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Canadian Air and
Precipitation Monitoring
Network (CAPMoN)

Réseau canadien
d'échantillonnage des
précipitations et de l'air
(RCEPA)

CAPMoN PRECIPITATION SAMPLING INSTRUMENTS OPERATION and MAINTENANCE MANUAL

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OPERATORS EDITION

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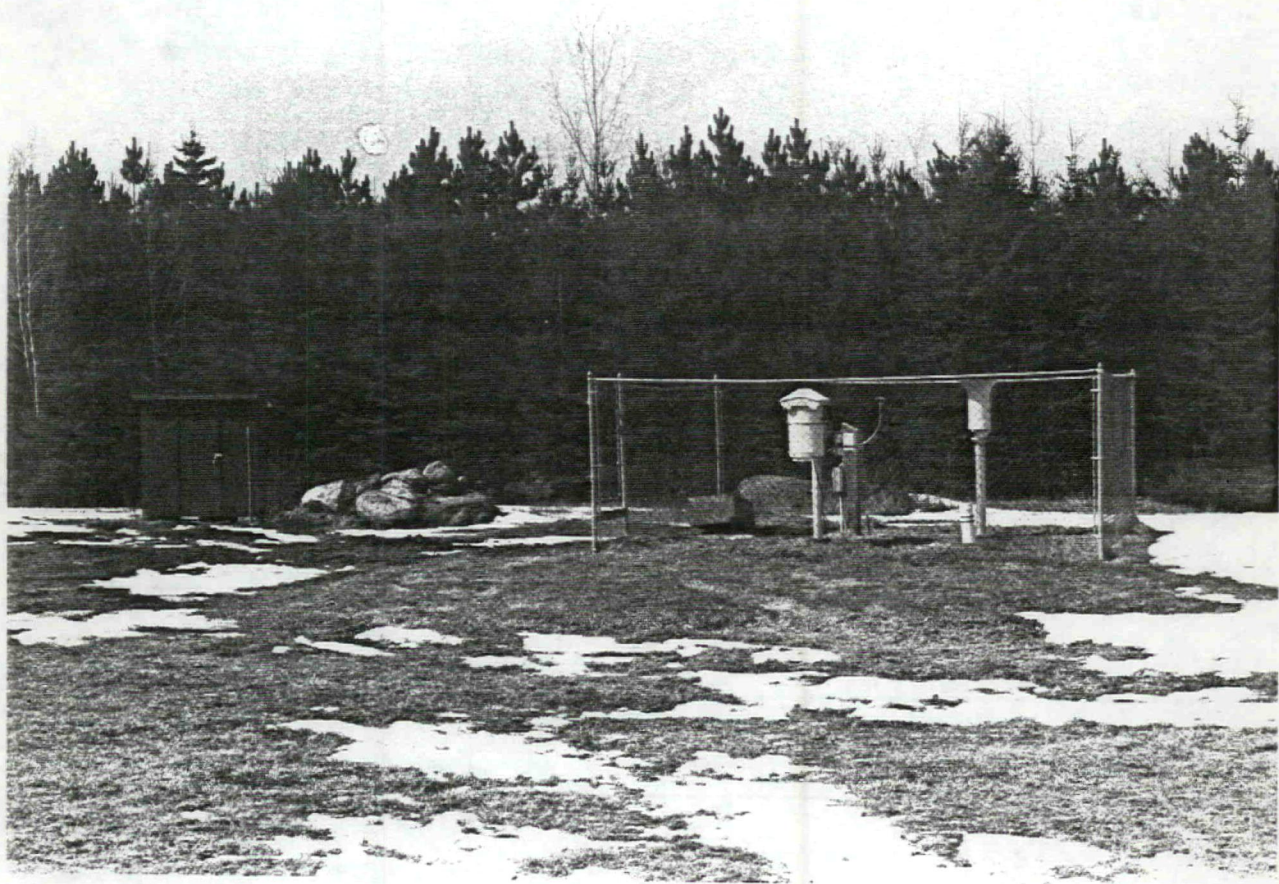
Preface

This manual was conceived for the purpose of providing the technician/technologist with a tool to aid in the servicing of the CAPMoN collector and other equipment installed at the sampling site. It is broken down into separate topics so that each topic is explained, in detail, with accompanying photos on the opposite page. Many photos are used in this manual to help the Service person understand and recognize what is taking place in any particular topic description or procedure.

Updates, new procedures or new equipment will be accommodated with additions to this manual or by replacing the appropriate pages with the updated versions of any particular page.

Any constructive ideas or comments to improve this manual or the details within this manual would be greatly appreciated. The Service person is encouraged to make their recommendations in writing to AES, ARQM, in order that the operation of the equipment associated with the CAPMoN, operate as reliably as possible.

42-77777-1
AES/ARQM



30 April 1985

RECORD OF CHANGES

Retain this record in front of the manual.

- On receipt of changes:
1. Enter the number of the new page
 2. Enter the accompanying Bulletin number
 3. Enter the insertion date
 4. Initial the entry
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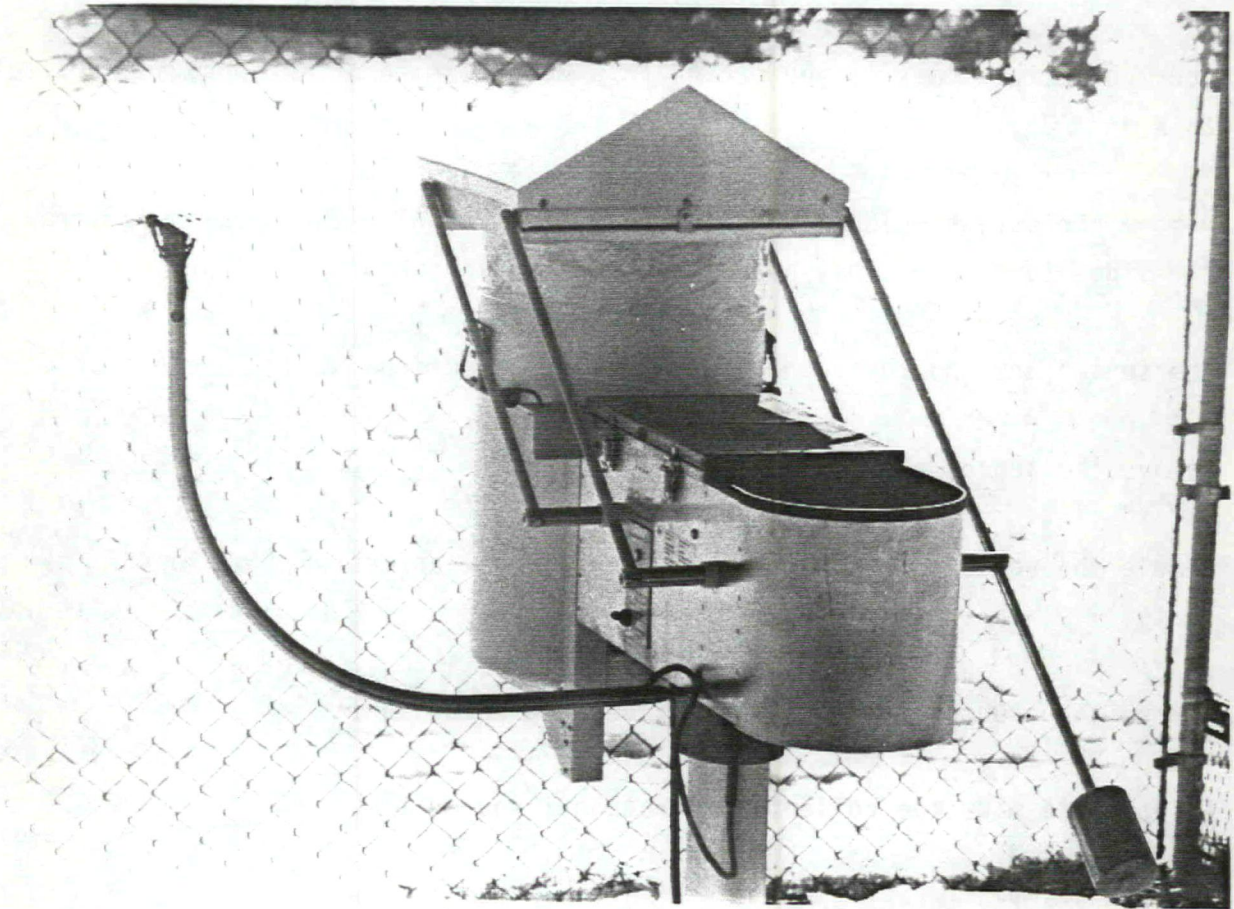
What is a Collector?

The CAPMoN Type A-M, Model A100, collector is used to collect precipitation samples. It is mounted on a metal post at the sampling site so that the bucket top is approximately 1.5 meters above the ground.

A sensor arm protrudes outward and upward from the collector body. At the top of the arm sits the sensor boards. The sensor boards detect the precipitation. The top side of the sensor board has interleaving fingers (grids) which can be shorted by drops of water to activate the motor inside the collector which opens the roof cover. The underside of the sensor board has, encased in epoxy, a heating element and a thermistor. The heater and thermistor keep the grids at a constant temperature (40°C) in order to melt snow to activate the motor and also to dry off the precipitation that may accumulate on the sensor boards.

Inside the collector are mounted the electronic printed circuit board, the drive motor and gear box, the transformer, the micro switch assembly, and the interior housing heater.

The printed circuit board (P.C. board) interfaces the sensors to the motor which moves the roof cover. Precipitation is detected by the sensor grids and activates a relay on the P.C. Board. The relay energizes the motor. The motor is assisted in driving the roof cover by the counter weight pivot arm. The point at which the motor stops, and in turn the roof cover, is limited by two microswitches. The motor is connected to the roof cover by a chain drive to the pivot arm shaft. A slip clutch mounted on the pivot arm shaft prevents the motor from stripping the gears in the gear box should the roof cover become accidentally jammed.



How the Collector is Put Together

The collector is used to collect precipitation samples for analysis in a laboratory whose data will be catalogued for further study by research scientists and others.

Your collector comes to you packed in a wooden crate of an approximate size of 2' X 4' X 3'.

Remove the screws holding the lid of the crate. Also there may be 2 screws on the sides to remove. They hold the wooden cross support.

The sensor arm and the counter weight are packed separately in the crate.

Remove the sensor arm from the crate.

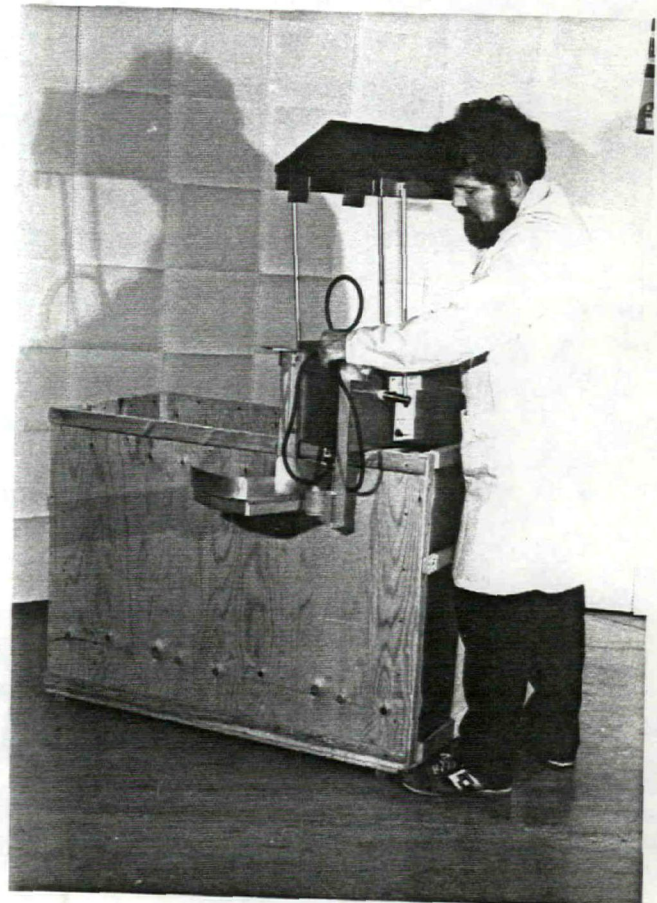
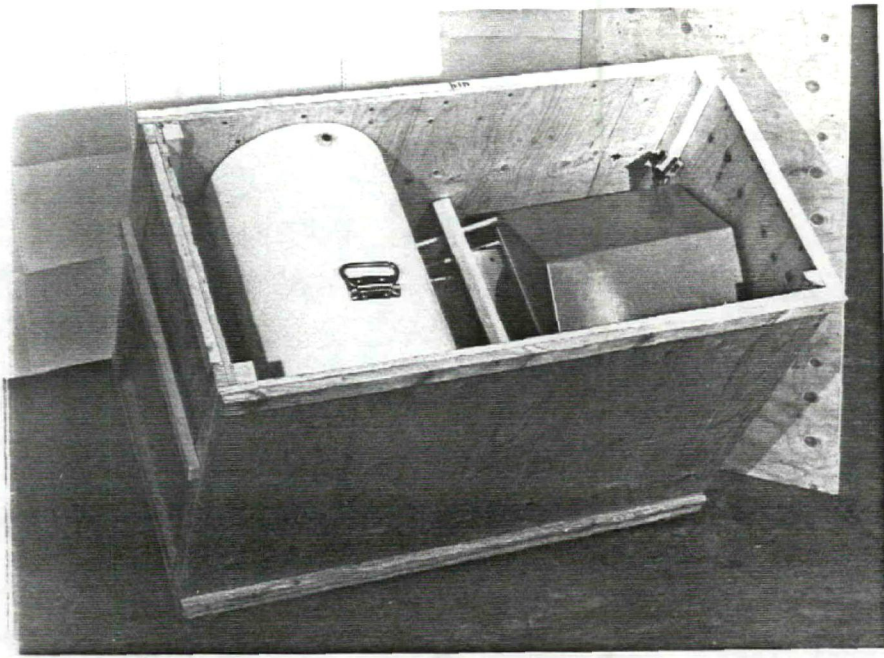
Remove the collector from the crate and place it cross ways on top of the open crate.

Remove the counter weight by taking out the securing screw.

In order to make the collector operational you must

1. Attach the sensor arm.
2. Install the counter weight.
3. Make sure the printed circuit board is in place.
4. Install the 2 sensor grids.
5. Install the slide in lid seal gasket.
6. Mount the collector on its pipe stand.
7. Put the collector bucket in place.
8. Make sure the power switch is off.
9. Plug in the collectors twistloc connector.
10. Turn the power switch on.
11. check the unit for proper operation.

The following pages will tell you how to do the above steps.

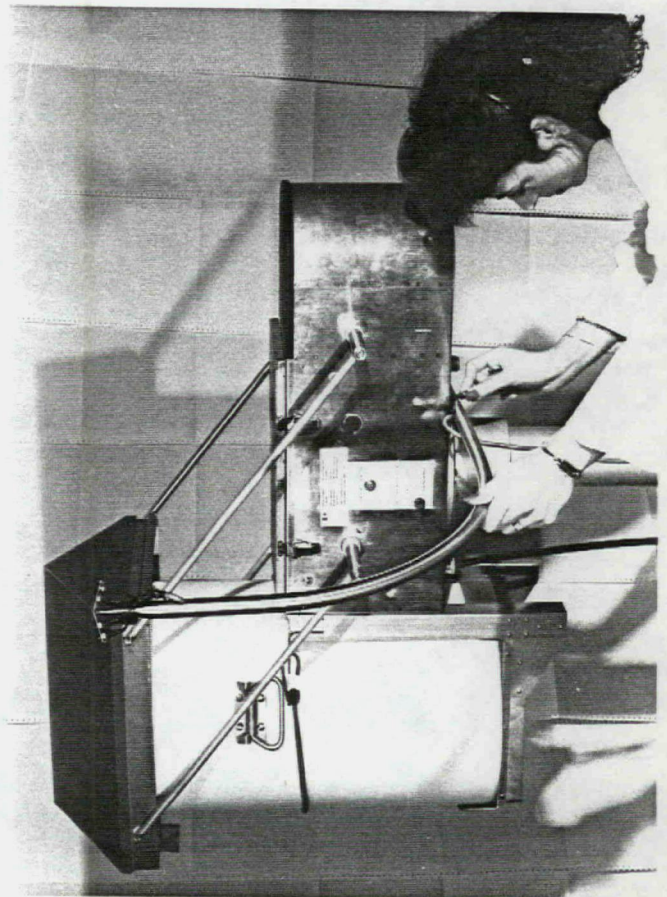
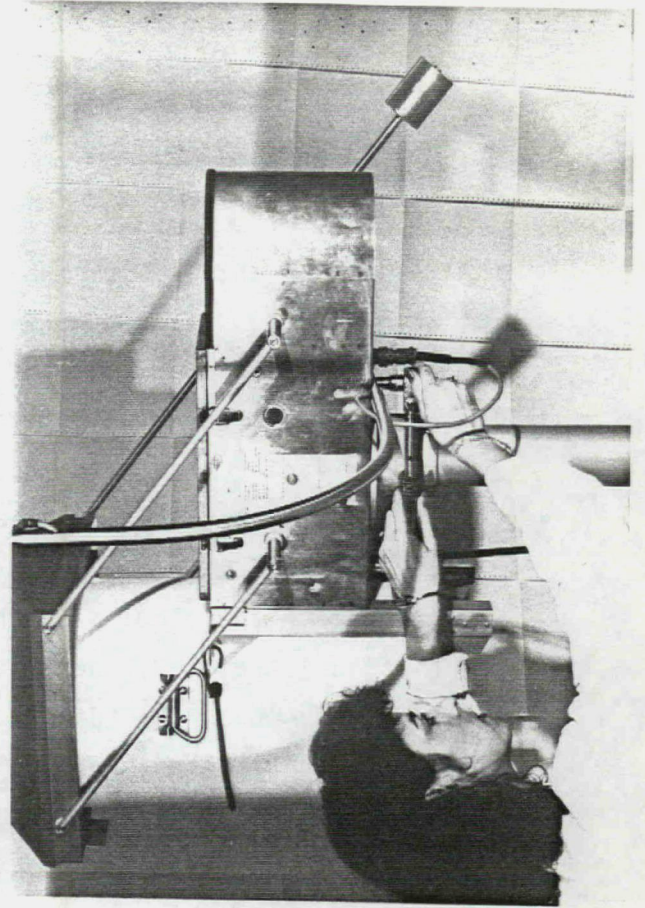
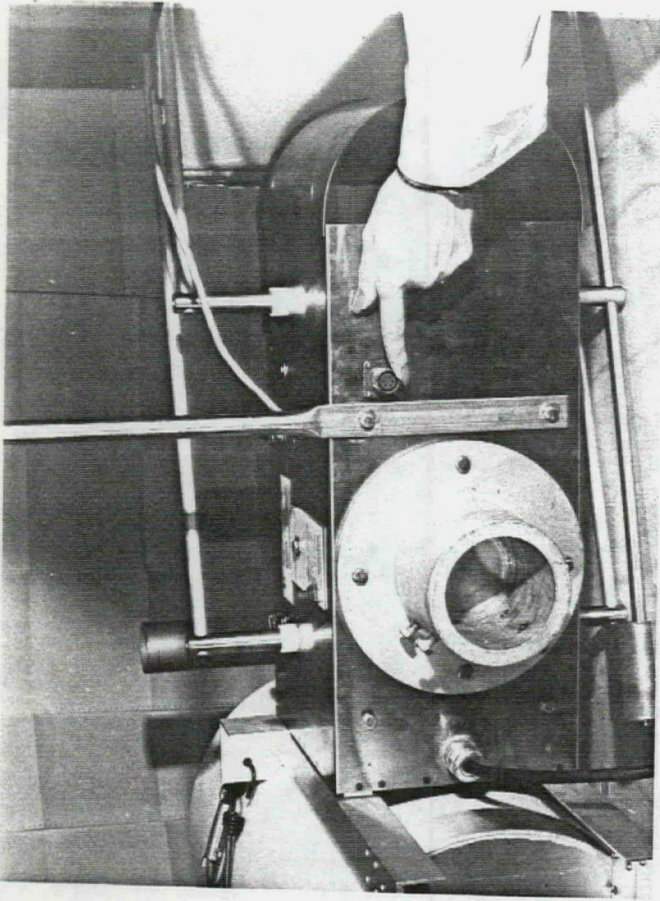


How to Install the Sensor Arm

When shipped the sensor arm is packed detached from the collector in the packing box. It is easiest to install the arm while the collector is on its mounting post but it can be installed while the unit is resting on the edge of the packing crate. The arm should be installed so that it protrudes out on the opposite side of the counterweight, i.e. on the same side as the power switch.

- the power switch should be off and the unit unplugged
- remove the two 7/16" bolts and lock washers on the underside of the collector to the right of the mounting flange - one bolt is located close to the sensor arm cable receptacle - the other one is located in a straight line behind this bolt about 8 inches away
- with the sensor arm curved upward, line up the mounting holes of the arm with the threaded holes of the collector and screw in the two 7/16" bolts (with the lock washers in place)
- with a 7/16" socket or wrench tighten the bolts onto the collector with moderate pressure - DO NOT over-tighten.
- insert the sensor arm cable plug into the receptacle on the underside of the unit - the receptacle is keyed to the plug and must be aligned
- secure the plug by screwing the plug collar onto the receptacle body - be careful not to cross-thread the collar - DO NOT over-tighten the collar

The arm is now in place.

