct insulation will be factory installed and will not need to be changed.

4. Attach the chiller unit with seven (7) of the original cap nuts (retain the unused cap nut for reinstallation when the fan panel is reinstalled.

5. Place a thread protector (provided) over the top, center screw. The cap nut cannot be used with the chiller installed.

Install Power Supply

1. Install power supply on mounting post. Position power supply 8-10" below the unit using the preinstalled bracket. Insure that the power cable for the chiller reaches the plug on the underside of the chiller unit.



2. Remove the original AC Cable and retain for future reinstallation with the standard fan panel.

3. Attach the AMP power cable from the power supply to the AC connector on the precipitation sampler.

4. Insure that the internal power switch is off.

5. Plug the Power Supply AC cable into a grounded GFI outlet.

Note: The chiller unit will turn on. It is always powered to insure sample quality even when the unit is turned off. The power can be disconnected from the chiller if it must be turned off.

Install Insulation and Adjust Thermostat

1. Insert the chiller insulation. The internal power connecter should be seated properly below the fan.

2. Adjust the chiller thermostat using the adjustment knob on the chiller itself to control the temperature.

LIMITED WARRANTY

WHAT IS COVERED

N-CON Systems Co., Inc. warrants that the product you have purchased will be free of defects in materials and workmanship. Products not manufactured by N-CON, but that are re-sold by N-CON, are warranted only to the limits extended by the original manufacturer.

FOR HOW LONG

This warranty covers all defects that you bring to the attention of N-CON Systems within ONE YEAR FROM DATE OF INVOICE.

WHAT N-CON SYSTEMS WILL DO

If your N-CON product is defective, we will repair or replace it (at N-CON's option) and will return such products by surface carrier prepaid within the continental United States. If expedited shipping is required, you will be charged the difference between air service and ground service to the same destination. The customer will assume all costs of removing, reinstalling and shipping defective products to N-CON.

HOW TO GET SERVICE

Please call 1-800-932-6266 to OBTAIN RETURN AUTHORIZATION. You must return your N-CON product within one year of the date of purchase, shipping prepaid, to our factory at this address:

N-CON Systems Company, Inc.
Warranty Repair Service
130 Old Edwards Road
Arnoldsville, GA 30619
(Mail & Purchase Orders: P.O. Box 809 Crawford, GA 30630)

In any correspondence with us, or if you send part but not all of the product, please include both Model and Serial # of the product.

WHAT THIS WARRANTY DOES NOT COVER

Your rights and remedies are specifically limited to those set forth in this warranty. This warranty shall not apply to any products which have been subjected to modification, misuse, neglect, improper service, accidents of nature or shipping damage. This warranty is in lieu of all other warranties, expressed or implied.

N-CON Systems disclaims any and all implied warranties including those of merchantability or fitness for a specific purpose. N-CON Systems shall not be liable for any special, incidental, or consequential damages. In no event shall N-CON System's liability to you exceed the purchase price of your N-CON product.