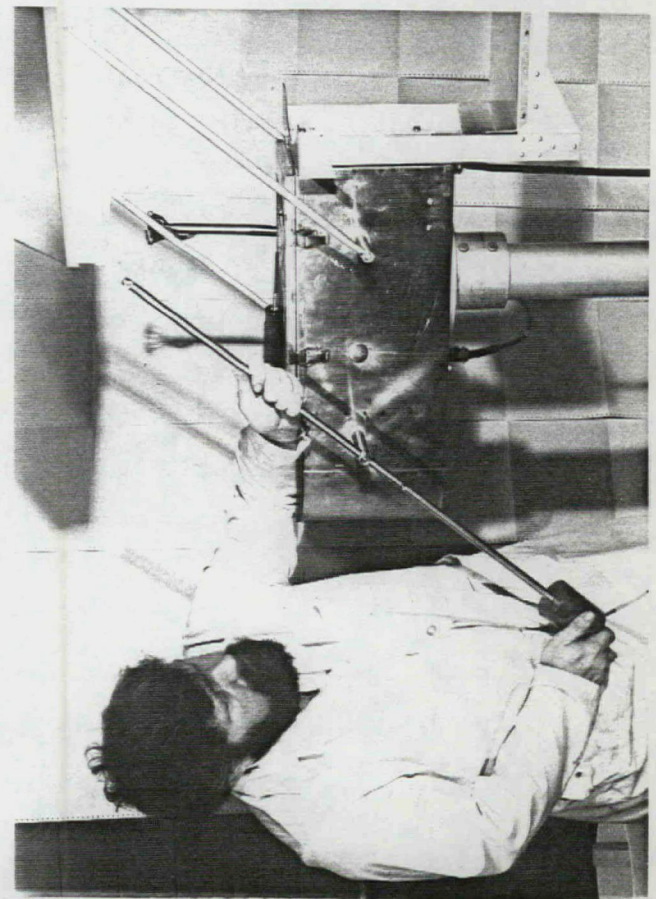
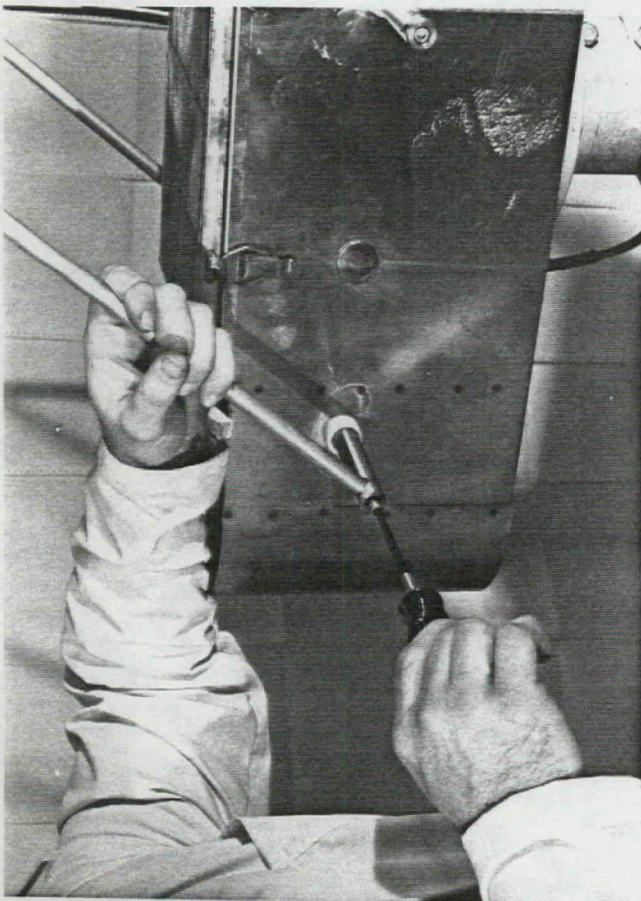
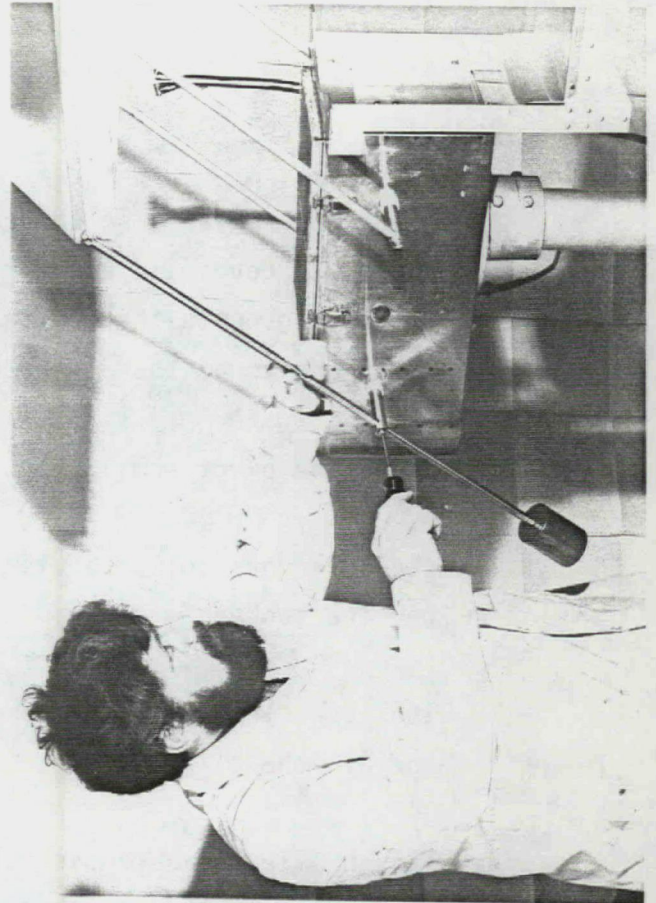
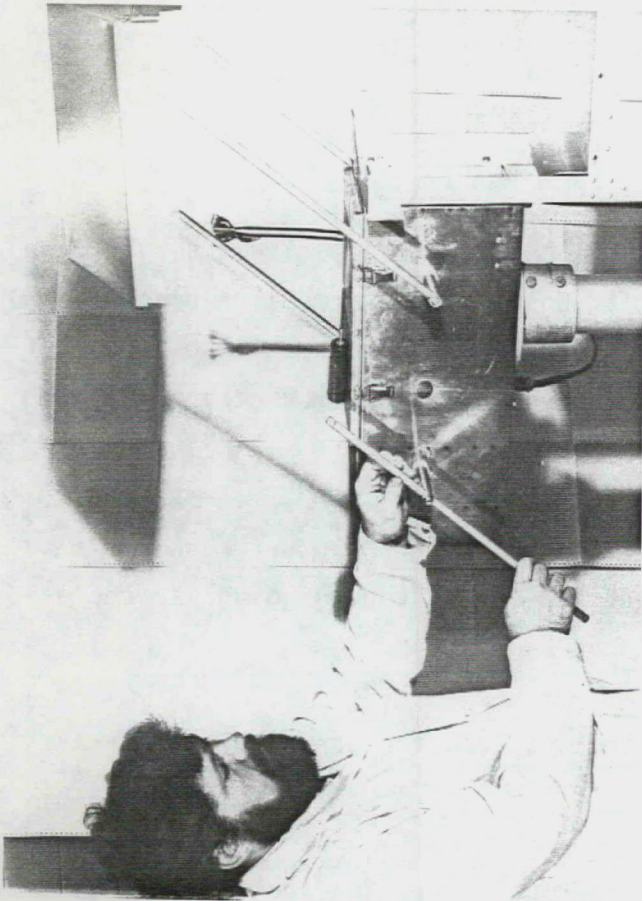


How to Install The Counter Weight

The counter weight assists the motor in the opening and closing of the collectors roof.

To install the counter weight you must first have the collector with the sensor arm facing away from you so that the left "short" aluminum pivot arm supporting the roof is readily accessible.

You now remove the circlip which is located at the top end of pivot arm. Once the circlip is removed, the allen screw and lock washer located at the opposite end, which threads into the shaft is removed. When the allen screw is out, remove the rod. Put the Stainless Steel rod and counter-weight in its place. Once the counter-weight arm is aligned with Stainless Steel shaft and lid cover, the allen screw and circlip can be put back and secured.

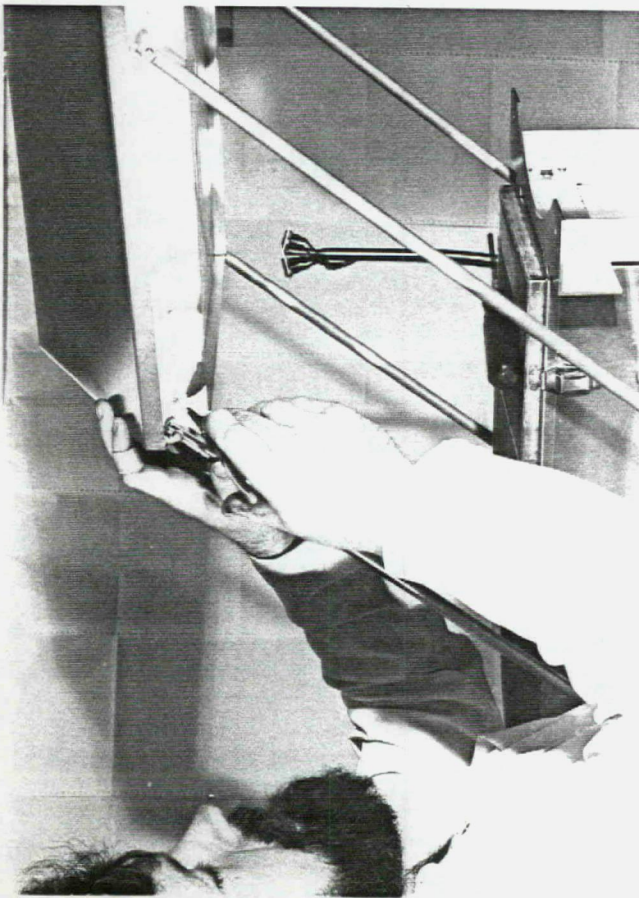
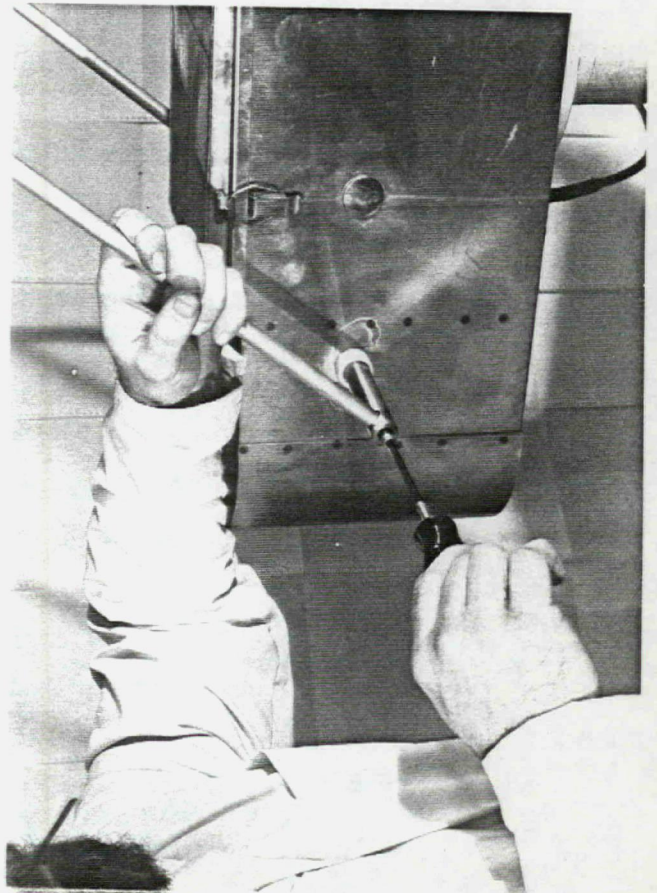
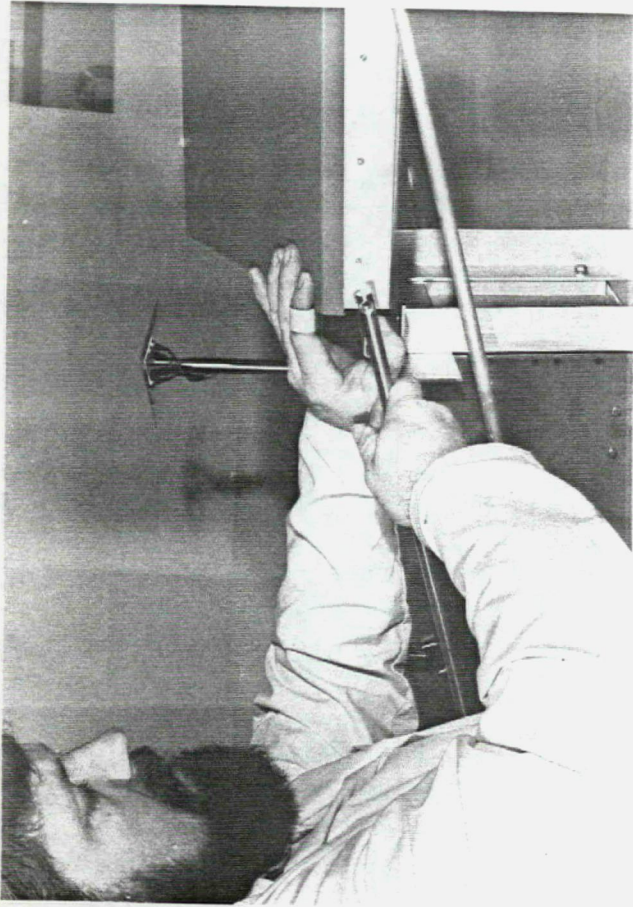
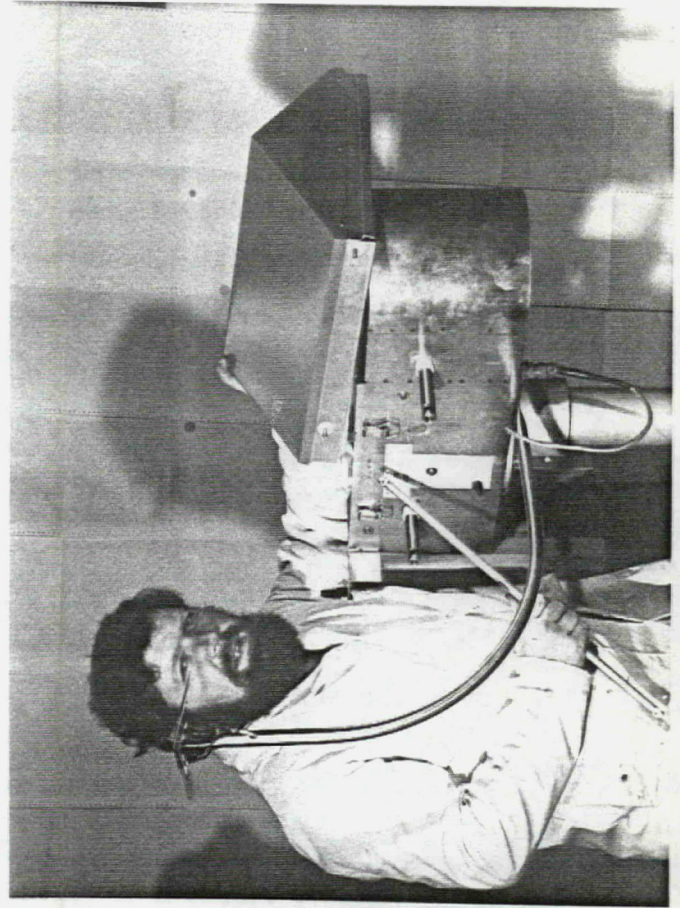


Removal of the Roof Pivot Arms

There are 4 pivot arms on the collectors which support and drive the roof open and closed to cover and uncover the bucket. One of these arms is replaced, after shipping, with the counterweight arm. In order to do repairs on the roof or on the shafts of the collector it may be necessary to remove the pivot arms.

To remove the pivot arms:

- make sure your collector is powered off and that the power plug is removed from the socket
- with your circlip pliers remove the circlips from the top side of each arm
 - retain the clips
- with an Allen key, remove the 4 Allen machine screws and lock washers that are located at the bottom side of the arms, in the end of the collector shafts. Take them all the way out and retain the screws and lock washers.
- while holding the roof pry the top of the arms gently away from the roof pivots - retain the nylon washers on the roof pivots between the pivot arms and the roof
- with the roof removed, gently, with a twisting motion, grab the top of the pivot arm and turn it out of the hole in the collector shafts
- if the pivot arm is the one with the counter weight, it will be necessary to remove it out through the bottom of the shaft hole

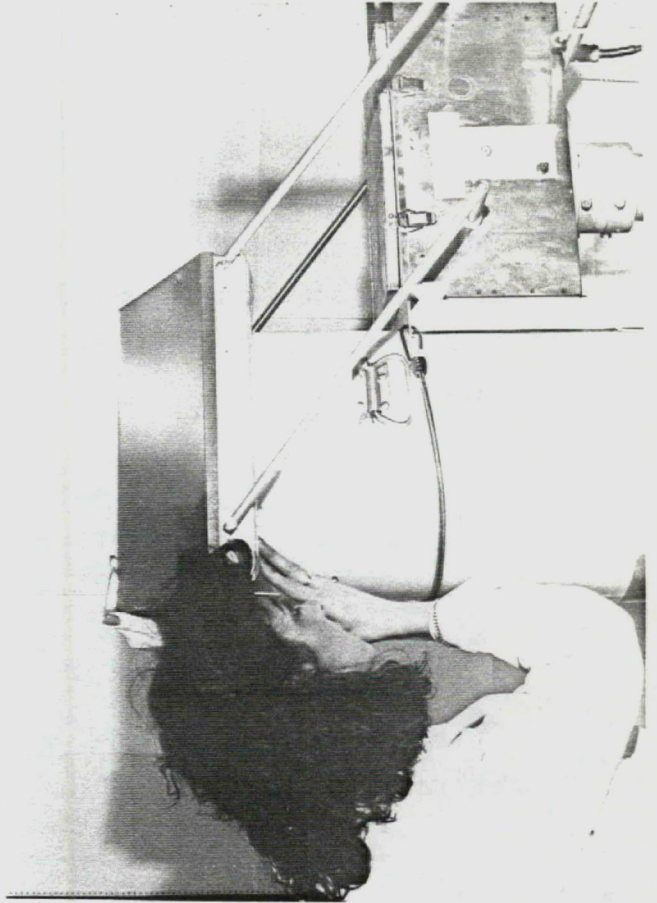


How to Install the Lid Cover Slide in Gasket

There are two types of gaskets presently being used - one is made from a white silicone rubber and the other is made from sponge rubber enclosed in a plastic cover. These gaskets provide a seal over the bucket in the closed position in order to keep dust and dirt out of the samples. Both gaskets are mounted on slide trays. The silicone gasket is glued onto the tray and the plastic/foam gasket is held in place with velcro fasteners.

To install either type of gasket:

- first open the collector to its full open position by placing a wet finger on the sensor grid
- turn the power off when the collector is fully opened
- loosen the screw holding the tab in place - this is located on the right hand edge of the roof opposite the roof tab supports
- lift the tab up to one side and secure it lightly in place
- slide the gasket tray into the two guides on the bottom of the roof so that the gasket material faces downwards
- push the tray all the way in and loosen the tab screw
- let the tab slide over the edge of the gasket tray and secure the tab in place with the screw - DO NOT over-tighten the screw, it may break off.
- turn the collector power on and check the unit for proper operation
- it may be necessary to adjust the microswitch cams in order that the gasket seals the bucket properly in the closed position



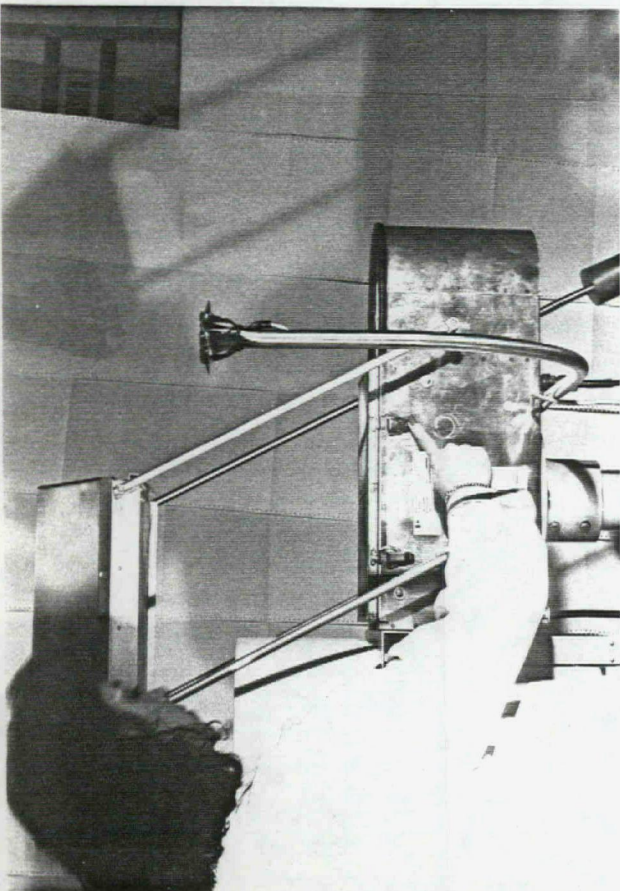
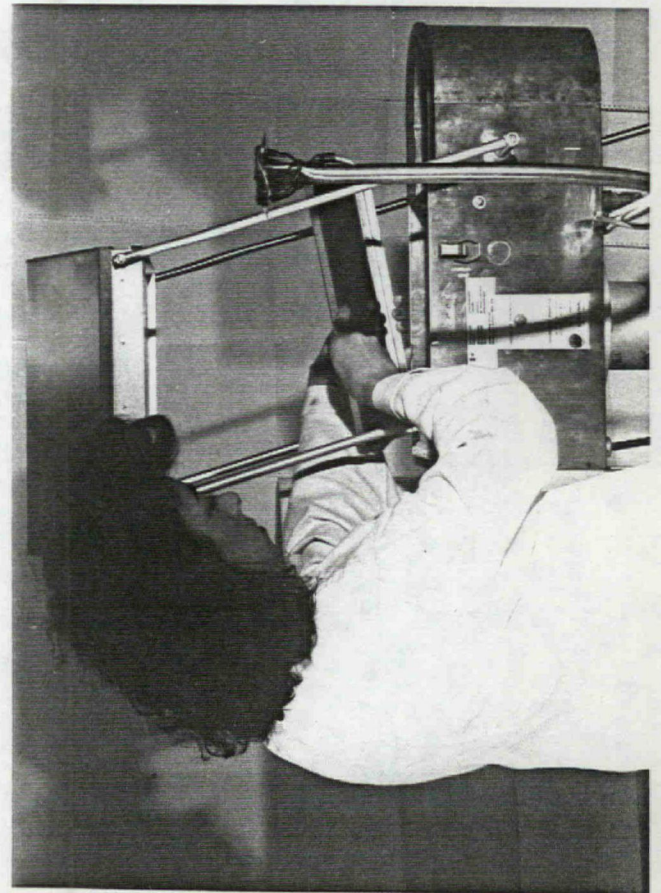
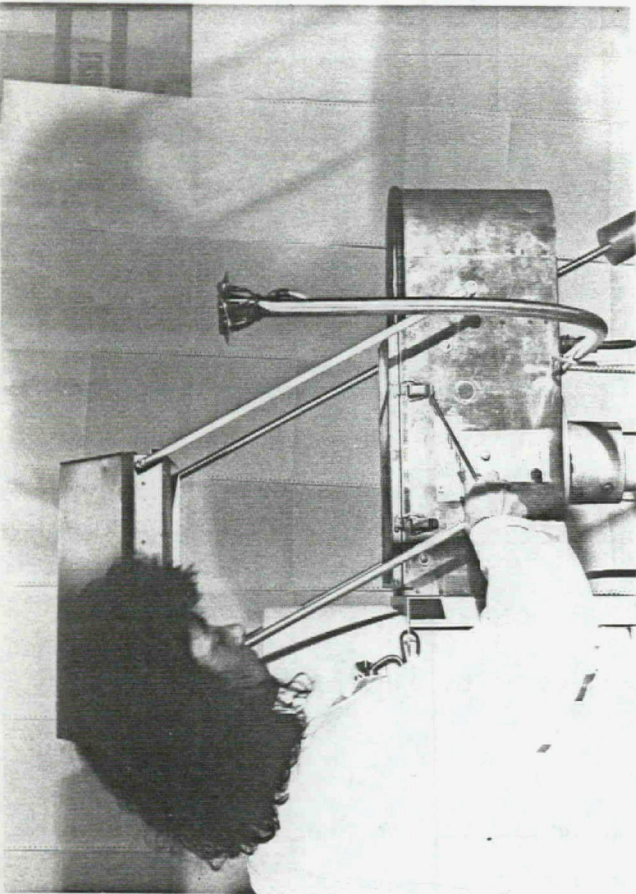
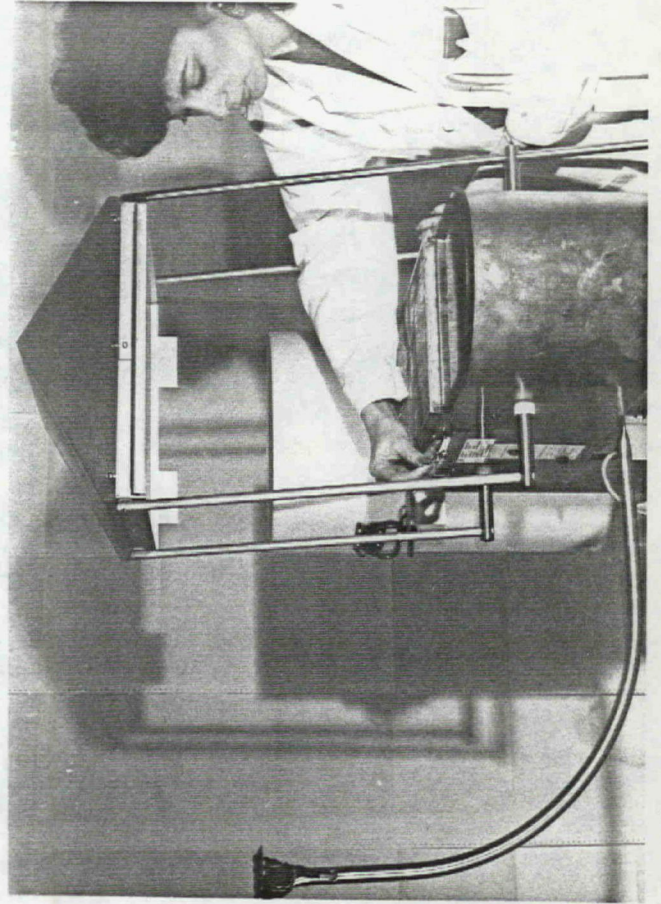
Removal of the Collector Housing Cover

The collector housing is covered by a rectangular stainless steel cover and a stainless steel splash screen. The cover fits over the collector housing and is held in place by four suitcase type latches whose clips are attached to the splash screen. The latches are attached to the collector housing and are spot welded in place.

- to remove the cover lift up on the four latches located at the front and back of the collector. Some latches are quite tight and may have to be pried with a blade screwdriver. Watch your fingers when they spring loose
- remove the splash screen and stand it beside the pipe stand or packing crate.
- remove the collector housing cover and stand it beside the pipe stand or packing crate

When replacing, place the cover on first, then the splash screen. It doesn't matter which way the splash screen is put on as long as the screening material is on the top. Flip the wire catches of the latch over the clips on the screen and push the latches down until they snap closed. You will have to close the latches directly opposite to each other simultaneously otherwise the screen will slip to the side before you get the next latch done up

Should more than one catch break, the unit should be replaced.

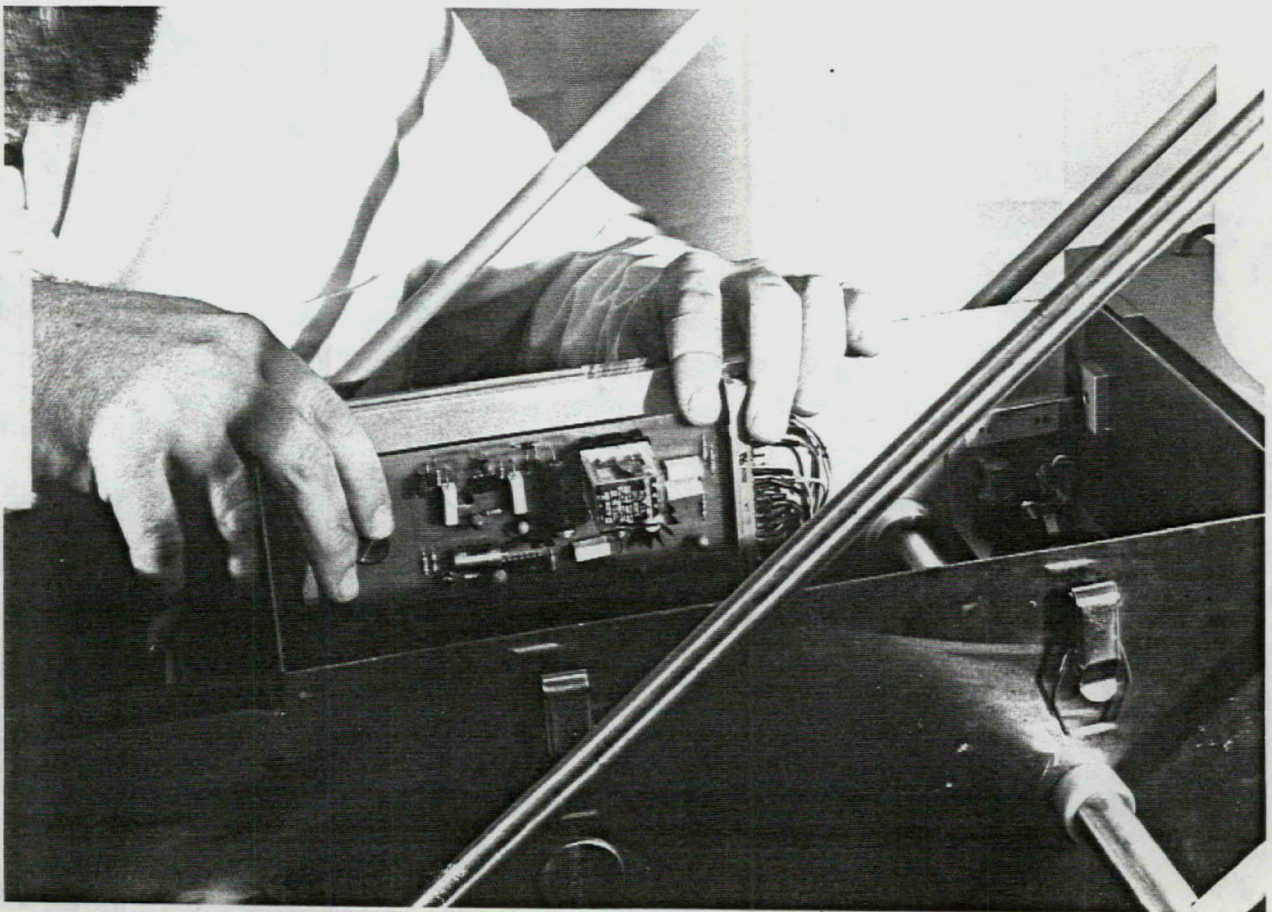


How to Install the Printed Circuit Board

Your collector usually comes with a circuit board pre-installed in the collectors edge connector.

Should you have it shipped separately or for some reason, you have to replace the board follow these steps:

1. The power switch on the side of the collector should be off and the unit unplugged from the Twistloc Receptacle.
2. Remove the screen and collector housing cover by undoing the four flip catches.
3. Remove the round thumbscrew located above and to the right side of the terminal strip on the same side as the on/off switch. Retain the thumbscrew.
4. Make sure the board relay is secure in its socket.
5. Insert the board into the edge connector with the components facing inwards and the printed circuit tabs to the left.
6. Line up the hole on the right end of the board with the thumbscrew socket and screw in the thumbscrew securely. Do not overtighten the thumbscrew as you may crack the epoxy board.
7. Replace the collector housing cover and splash screen and secure the flip catches.
8. Plug in the Twistloc plug and turn the power switch on.



Installing and Checking the Sensor Grids

The sensor grids are the elements of the collector which detect the presence of precipitation.

The sensor Grids may come wrapped in tissue paper. Remove the Sensor Grids from the paper. You will need 2 grids.

1. Turn off the power switch at the side of the collector.
2. Place 2 sensor grids in the sockets of the sensor arm by aligning the pins of the grids with the socket holes and pushing them firmly into the holder, all the way down.
3. Turn on the power switch at the side of the collector.
4. The sensor grids should now start to heat up and reach a temperature of about 40°C.
5. With a bare hand, feel the under side of the sensor grids for warmth. At 40°C you should be able to leave your hand comfortably on the grids. The grids should be warm, not cold nor should they be so hot you would have to withdraw your hand.
6. Moisten the end of your finger with your tongue and place your wetted finger on the top of a sensor grid. The collector cover should open up and stop on the other side leaving the bucket exposed.
7. After about 2 minutes the collector cover should return and stop over the bucket.
8. Repeat step 6 for the other grid and watch the operation of the collector cover.



Checking the Printed Circuit Board for Operation

The circuit board is one of the major components of the collector. IF it does not function properly, the collector will not operate reliably.

The sensor arm and sensor grids should be in place and the printed circuit board should be secure in the edge connector before this check.

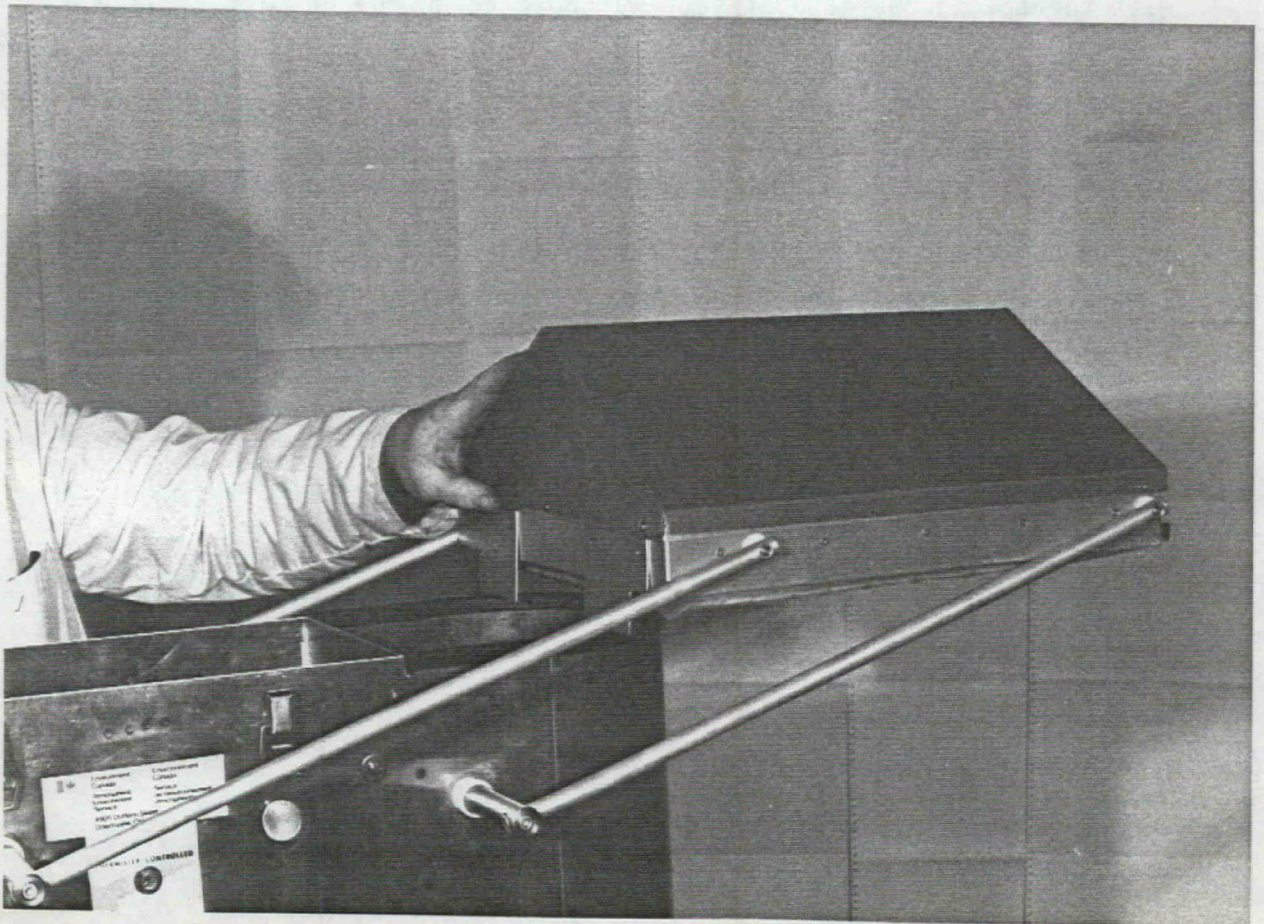
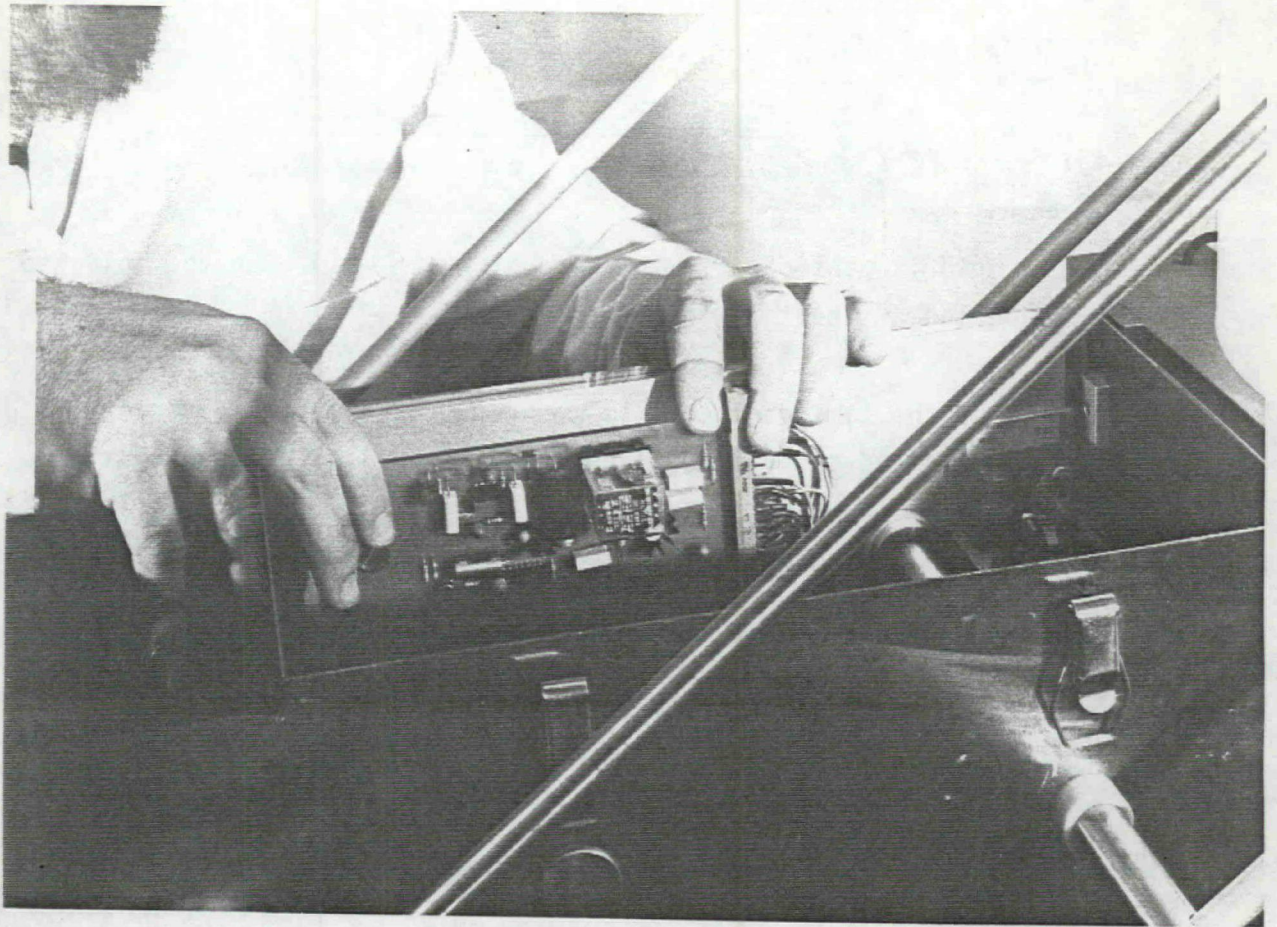
- * Do not place your hands inside the collector housing! There are live wires on the terminal strip. Keep fingers out! Watch out for the moving arms!

Remove the collector housing screen and cover. The collector should be plugged in and the power switch tuned on.

While watching the Printed Circuit board relay through its clear plastic housing, place a wetted finger on a sensor grid. You should be able to see the relay contacts move and at the same time the collector lid should open and expose the bucket.

After about a 2 minute delay you should again see the relay contacts move. The collector lid should return and cover the bucket.

10B



Testing the Sensor Grid Timing

The sensor grid is part of a timing circuit which will open the collector for a minimum period of about 2 minutes.

The purpose of the timing circuit is to keep the collector cover from rapidly starting to open and close under light drizzle or light rain conditions.

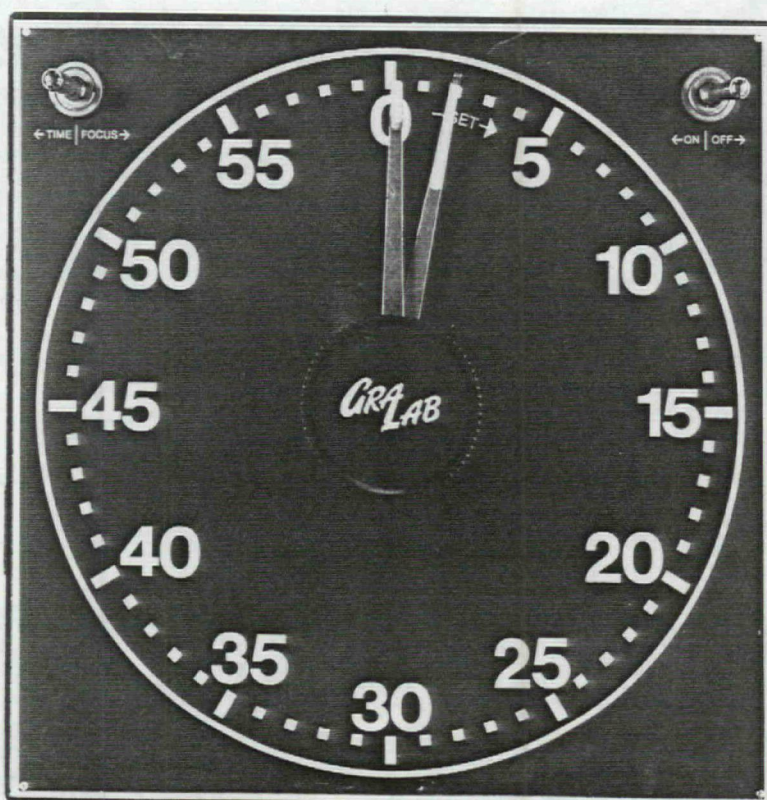
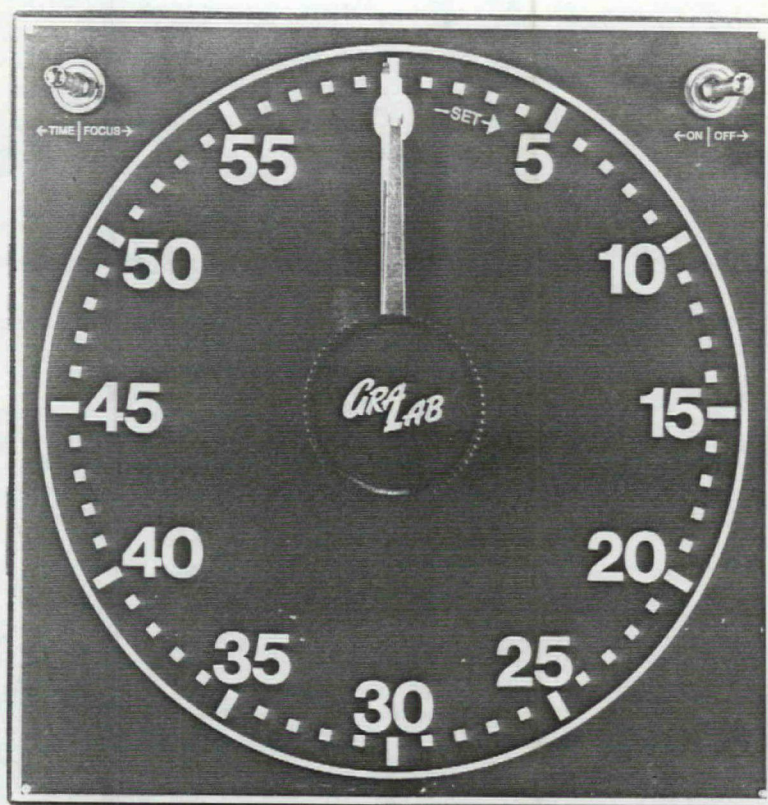
To check out the timing of this circuit you will require a time piece, (watch, clock, egg timer or sundial) preferably a watch with a sweep second hand.

With the sensor arm, sensor grids and P.C. Board installed, make sure the power to the collector is on.

You can conduct this test on a dry day, (no rain or snow), or inside the sample handling area.

Wait for the second hand of your watch to reach the 00 mark. Place a wetted finger on the sensor grid and watch the collector cover open. Approximately 2 minutes should pass before the cover starts to close. Keep on eye on your watch and take note of the amount of time it takes.

If the collector cover stays open much less than 2 minutes or much longer than 2 minutes under dry conditions, you should replace the printed circuit board.



ELECTRICAL PARTS

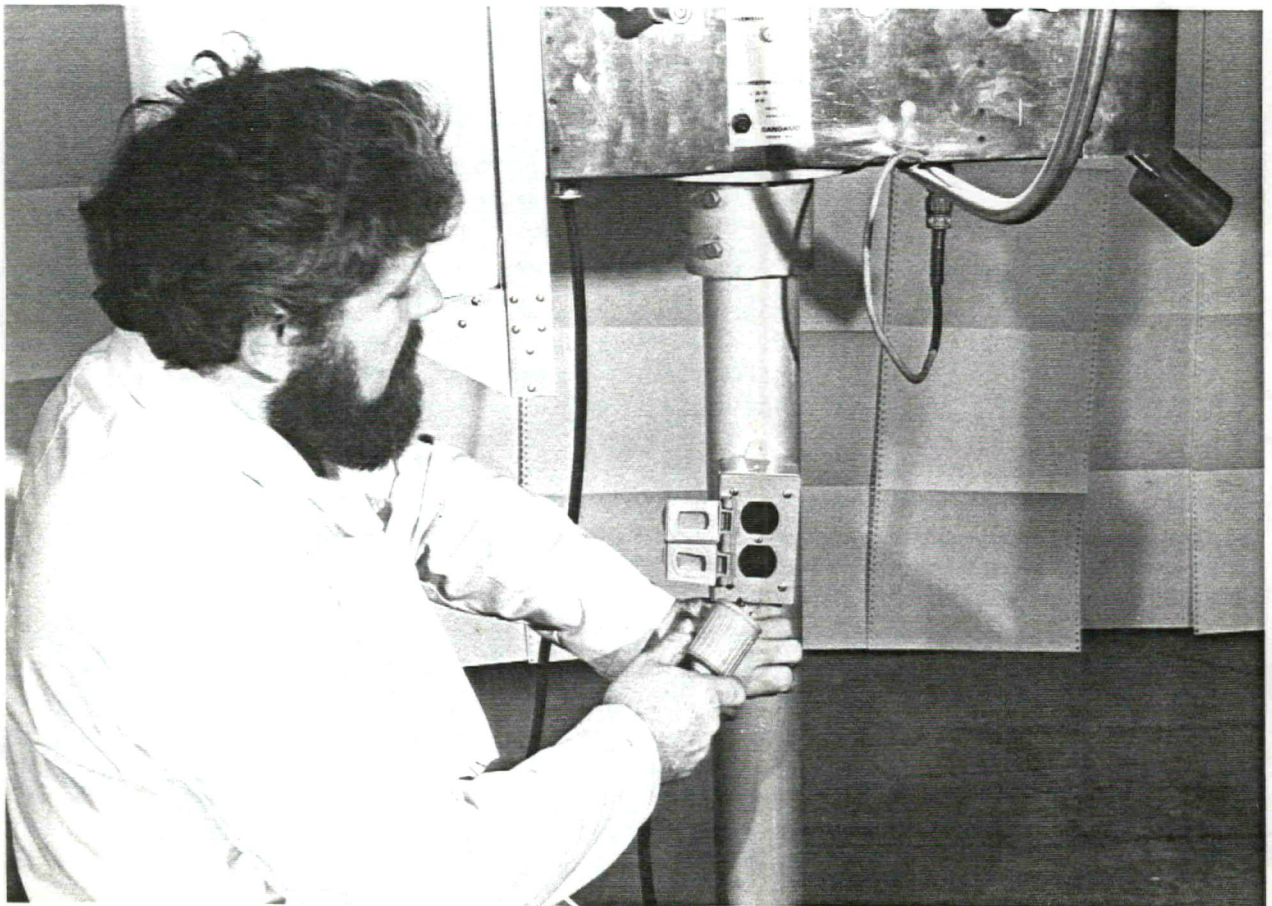
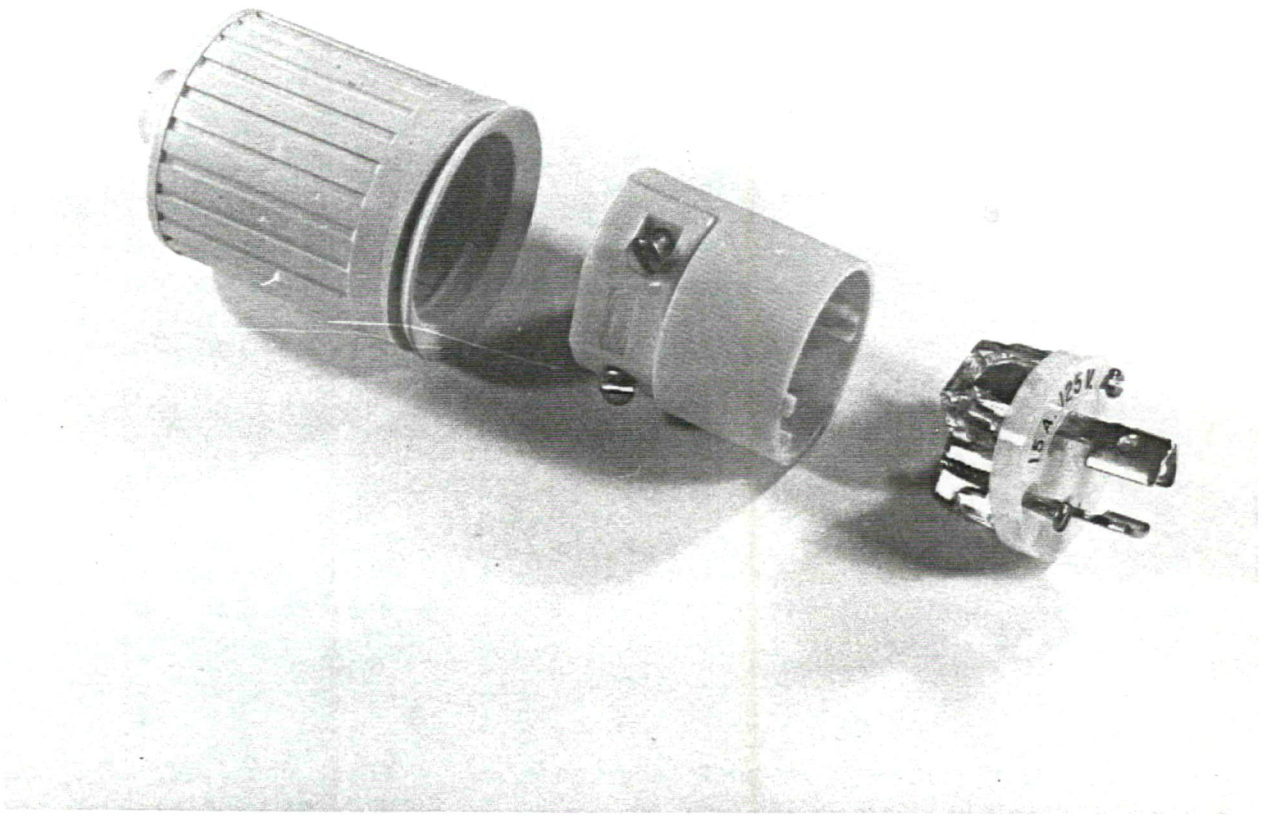
A.C. Power Cord and Connectors

The power plug (twist loc) is used to provide 110V AC to the collector. It may be necessary to replace the plug if it gets damaged.

The power plug is a twist type plug that has a yellow rubber boot over it.

To replace the plug and install a new one the following steps should be followed.

1. Remove the rubber boot by moving the boot upward on the cable.
2. Unscrew the three screws on the white bottom. (It requires only one turn to undo each screw.)
3. The white bottom will separate from the top.
4. Unscrew the top two screws on the yellow top to loosen the power cable.
5. The inner side of white bottom part has three screws (green, silver, bronze).
6. Connect green lead to (i.e., ground) to green screw.
7. Connect black lead (i.e., hot) to bronze screw.
8. Connect white lead (i.e., neutral) to silver screw.
9. Place the yellow top on the white bottom part. Make sure that the key, on the yellow top is lined up with white bottom part.
10. Tighten up the two screws on the yellow top.
11. Tighten up the three screws on the white bottom.
12. Place the yellow boot back over the plug.



Troubleshooting the Collector

Symptom	Possible Cause	What To Do
Collection will not open or close. Sensor grids cold.	<ul style="list-style-type: none"> - No main power to unit. - Power switch off. - Fuses blown. - Broken wire in power cord. - Sensor Arm not plugged into receptacle. 	<ul style="list-style-type: none"> - Check the power switch. Is it on? (use the cheater cord and light bulb to check) - Check the fuses. - Look for bad wiring in the cord. - Plug in Sensor arm.
Collector will not open. Sensor grids warm.	<ul style="list-style-type: none"> - Corrosion in Sensor arm plug. - Bad P.C. Board. 	<ul style="list-style-type: none"> - Check for corrosion in plug and receptacle of sensor arm. Clean if possible - Change the P.C. Board.
Collector will not close. Sensor grids warm.	<ul style="list-style-type: none"> - Water in the Sensor Arm Plug. - Bad P.C. Board - Bad microswitches 	<ul style="list-style-type: none"> - Check connector of sensor arm for wetness. Dry if possible. - Change P.C. Board - Call Inspector
Motor Hums but will not open or close.	<ul style="list-style-type: none"> - bad motor - clutch slipping - gears worn 	<ul style="list-style-type: none"> - Call inspector
Motor continues to hum after lid opens or closes	<ul style="list-style-type: none"> - microswitches not set properly - snow or leaves on bottom of bucket or support bracket 	<ul style="list-style-type: none"> - Call inspector - Clean bottom of bucket and support bracket
Lid operates open and closed but grids are cold	<ul style="list-style-type: none"> - sensor grids burnt out - P.C. Board is bad 	<ul style="list-style-type: none"> - Change sensor grids - Change P.C. Board
No Recognizeable Symptom.	<ul style="list-style-type: none"> - ? 	<ul style="list-style-type: none"> - When in doubt call your Inspector

13B



ELECTRICAL PARTS

How to Check and Replace the Fuses

The fuses are located inside the housing of collector. They are close to the bucket end of the collector and are marked F_1 and F_2 . F_1 is used for motor circuit and F_2 is for heater circuit. It may be necessary to replace a fuse at some point due to some malfunction of the electrical system.

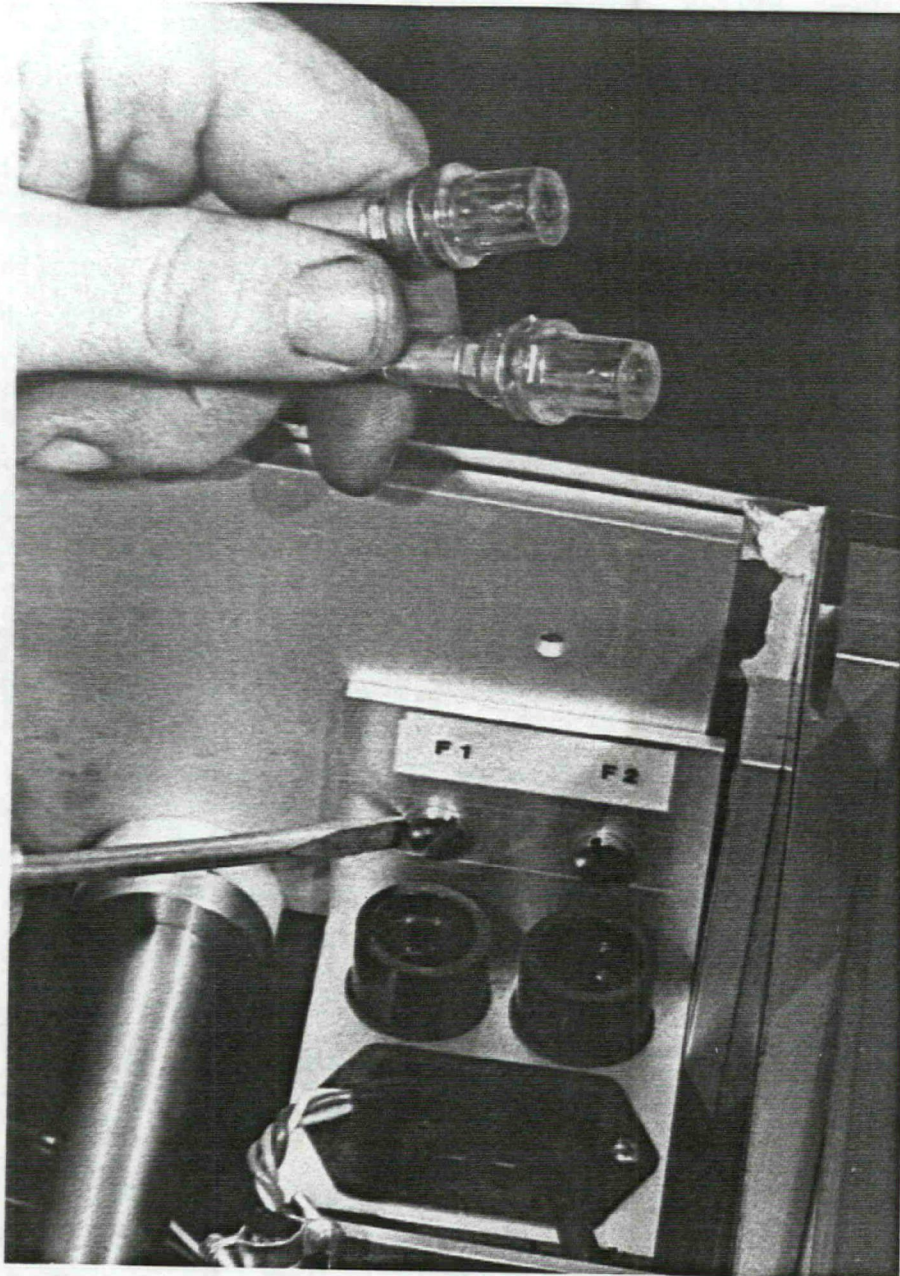
F_1 is a slow blow 2 amp. fuse and F_2 is a fast acting 1 amp fuse.

During a visual inspection if the light in the any of the fuse holder tops is on it means that corresponding fuse is open or burnt out.

The following procedure should be followed to replace the fuse.

1. Turn the power off.
2. Push down the top part of the fuse holder and turn it anti-clockwise. The top will pop open.
3. The fuse will come out with the top part of the fuse holder.
4. Replace this fuse with the new one. Always make sure that the type and current rating corresponds to that of the open fuse.
5. Insert the fuse and top into the fuse holder.
6. Push the top downward and then clockwise. One quarter of a turn is needed for this operation.
7. Turn the power on and check for proper operation.

14 B



How to Install (TFE) Peaked Roof

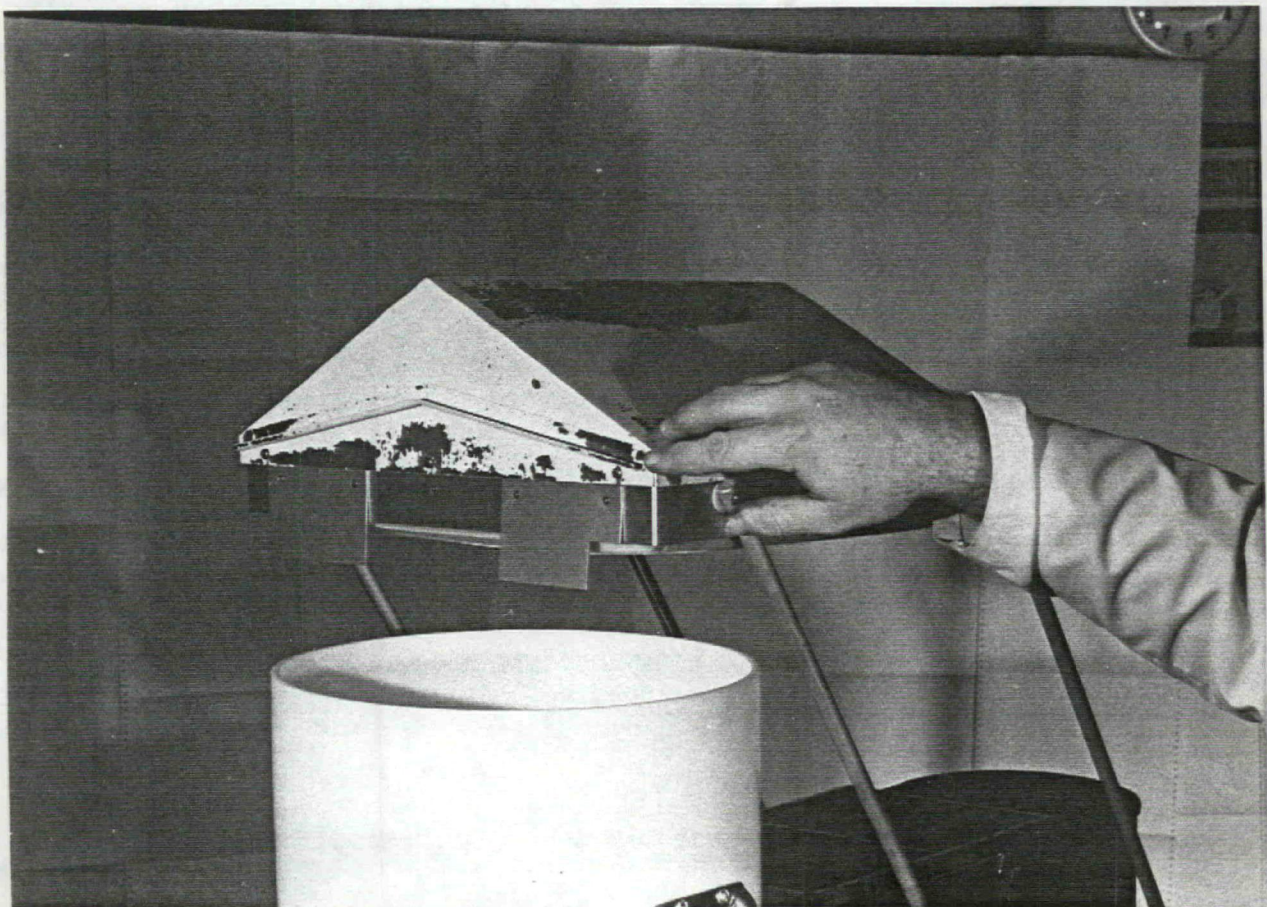
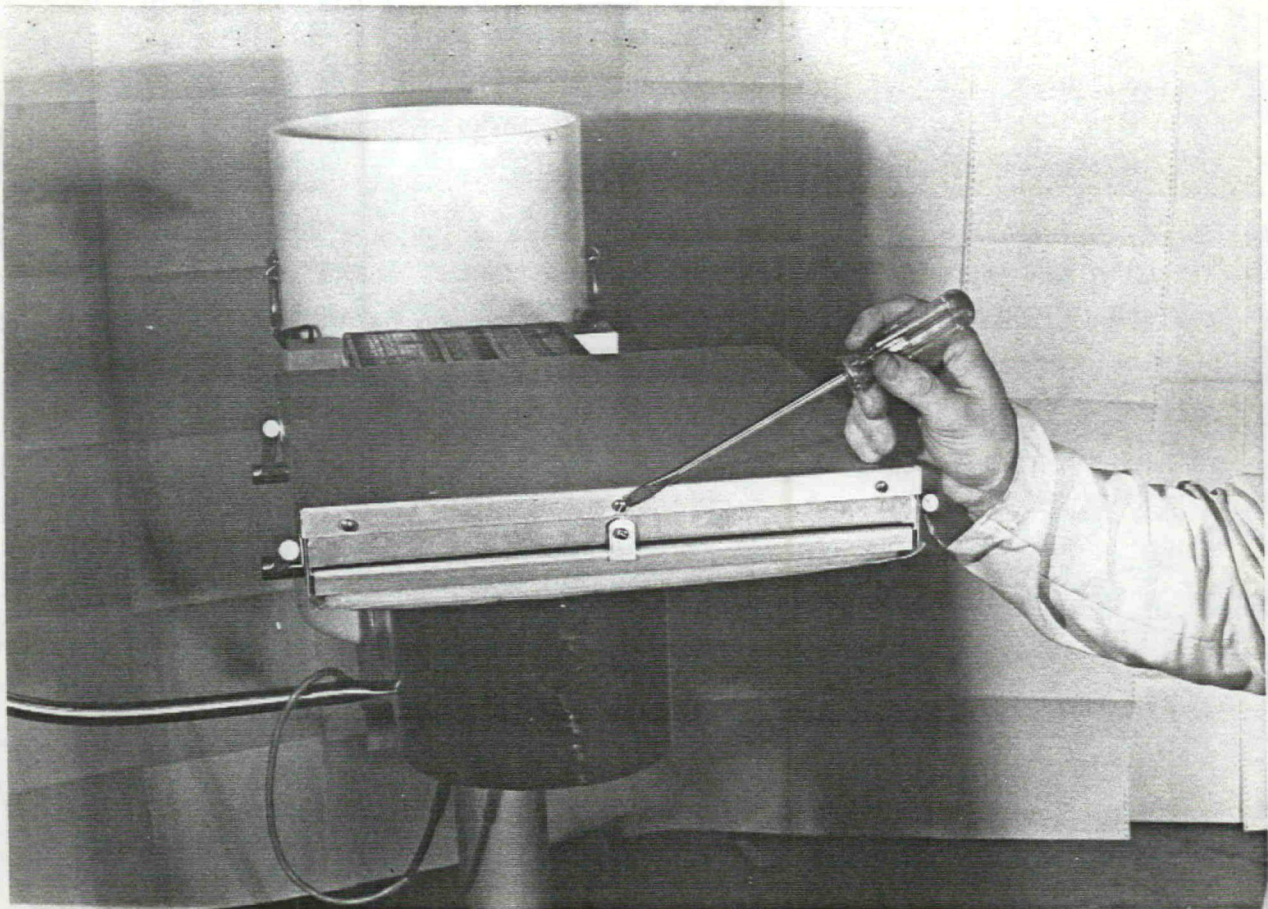
The roof is fitted to the collector cover to prevent snow and foreign material from collecting on the cover and dropping into the sample bucket when the collector starts or stops its movement.

As you look at the peaked roof you will notice that it has six small "cut-outs", three in the front and three in the back of it. These small "cut-outs" are made to line up with six screws on the lid cover (three on the front, three in the back). These six corresponding screws should be partially removed.

Now as you hold the peaked roof make sure that the small trough is on the side of the bucket.

You now slide the peaked roof over the lid cover so that six screws fit into the six cut-outs and fasten the six screws onto the roof.

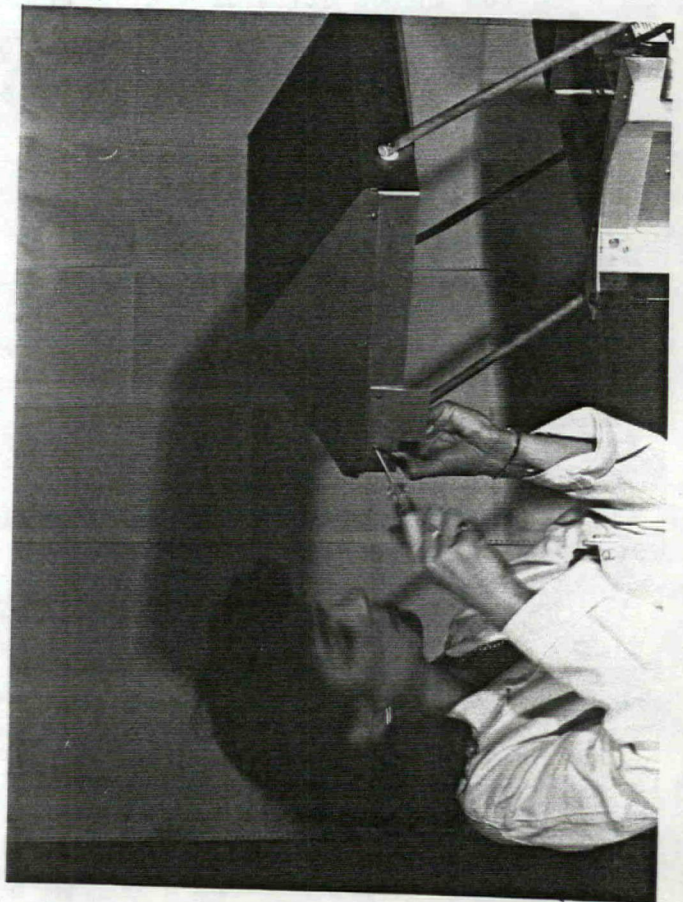
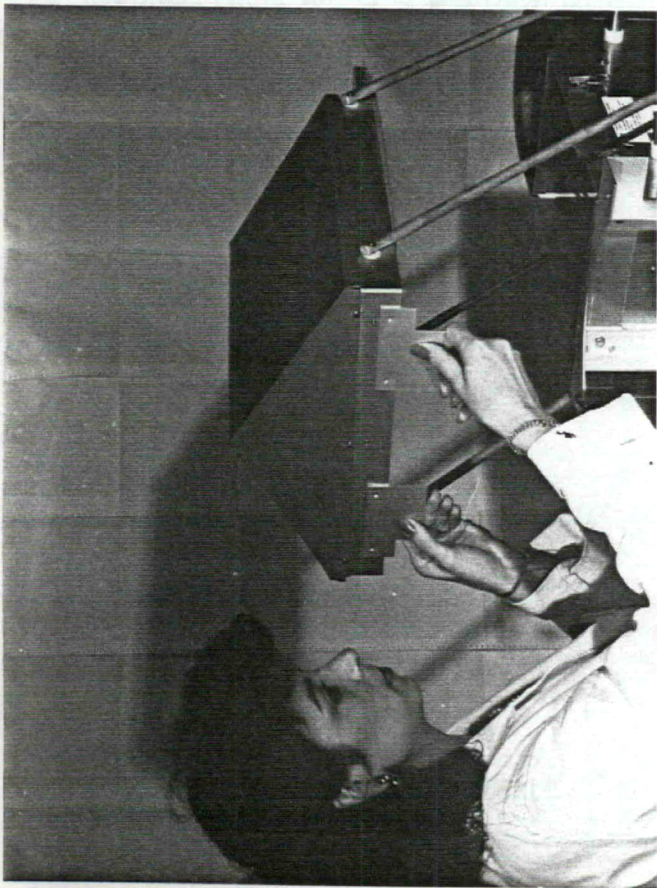
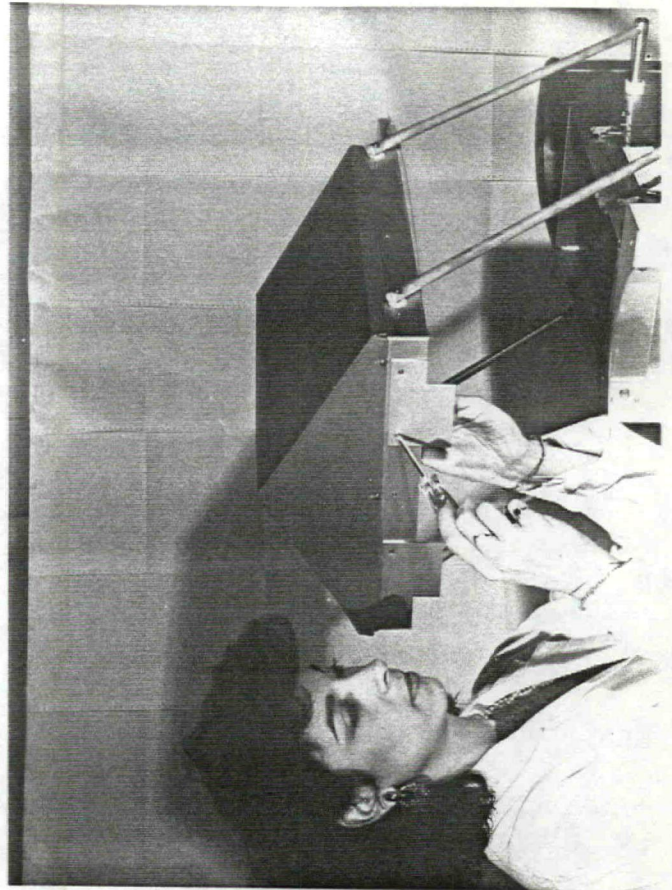
15B



Installation of the Roof Tab Supports

The roof tab supports should be located on the left hand edge of the roof as you are facing the collector with the power switch facing you. The roof tabs prevent the roof from putting too much pressure on the microswitches while the collector is in the OPEN position. They must be in place. The unit is normally shipped with these tabs in position, but for some reason they may be missing or may have been damaged.

- to install new roof tabs, move the roof to the closed position over the bucket if it is not already there
- turn the power off
- remove the 2 left hand Phillips screws and nuts located on the left edge of the roof and retain the screws and nuts in your pocket
- remove the 2 right hand Phillips screws and nuts, located on the left edge of the roof and retain the screws and nuts
- the center screw does not have to be removed
- the support tabs are 'L' shaped aluminum pieces with 2 countersunk holes on their top edge
- align the left hand tab holes with those in the roof - the countersunk holes should face toward you and the notch cut should be in the bottom left corner facing the outside of the collector
- find 2 loose Phillips screws and nuts in your pocket and screw the left hand tab in place
- do the same for the right hand tab - the notch should be in the bottom right hand corner facing the outside of the collector
- once both tabs are in place, turn the collector power on and open the collector by touching the grids with a wetted finger
- the roof should come to rest on the collector with the roof tabs supporting the weight of the roof
- it may be necessary to adjust the microswitch cam if the motor continues to run when the roof is in the full open position and at the end of its travel



HEAT SEALER

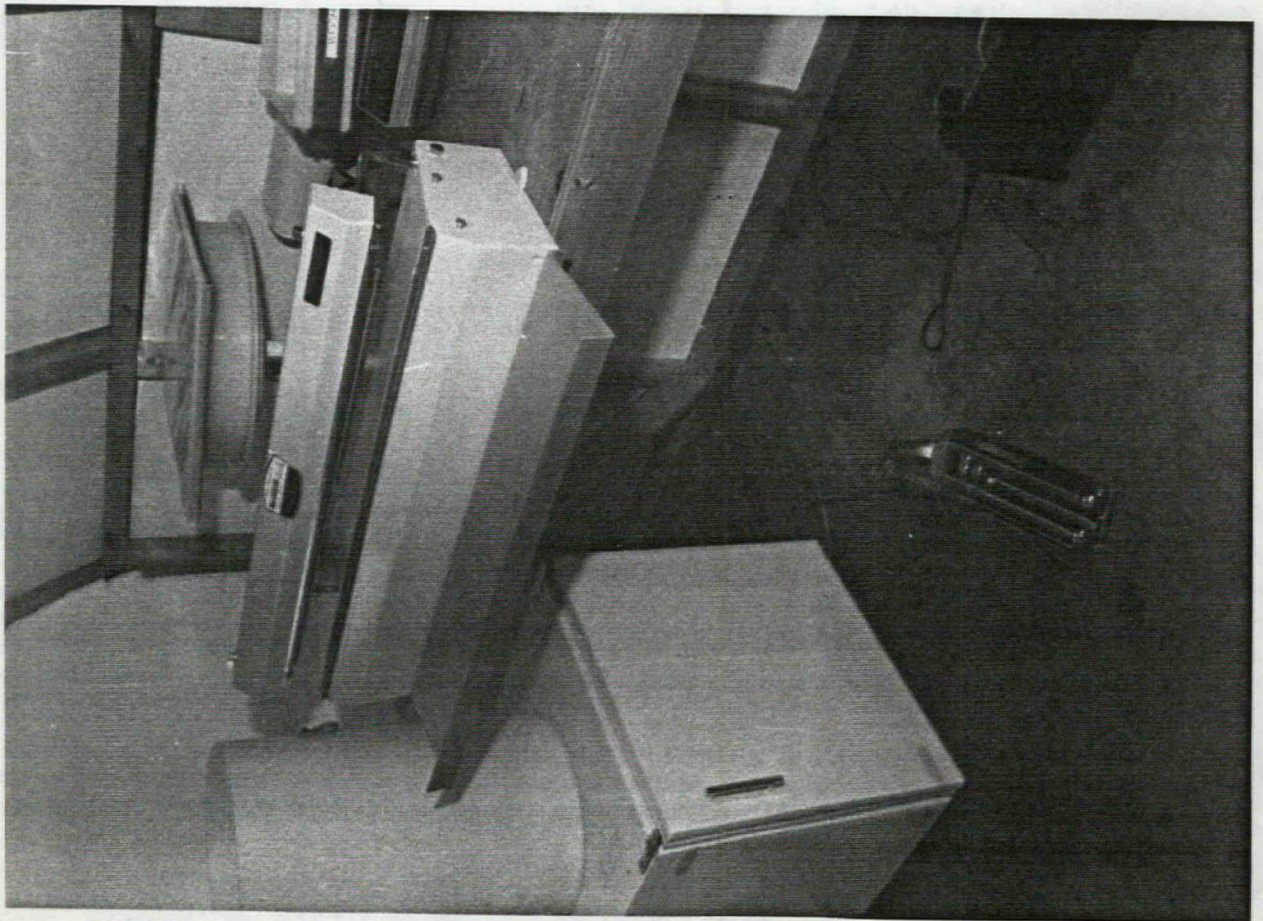
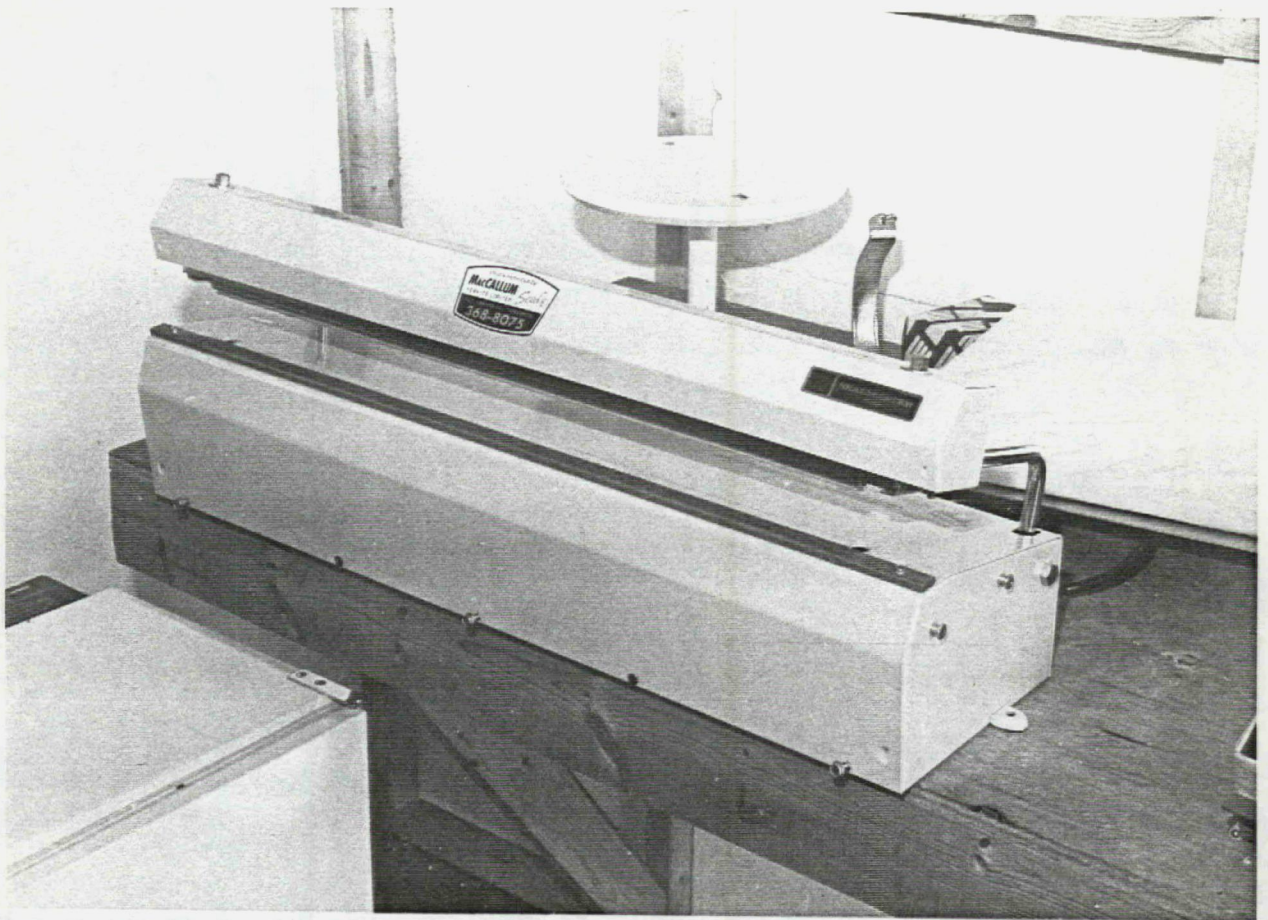
Operation and Setting of the Heat Sealer

The Heat Sealer is used in the CAPMoN Network to seal all sample bags.

The heat sealer is controlled by a foot pedal which when depressed, forces the top arm of the sealer into contact with the heater bar. When contact is made the heater bar heat seals the polyethylene film compressed between the arm and the heater bar.

The heating time interval required to make a proper seal depends upon the material being sealed. The heating interval is controlled by a dial on the left of the sealer. Under normal operation, the dial should be set at setting #4.

When the top arm is depressed and a seal is being made, a buzzer will sound for the duration of the sealing interval. The top arm must be depressed for 1 to 2 seconds after the buzzer to allow the seal to cool while being compressed between the jaws of the collector.

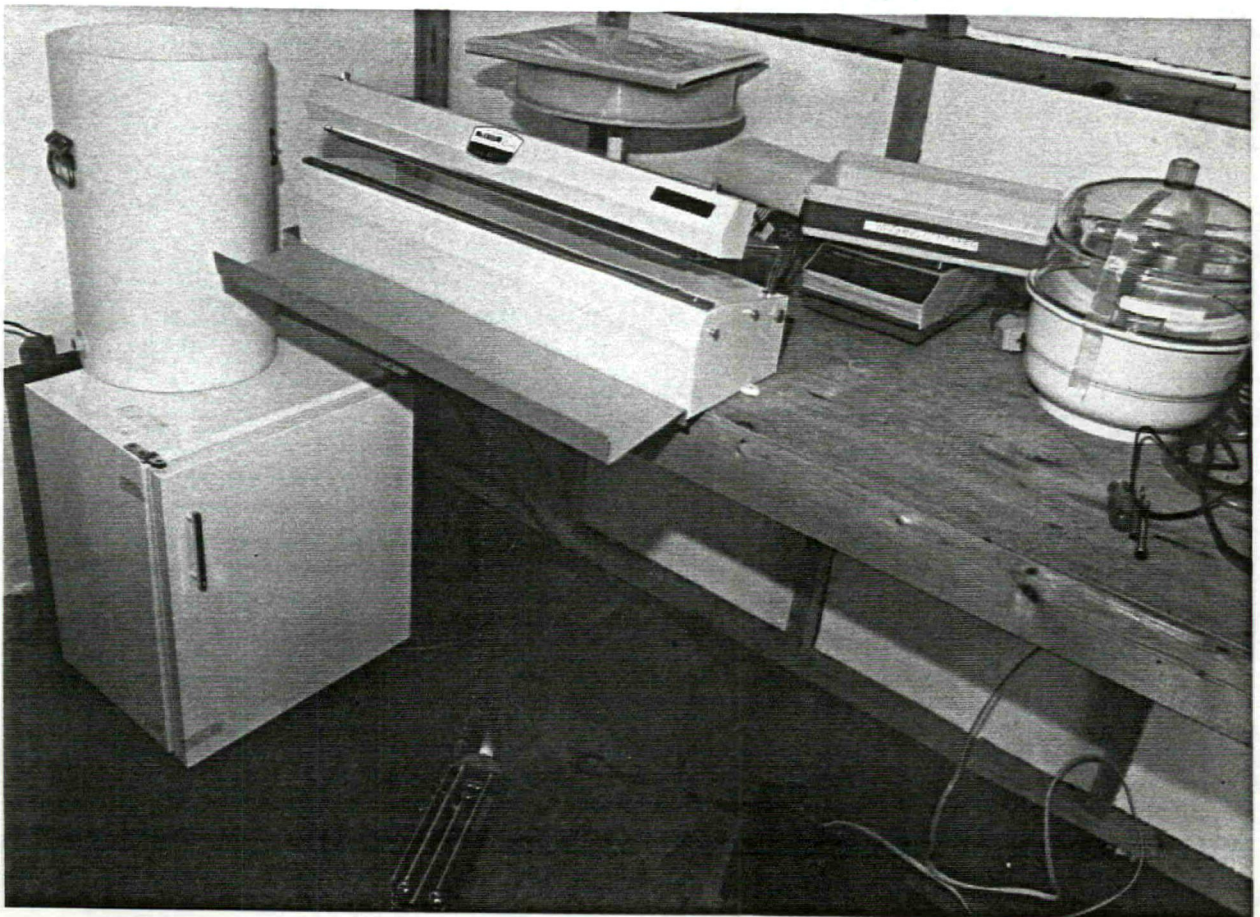
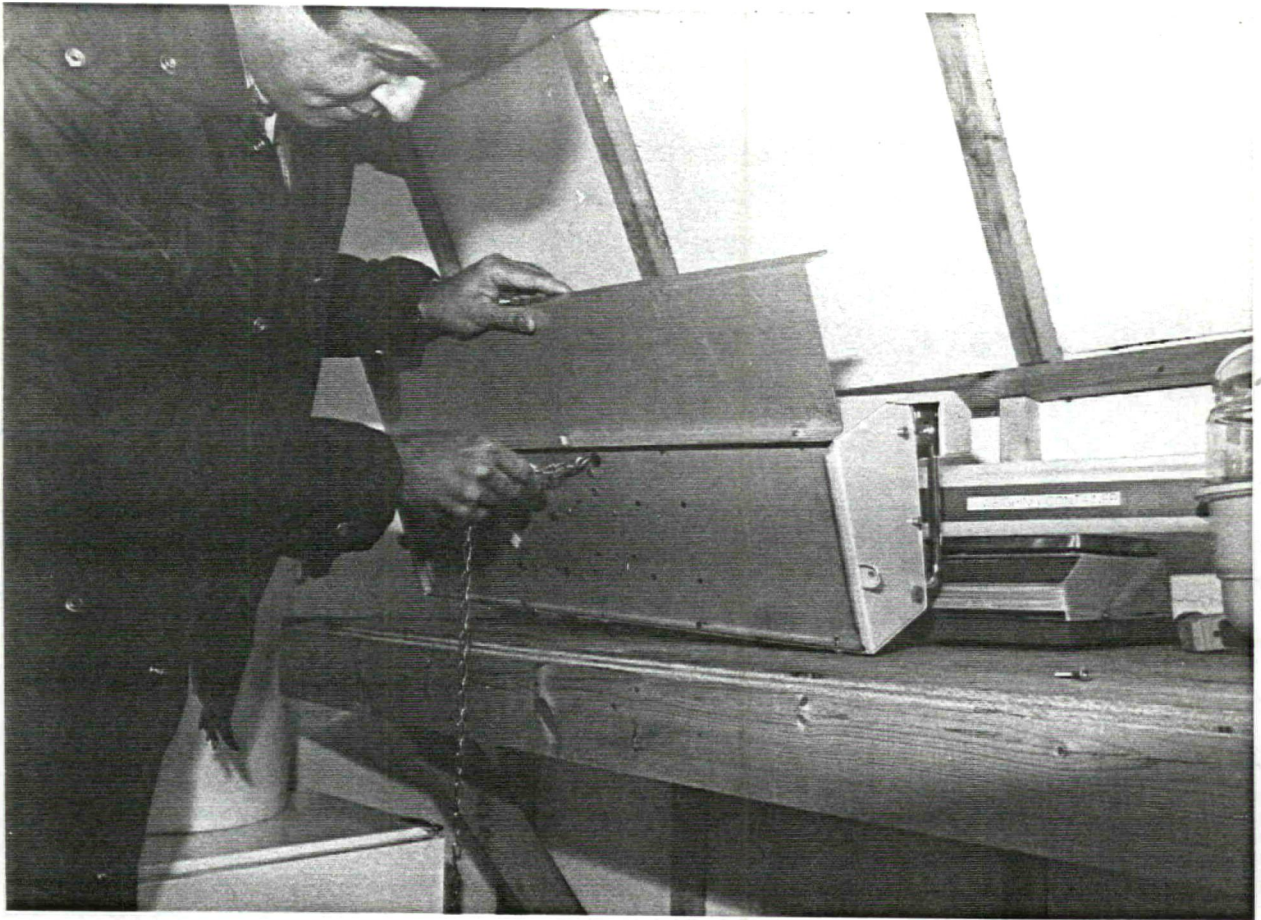


Installing the Heat Sealer Chain and Pedal

The Chain/Pedal system enables the operator to handle the sample bag with both hands during the sealing operation. The chain and pedal can be installed as follows:

1. Set the sealer in its final location in the sample handling area.
2. The front edge of the heat sealer should be at least 1" ahead of the work bench. This will allow the foot pedal chain to run freely.
3. Screw the sealer to the work bench using the side mounting brackets and screws provided.
4. Press down the top arm of the sealer. A hook will appear at the bottom front of the sealer body. Attach the chain to the hook.
5. Attach the foot pedal to the bracket at the end of the chain using the #3 screws provided.
6. Now you need to adjust the chain length. This can be done as follow:
 - (a) Press down the top arm of the sealer until it makes solid contact with heater bar on the lower housing.
 - (b) Hook the appropriate chain-link to the exposed hook.
 - (c) check the adjustment by sealing the bag.

Note: An alternate method of installation is to align the front edge of the unit with the bench and secure it in place. In this case a hole will have to be drilled through the bench for the foot pedal chain.



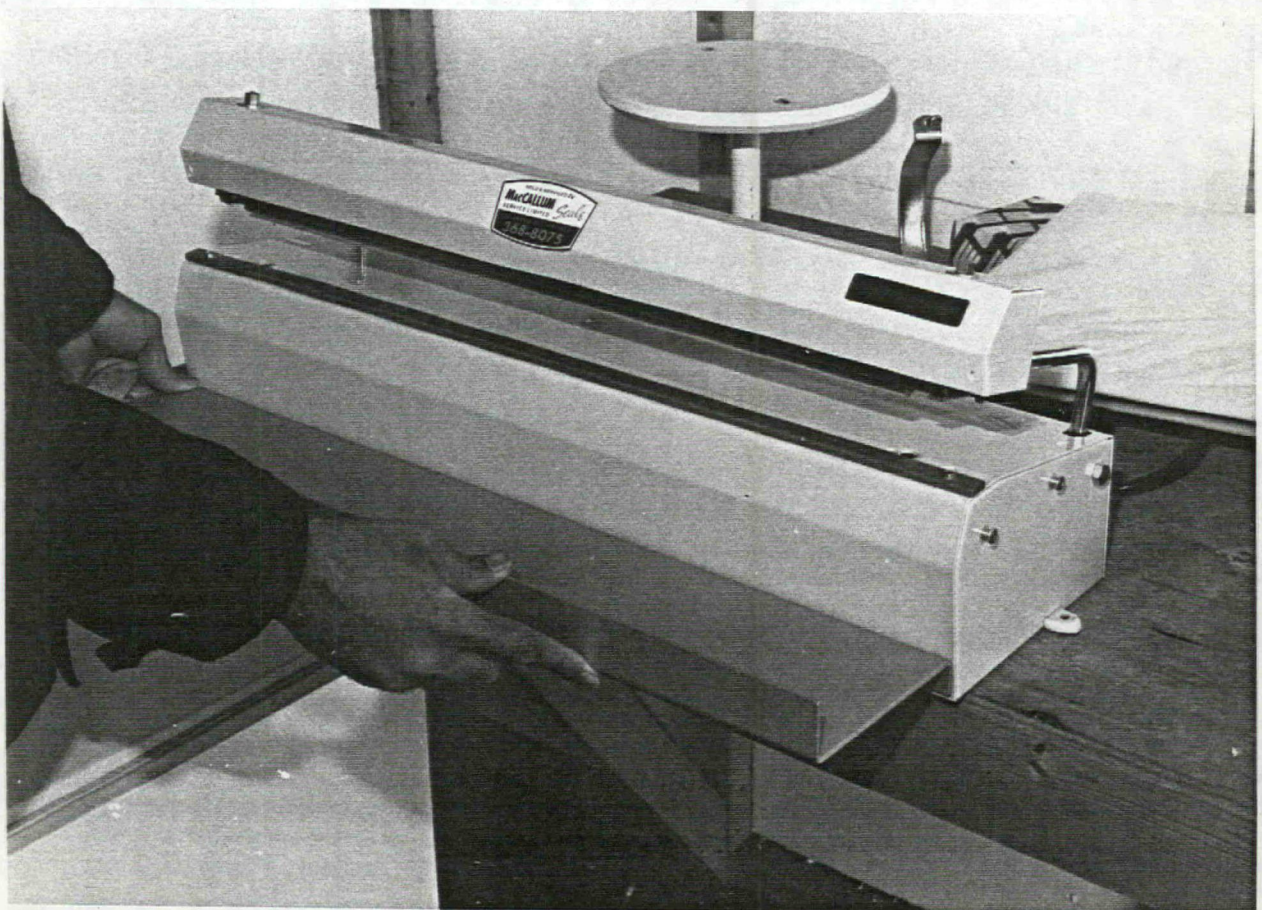
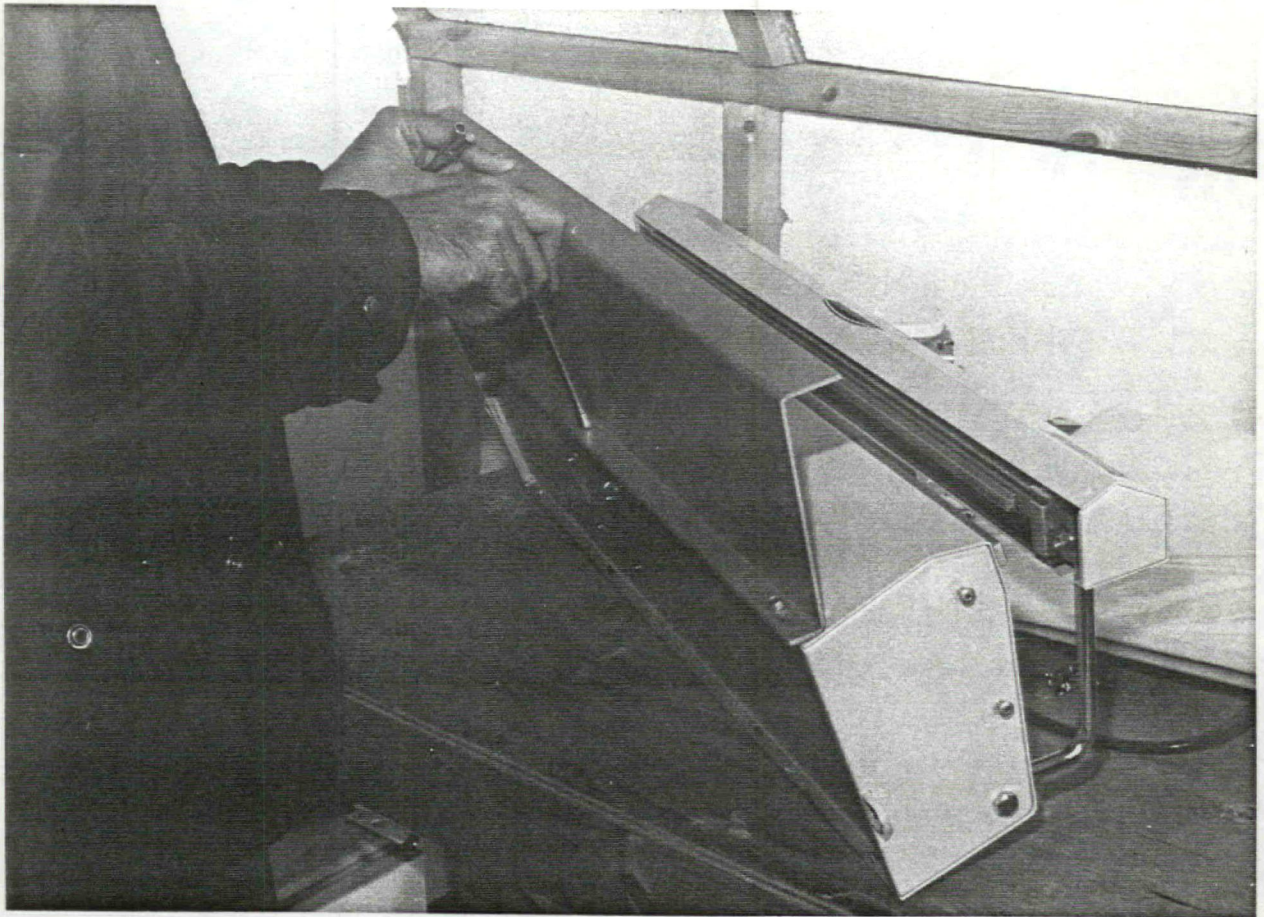
HEAT SEALER

Installation of Heat Sealer's Sample Support

This bracket is used to support the sample during the sealing of the sample bags.

The Heat Sealer Sample Support can be installed as follows:

1. Remove the three hexbolts at the front of heat sealer.
2. Line up the three holes of the support with the holes of heat sealer. At this stage also make sure that the bent metal portion of the support faces upward.
3. Insert and tighten the three screws to mount the sample support.
4. Check that the support is mounted firmly.



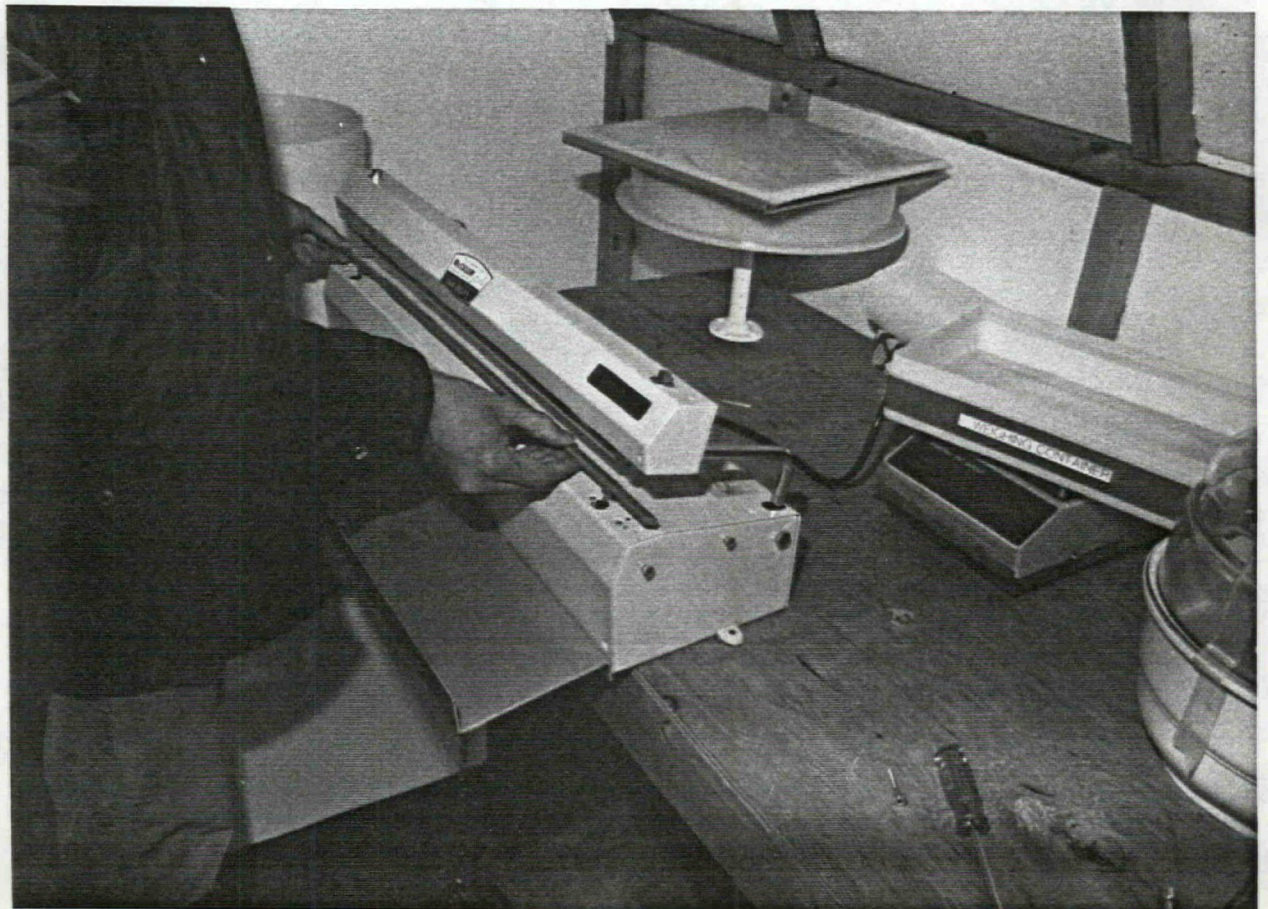
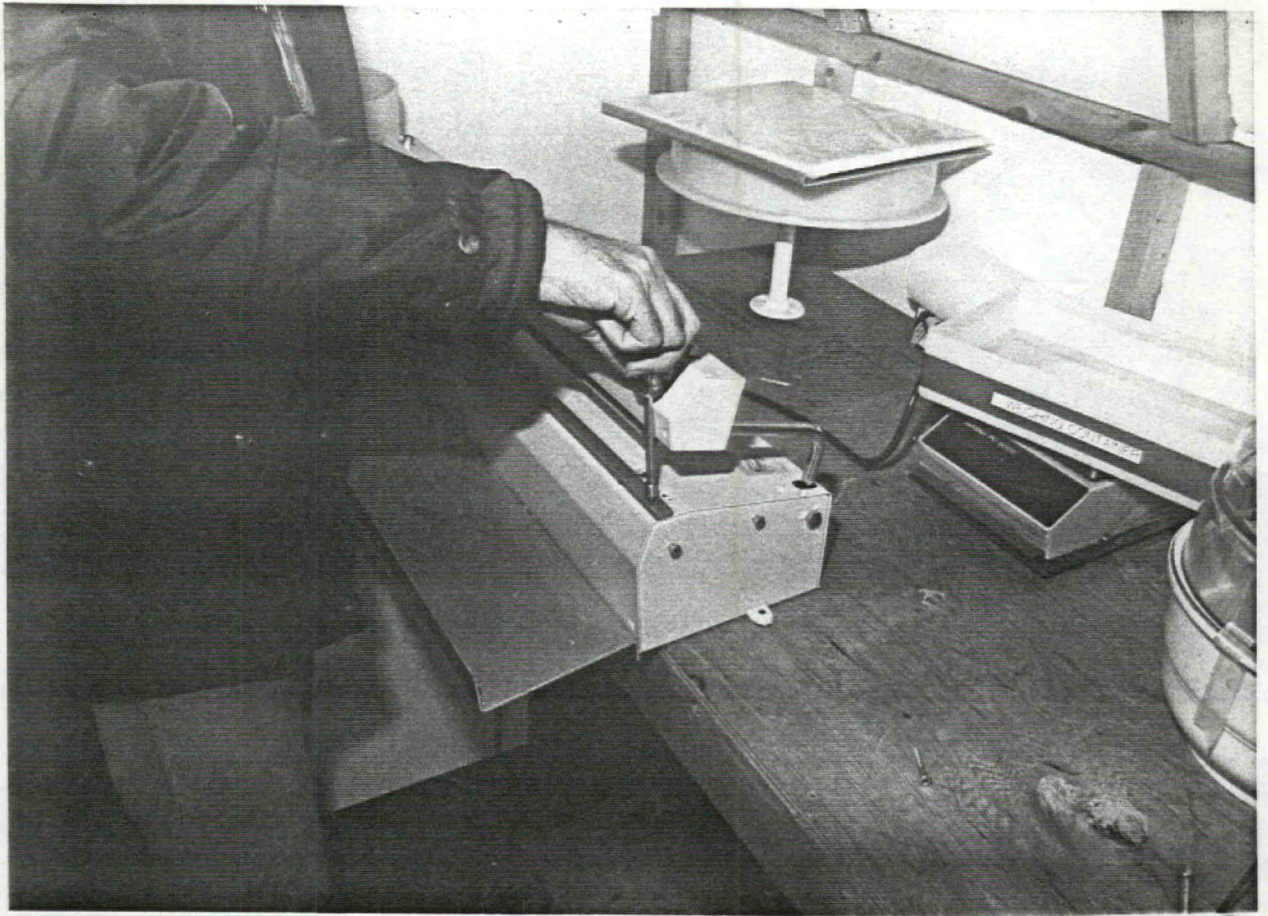
HEAT SEALER

Changing the Heat Sealer Bar

The Heat Sealer Bar provides the heat required to seal the bag. It is located on the top of heat sealers lower housing. It has a brown plastic cover over it. If the plastic over the heater element is blackened or burnt through, the heat sealer bar needs replacing. The replacement is done as follow:

1. Unplug the power cord.
2. Remove the burnt heat sealer bar by undoing the two hex head screws. These screws are located on the top corners of the heat sealer bar.
3. Place the new bar in position and tighten the screws.
4. Plug in the power cord and check for proper operation.

Note: The teflon tape on the heater bar should be replaced once every time the inspector makes his quarterly inspection and maintenance visit.



Troubleshooting the Heat Sealer

Symptom	Possible Cause	What to Do
Bag sticks to heater bar after seal	<ul style="list-style-type: none">- heater setting too high- heater bar teflon tape burnt through	<ul style="list-style-type: none">- reduce knob setting on sealer unit to a lower number (setting 3-1/2 to 4)- replace the heater bar
Very light seal on bag after sealing. Looks almost transparent.	<ul style="list-style-type: none">- heater setting too low	<ul style="list-style-type: none">- increase knob setting - make trial seals on extra bag to check for proper seal
No sealing action at all.	<ul style="list-style-type: none">- heater element on heater bar open.- other problems within sealer	<ul style="list-style-type: none">- replace heater bar- replace heat sealer unit
Bubbles apparent in seal after sealing	<ul style="list-style-type: none">- heater setting slightly too high	<ul style="list-style-type: none">- reduce knob setting slightly - make a trial seal to test



BALANCE

Installing and Operating the Balance

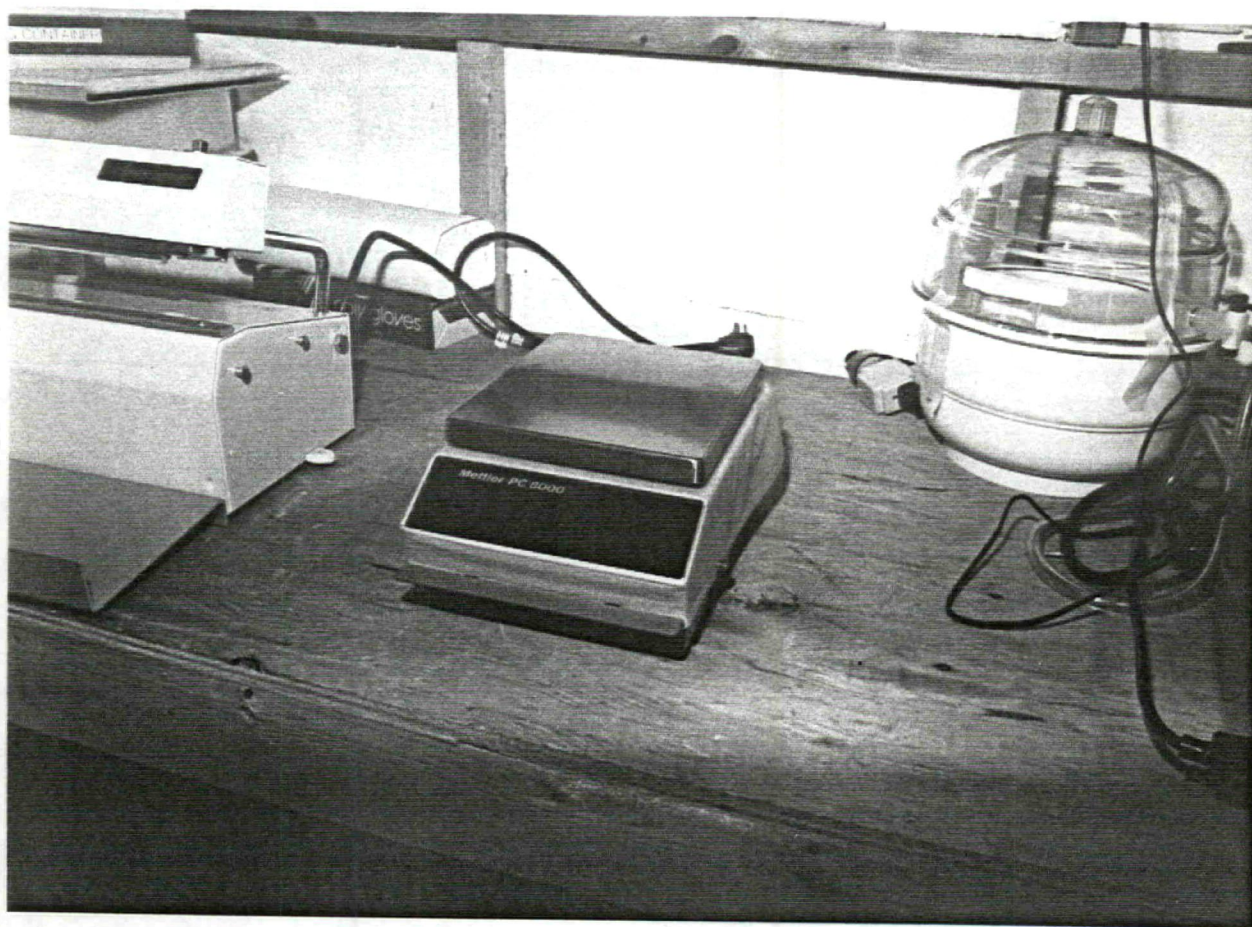
The balance is used to weigh the precipitation samples.

To assemble the balance follow the instructions as given on pages 4 to 7 of the instruction booklet provided with the balance.

The installation of the balance is as follow:

1. Set the balance on a flat and stable surface. The balance should remain on that surface in a fixed position permanently.
2. Mount the pull-on plastic cover on the balance body.
3. Place the pan on the balance body.
4. Check that the plastic cover does not interfere with the free movement of the pan.
5. Attach the power cord to the back and place the plug into a power outlet.
6. Turn the balance on by pressing the front control bar.
7. The display will initially read $\pm 8.8.8.8.8$ but within seconds, will change to ± 0.0 .
8. If the balance does not display exactly 0.0 with no load on the pan then press the control bar again.
9. Now allow the balance to warm up for at least 20 minutes before use.
10. Place the plastic weighing container (provided separately) on the top pan of the balance. The balance will read approximately 290 grams.
11. Push the control bar once the display will read 0.00 (This method is called "Taring").
12. Place a 200 gram weight in the center of plastic container.
13. Read the weight off the digital display.
14. If the displayed weight is less than 198.2 and greater than 200.2 grams the balance needs calibration.

NOTE: Calibration should only be done by a regional inspector.



Replacing Micro Fuse

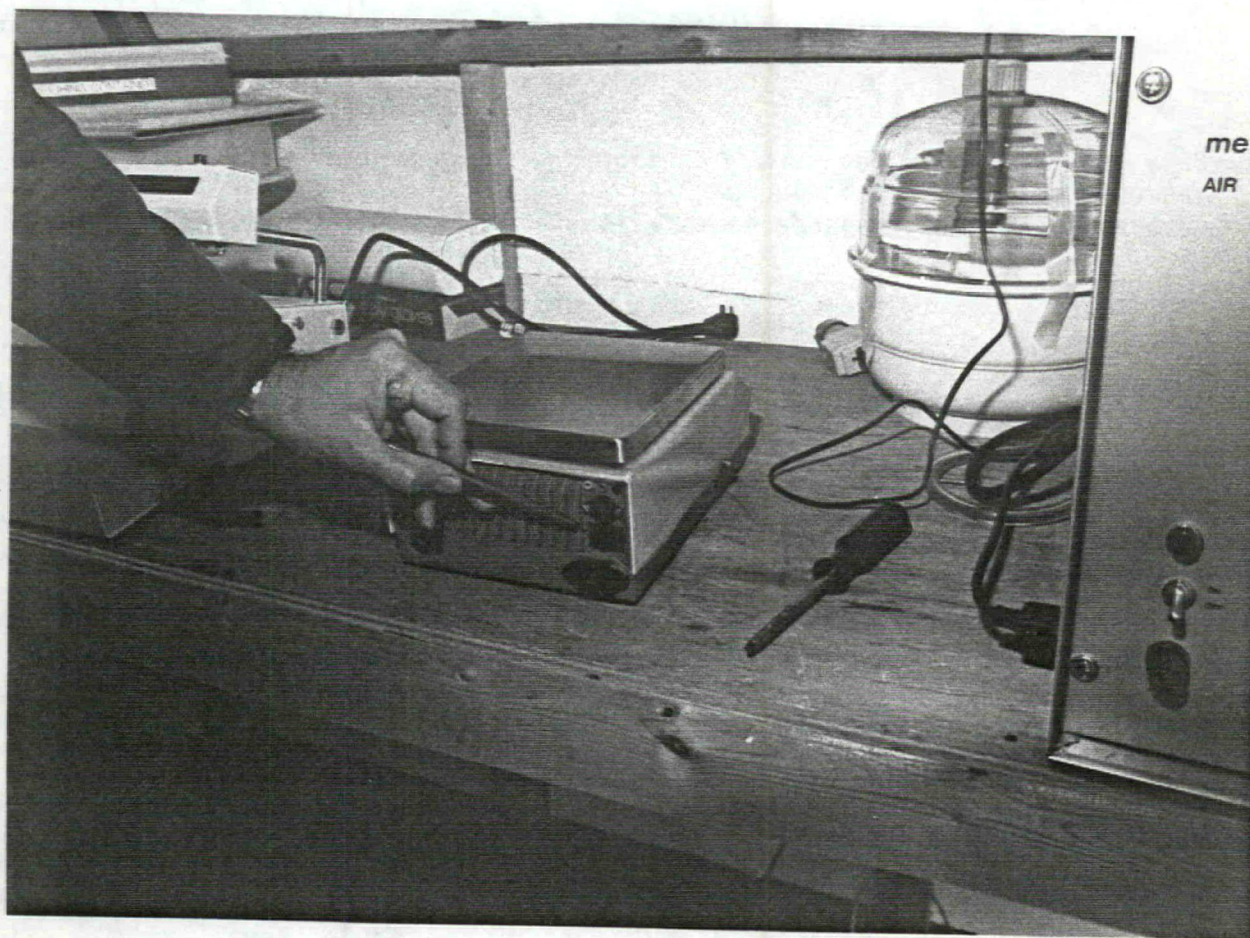
The micro fuse protects the balance from electrical malfunctions.

In the Meller balance model 8000, the micro fuse used is a 250 mA fuse. This unit comes with a spare fuse.

The micro fuse is located on the back of the balance.

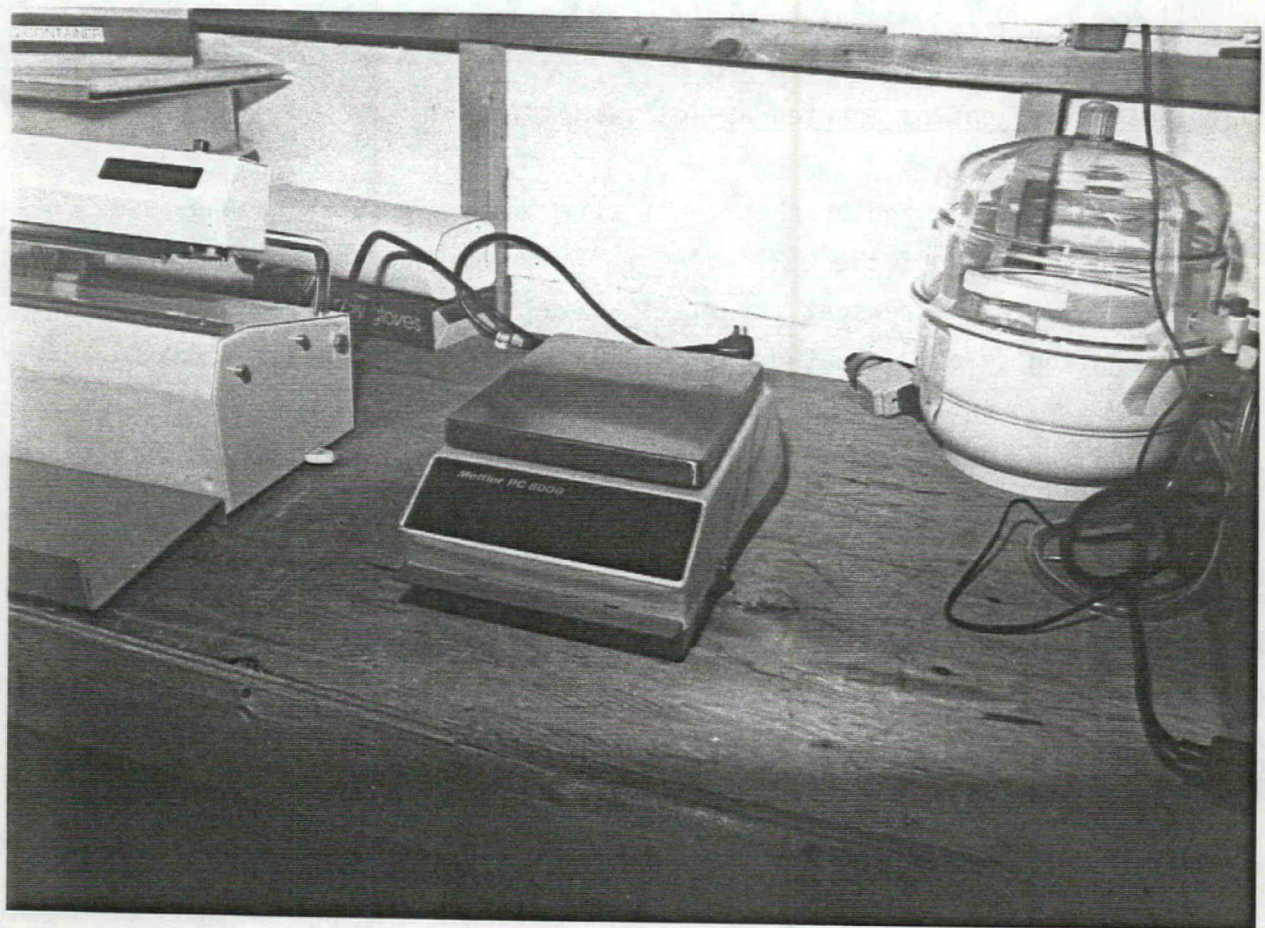
To replace the micro fuse:

- Disconnect the power cable.
- Turn the fuse holder counter clockwise and remove.
- Remove the defective fuse and insert the new fuse (T250mA)
- Return the fuse holder and tighten by turning clockwise.
- Connect the power cable.
- Switch on the balance and check for proper operation.



Troubleshooting the Balance

Symptom	Possible Cause	What to Do
Display doesn't light up	<ul style="list-style-type: none"> - balance not switched on - power cable not connected - microfuse blown 	<ul style="list-style-type: none"> - press control bar - check powerplug at back of unit and at receptacle - replace the fuse in back of unit
Only upper segments of display light up.	<ul style="list-style-type: none"> - too much weight on weighing pan - balance is defective 	<ul style="list-style-type: none"> - reduce weight - replace balance
Only lower segments of display light up.	<ul style="list-style-type: none"> - pan support not in place - weighing pan not in place - in use cover touching pan support 	<ul style="list-style-type: none"> - check pan support for proper positioning on pegs - place pan on pan support - check that in use cover is free from touching pan support
"OFF 2" is displayed	<ul style="list-style-type: none"> - there has been a power failure - control bar not pressed all the way down when it was turned on 	<ul style="list-style-type: none"> - press control bar again - press control bar again
Weight results unstable	<ul style="list-style-type: none"> - there is a draft in the room - weighing table is unstable 	<ul style="list-style-type: none"> - close the door - reduce drafts in the area - balance should be set on a stable, level area
Weight results are obviously incorrect	<ul style="list-style-type: none"> - balance on uneven surface - calibration is not in order - control bar not pressed before measurement - something touching 	<ul style="list-style-type: none"> - balance should be on a level surface - balance should be recalibrated - zero the unit by pressing control bar before measurement - check for a clear area around balance



Installing and Operating the Dustbuster

The Dustbuster is a light weight vacuum cleaner used to evacuate air from the bucket, in order to provide a tight fit of the bag.

The Dustbuster, when kept in its mounting bracket, is on continuous charge and is always ready for immediate use.

The Dustbuster can be mounted as follow:

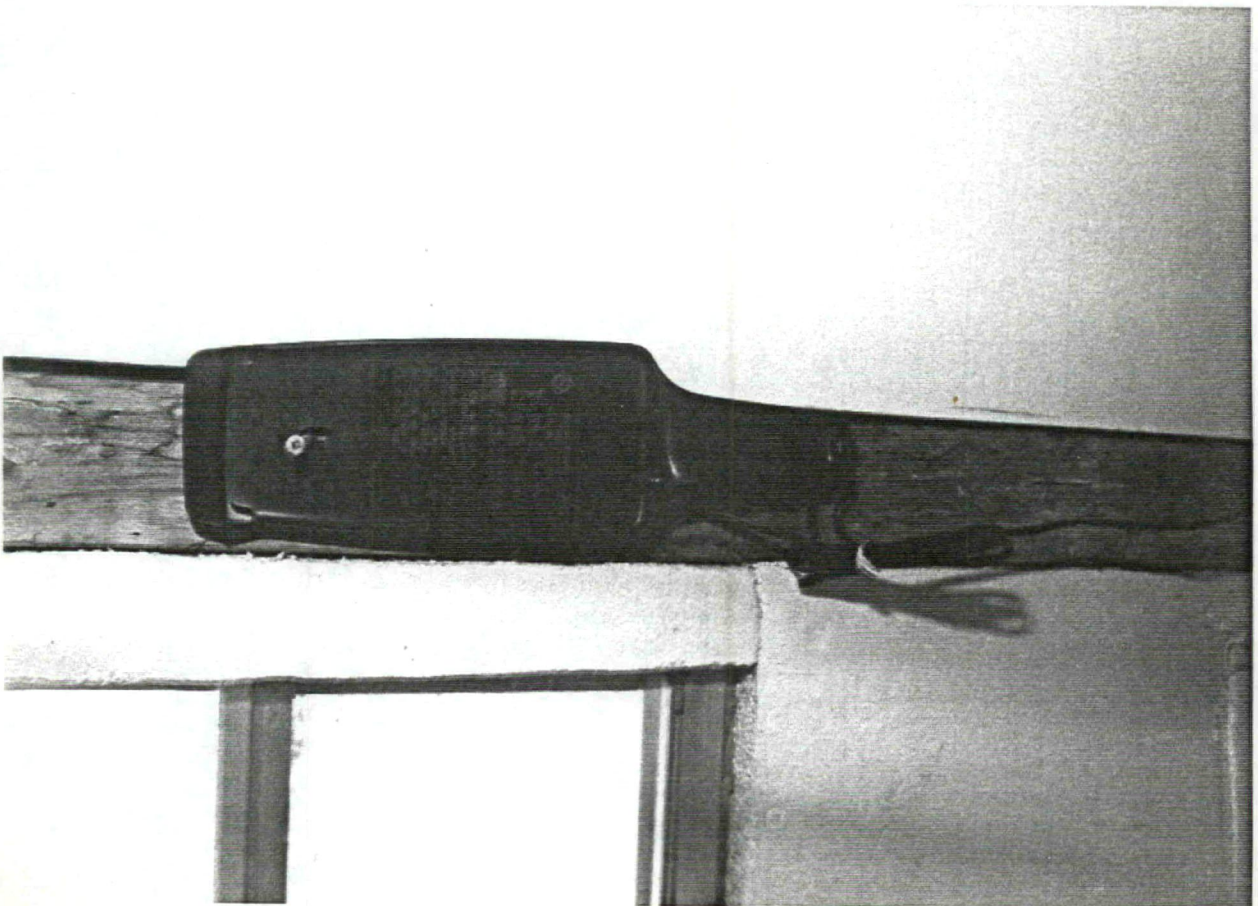
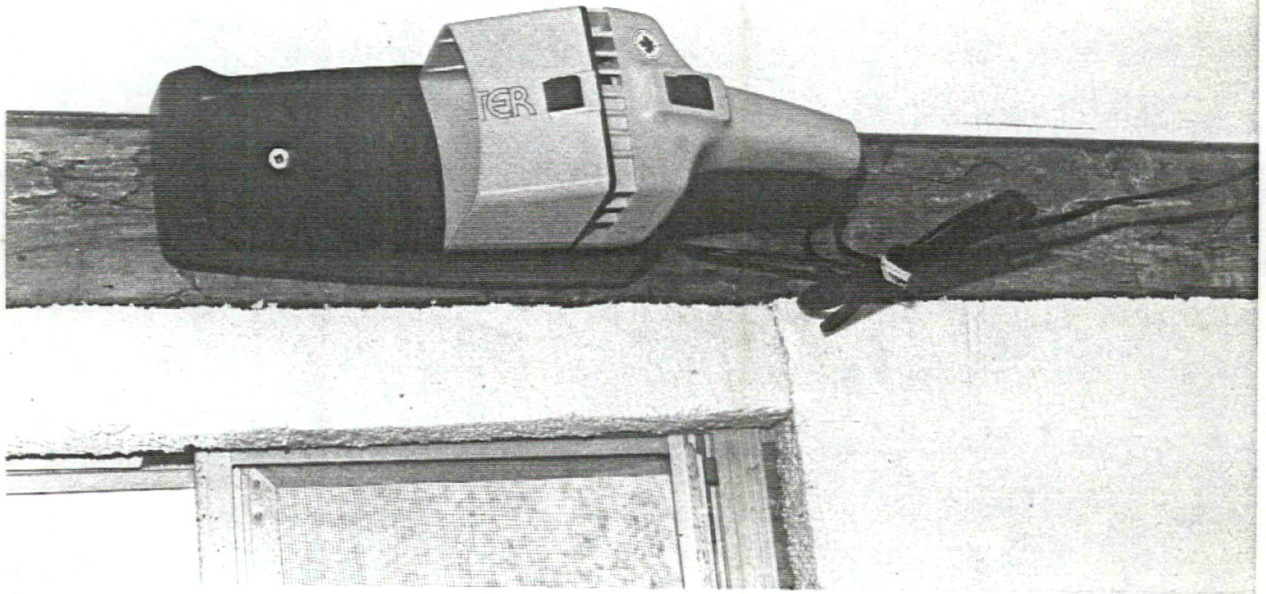
Mount the charging bracket vertically in the sample handling area. First place it against the wall where it is to be mounted and mark centers for the mounting screws at the small end of the key slots. Next drive the mounting screws into the wall. Now place bracket on the mounting screws and slide into place so that screws are in small in part of key slot. Make sure that cord is in the slot so that it is not damaged by edge of bracket.

The charging procedure of the Dustbuster is as follow:

1. Place Dustbuster into the charging bracket, then push the handle end of the unit into the bracket until you hear click.
2. Plug the charger into the power receptacle.
3. The batteries in the Dustbuster require approximately 16 hours to reach the full capacity.
4. the exposed electrical terminals mounted in charge are at low voltage D.C. and are not a shock hazard.

Operation of the Dustbuster

1. Remove the Dustbuster from the charging bracket by gripping the handle and gently pulling unit from the bracket.
2. It can be turned on by pushing the slide button towards the nozzle end. The slide button is spring loaded to the off position, so pressure must be exerted to hold the button towards the nozzle to keep unit operating.
3. The Dustbuster will automatically turn off when your thumb is removed from the button.

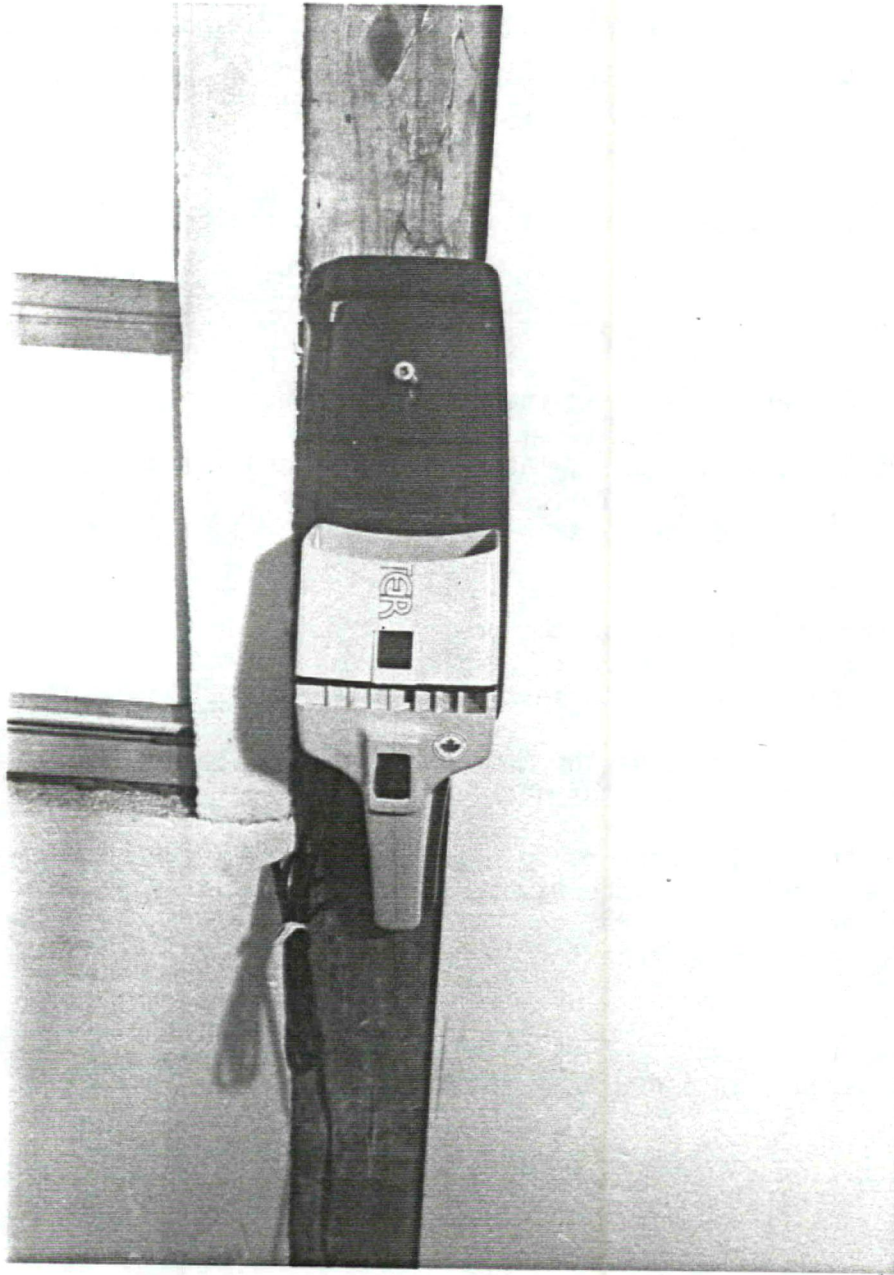


Troubleshooting the Portable Vacuum (Dust Buster)

When not in use, the vacuum should be placed in its holder. The charging unit should always be plugged into a live A.C. outlet.

When the unit is completely discharged, it will take up to 18 hours to recharge the internal batteries.

Should the unit fail to hold a charge, have the unit replaced with a new one and send the old one back for repair.

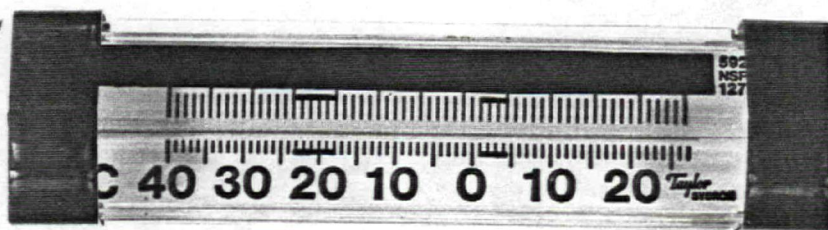


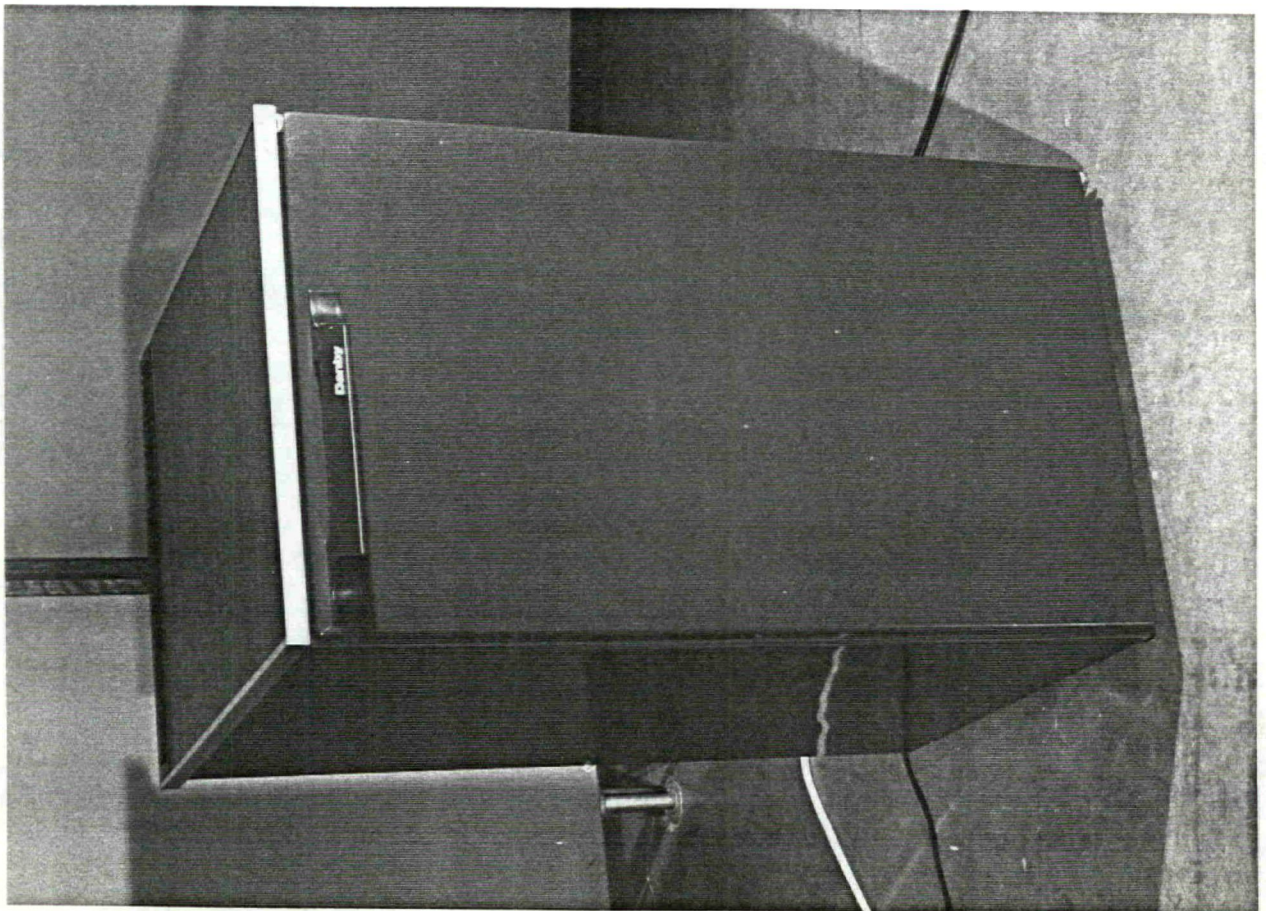
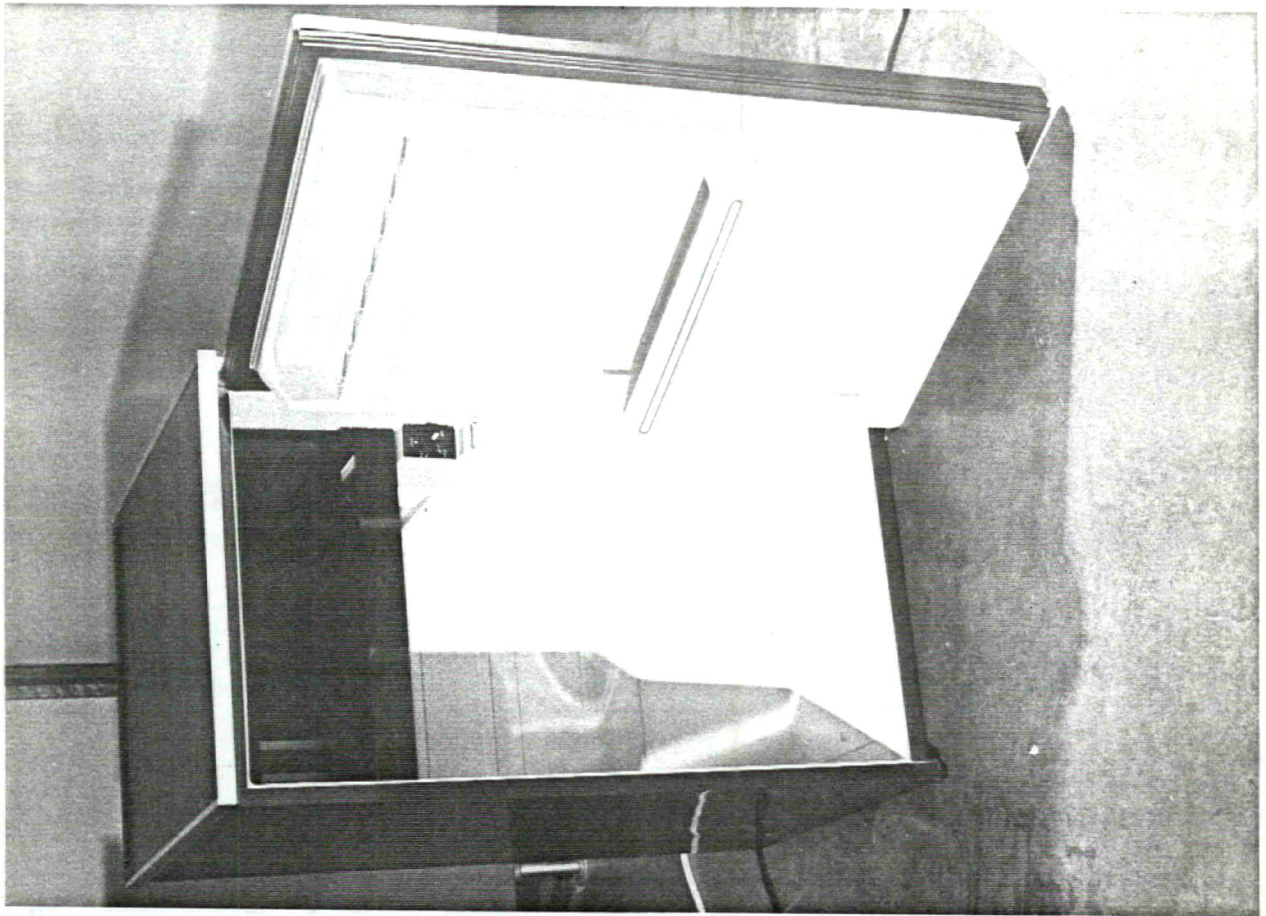
Installation and Setting of the Refrigerator

A refrigerator is used to keep collected precipitation samples cool at a temperature of $4^{\circ}\text{C} \pm 1^{\circ}\text{C}$. It is also used to freeze the gel-type freezer packs used during sample shipment to the laboratory.

Following is the procedure to install the refrigerator in the sample handling area.

1. Place the refrigerator in the designated location.
2. Remove the bottom drawer, the glass panel and the metal shelves from the inside in order to maximize the interior storage space. Also remove the lower drawer and the plastic bottle brackets mounted on the inside of the door.
3. Plug the refrigerator in the power source.
4. Adjust the thermostat to setting 'Med'.
5. Place the refrigerator thermometer (provided separately) on the middle shelf of the refrigerator door.
6. Allow the refrigerator to operate for 4 hours. check the temperature on the thermometer. If the temperature is $4^{\circ}\text{C} \pm 1^{\circ}\text{C}$, the refrigerator is ready for routine operation. If not, readjust the thermostat, allow the refrigerator to operate for one hour and recheck. Do the readjustment until the temperature is $4^{\circ}\text{C} \pm 1^{\circ}\text{C}$.
7. If the refrigerator cannot reach as low as 4°C , the refrigerator should be replaced with a new one.





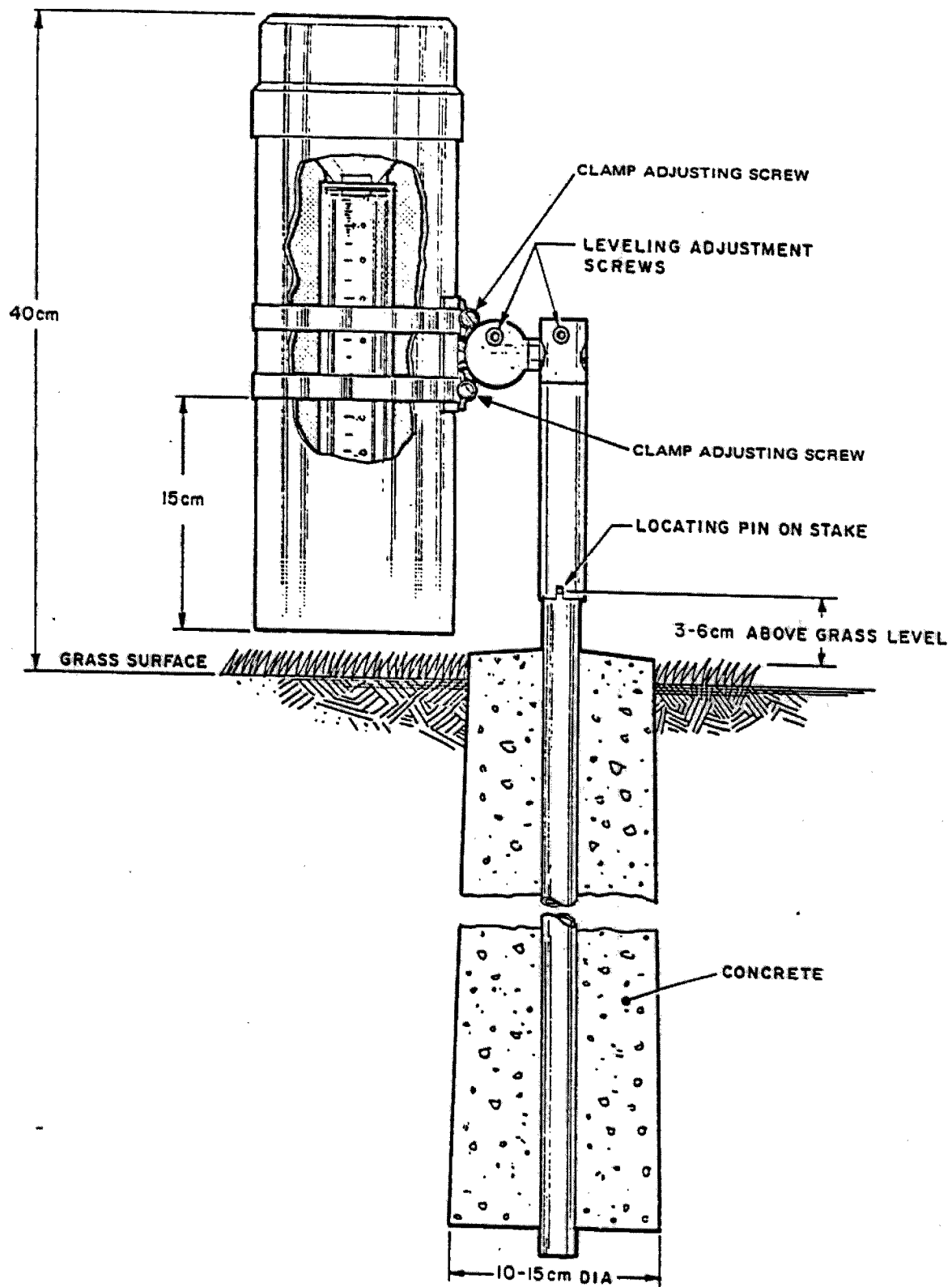
Description of Rain Gauge and Its Parts

The rain gauge used at all CAPMoN sites is the "Type B plastic rain gauge". It is used to catch and record the amount of precipitation fallen on any given day. It is primarily used to measure the precipitation during the warmer months of the year.

The rain gauge consists of four main components:

- i) A top funnel
- ii) A graduated cylinder
- iii) An outer cylindrical housing
- iv) A mounting/clamp mechanism.

The funnel sits on top of the lower cylindrical housing. The funnel fits directly into the graduated cylinder which fits inside the outer housing. The outer cylinder is clamped to the mounting post with two hose clamps. This can be levelled using two adjusting screws on the mounting assembly.



Rain Gauge Type B

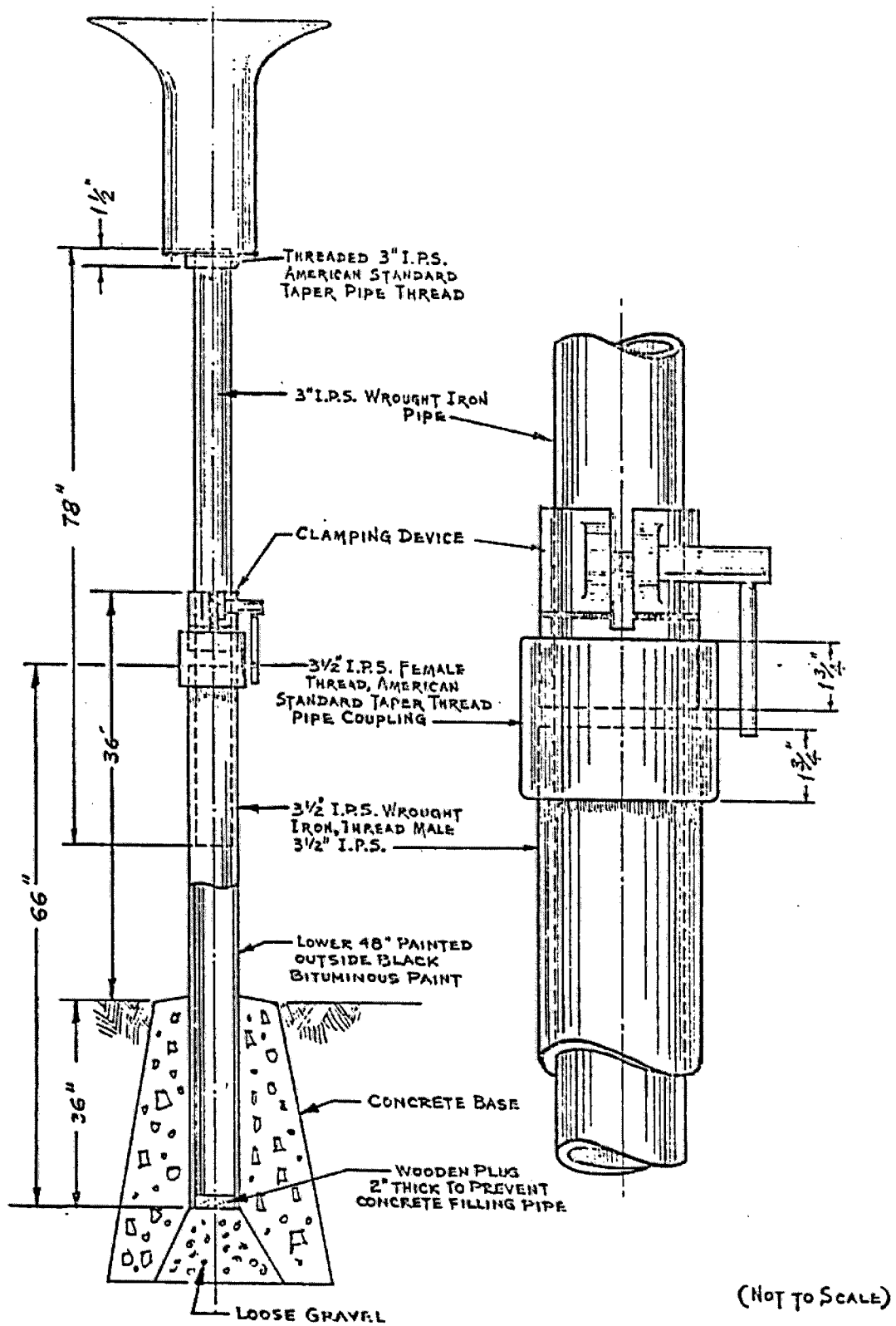
Description of the Snow Gauge and Its Parts

The snow gauge used at CAPMoN sites is called the "Nipher Sheilded Snow Gauge". It is used to measure snow (or rain or hails) during winter season.

The Nipher Sheilded snow gauge consists of four main components.

- i) A vertical stand (wrought iron or aluminum).
- ii) A fiber glass or aluminum nipher sheild (shaped like an inverted bell).
- iii) A copper receiver for collecting the precipitation.
- iv) A plastic graduated cylinder (provided separately).

The aluminum stand on which the snow gauge is mounted is either a manually-operated two pipe system or a telescopic crank stand. The Nipher Shield is located on top of the stand and the receiver sits directly inside the Nipher Shield.



Nipher Snow Gauge

A Description of the Snow Ruler

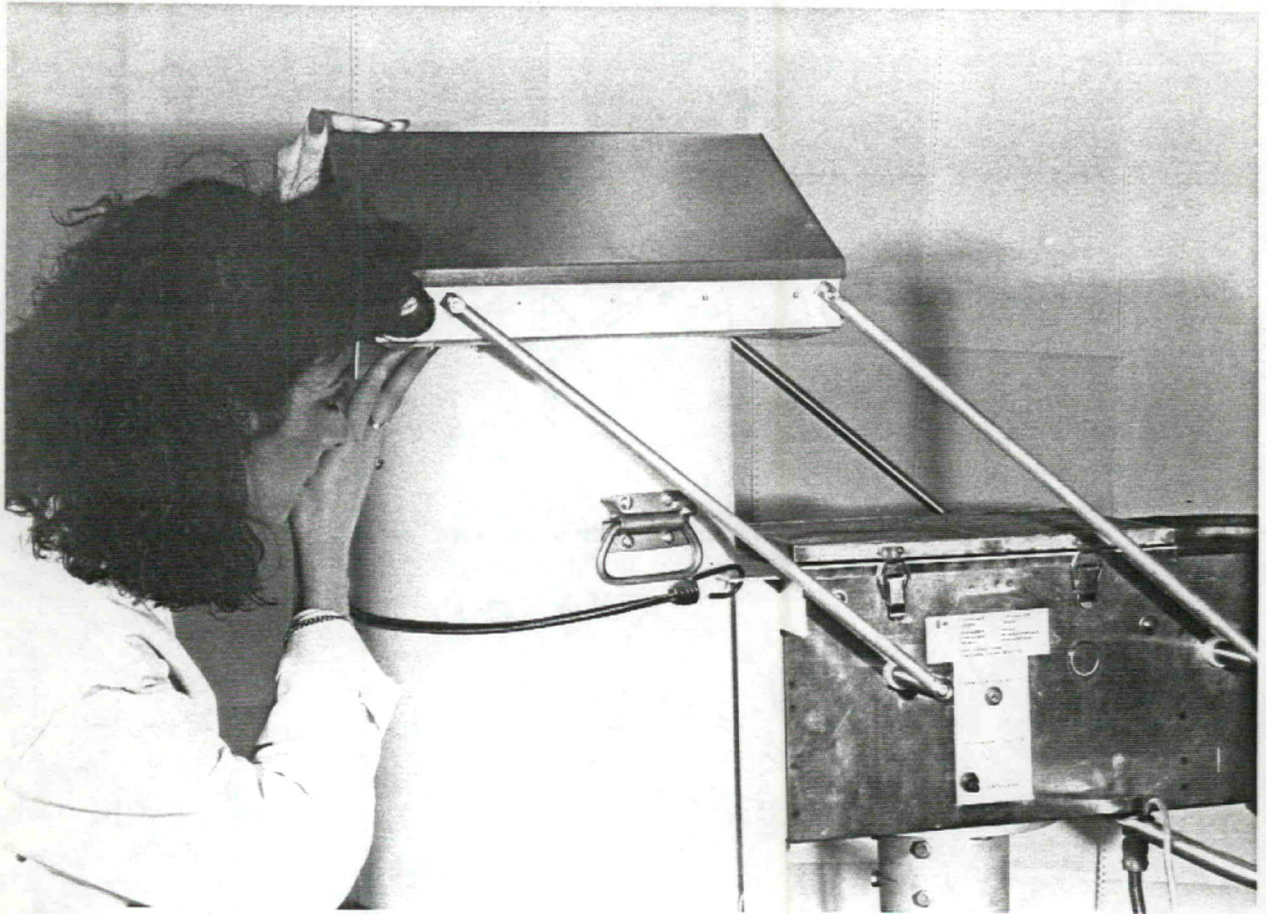
A snow ruler is used to measure the depth of snow accumulated on the ground.

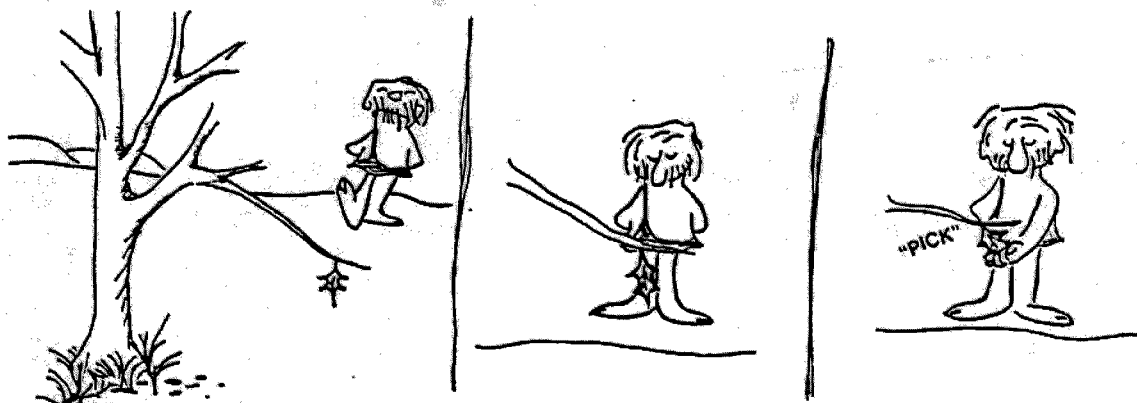
The ruler used at all CAPMoN sites is an AES Type 4 Snow Ruler. It is made of wood coated with polyurethane materials. It is 1 meter long and is scaled in units of 0.2 cm per division.



A List of Replaceable Collector Parts

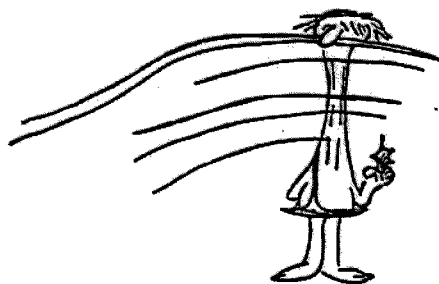
Part Description	Where it is Located
Printed Circuit Board (1)	Mounted in the edge connector inside housing.
Motor and Gear Box (1)	Mounted on the motor base plate inside housing.
Motor Capacitors (2)	Mounted on the motor base plate inside housing.
Microswitch Assembly (1)	Mounted on the left side inside the collector housing.
Microswitches (2)	Mounted on the microswitch assembly.
Terminal strip (1)	Mounted on the inside of the collector housing.
Fuse Holders (2)	Mounted in the fuse holder bracket inside the housing.
Power Switch (1)	Mounted through the front of the collector housing.
Transformer (1)	Mounted on the lower base plate inside the housing.
Heater Element (1) Screw Base	Screwed into the element socket at rear inside housing.
Thermostat (1)	Mounted on the lower base plate inside the housing.
Sensor Arm (1)	Separately mounted on the bottom outside of housing.
6 Pin Bulkhead Socket (1)	Mounted on the bottom of the collector housing.
Housing Cover (1)	Fitted over the collector housing.
Splash Screen (1)	Fitted over the collector housing cover.
Peaked Roof (1) TFE coated	Attached to the roof plate at end of pivot arms.
Slide in Lid Gasket (1)	Located on tray under roof plate.
Circlips (6) 2 sizes	Located on pivot arms and counter balance.





IF YOU DON'T KNOW WHAT IT DOES

KWANG!



DON'T FOOL WITH IT!

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