

GE Infrastructure
Sensing



C-1 RH

General Eastern Relative Humidity Generator

Operator's Manual



GE Infrastructure
Sensing

C-1 RH

General Eastern Relative Humidity Generator

Operator's Manual

A40089815H

March 2005

The *C-1 RH Generator* is a General Eastern Instruments product. General Eastern Instruments has joined other GE high-technology sensing businesses under a new name—GE Infrastructure Sensing.



Warranty

Each instrument manufactured by GE Infrastructure Sensing is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of GE Infrastructure Sensing. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Infrastructure Sensing determines that the equipment was defective, the warranty period is:

- one year for general electronic failures of the instrument
- one year for mechanical failures of the sensor

If GE Infrastructure Sensing determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by GE Infrastructure Sensing, the repairs are not covered under this warranty.

The warranties set forth herein are exclusive and are in lieu of all other warranties whether statutory, express or implied (including warranties or merchantability and fitness for a particular purpose, and warranties arising from course of dealing or usage or trade).

Return Policy

If a GE Infrastructure Sensing instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify GE Infrastructure Sensing, giving full details of the problem, and provide the model number and serial number of the instrument. If the nature of the problem indicates the need for factory service, GE Infrastructure Sensing will issue a RETURN AUTHORIZATION number (RA), and shipping instructions for the return of the instrument to a service center will be provided.
2. If GE Infrastructure Sensing instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.
3. Upon receipt, GE Infrastructure Sensing will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
- If GE Infrastructure Sensing determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner's approval to proceed, the instrument will be repaired and returned.

Table of Contents

Overview	1
Principle of Divided Flow	1
Operating Modes	1
Features	2
Expected Sights and Sounds	3
Operation	4
Getting Started - Stand Alone	4
Feedback Operation	6
Automatic Operation	7
Maintenance	11
Replacing the Desiccant	11
Adding Distilled Water	12
Troubleshooting	12
Things to Watch Out For (Do's and Don'ts)	12
Audio-Visual Clues	13
General Guidelines	13
SST Sample System	14
Setup	14
Operation	14
Specifications	15
C-1 RH Generator	15
SST Sample System	16
C-1 Replacement Parts	16

Overview

Principle of Divided Flow

The **C-1** uses a divided flow method to generate a relative humidity between 0% and 100% quickly and accurately. Relative humidity is controlled by time-proportioning a fraction of a constant flow dry airstream through a saturator and into a mixing chamber. The saturated air rejoins the remaining dry air and mixes to the desired RH value before flowing into the test chamber.

The water vapor pressure relationships that govern the operation of the **C-1** are sensitive to a number of parameters, including flow, pressure, and temperature. For details on how inconsistencies in these parameters may effect the **C-1**, refer to *Troubleshooting* on page 12.

Operating Modes

Stand Alone

The **C-1** will operate as an independent, open loop factory-calibrated device. All that is needed for stand-alone operation is the appropriate line voltage (see the label on your **C-1** for power requirements) and distilled water.

Feedback

The **C-1** can be connected to a GE Infrastructure Sensing **M2**, **M3**, or **M4** chilled mirror hygrometer (referred to as the "monitor" for the remainder of this manual) to operate as a closed loop system. This is accomplished by connecting the **C-1** to the monitor using a null modem cable and configuring an appropriate sensor and sample system, such as the GE Infrastructure Sensing SST, to measure the **C-1** chamber environment. In this mode the **C-1** corrects for any deviation from setpoint as measured by the monitor, and is NIST traceable at all times.

While in the feedback mode, the **C-1** is capable of calibrating itself to the chilled mirror system. See the appropriate section in *Operation* for details.

AUTO

Optional software allows **C-1** users to create automatic test profiles (RH vs. time) on an IBM or IBM-compatible computer with a serial port. These routines can be saved, stored, and downloaded at will into the **C-1**. The **C-1** will in turn store the routine in it's memory until a new routine is loaded. Test routines can be run on the **C-1** in either stand alone or feedback operation. See the appropriate section in this manual for details.

Features	Refer to Figure 1 on page 3 for a visual reference to various parts described in this section.
<i>Power Switch , Fuse Holder, Line Cord Receptacle</i>	Provide power input and fuse protection for the C-1 .
<i>Power Supply Terminals</i>	Provide a convenient source of 24 VDC (unregulated) to power instruments under test.
<i>Setpoint Display</i>	LED indicator that displays the RH value the C-1 is generating.
<i>Increment/Decrement Switch</i>	Adjust setpoint up or down; hold in position to scroll to desired setpoint.
<i>Auto/Cal Switch</i>	While the C-1 is operating, use of this switch will start the self calibration routine or the last test routine download into the C-1 . The only way to interrupt either routine is to shut off the C-1 and power it up again.
<i>Dry Gas Inlet</i>	Allows optional use of dry gas to prolong desiccant life. The dry gas source is connected to the dry gas inlet port on the generator. The gas flows from the source into the dry gas port through the desiccant to form the dry air stream. A minimum dew point of -40°F (-40°C) is recommended for prolonged desiccant life.
<i>Desiccant Tube</i>	All incoming air/gas passes through the desiccant to form the dry air stream. The desiccant tube is removable; it's gasket connectors mate to the receptor tubes in the C-1 .
<i>Serial Port</i>	Standard RS-232 interface for connection to M2/M3/M4 , computer, or other devices.
<i>Captive Chamber Cover</i>	Each C-1 comes with three chamber covers that can be drilled or slotted to allow access for wires, screwdrivers, etc. The cover hold-down devices provide the proper seal for the cover, as well as lending structural support for large or awkward instruments.
<i>Fill Tube and Fill Light</i>	Distilled water is poured into the fill tube to fill the saturator and chamber bath assembly. The proper volume of water is 800 ml; or, just fill slowly until the fill light goes out. If the fill light comes on during operation, slowly add water until the light goes out.

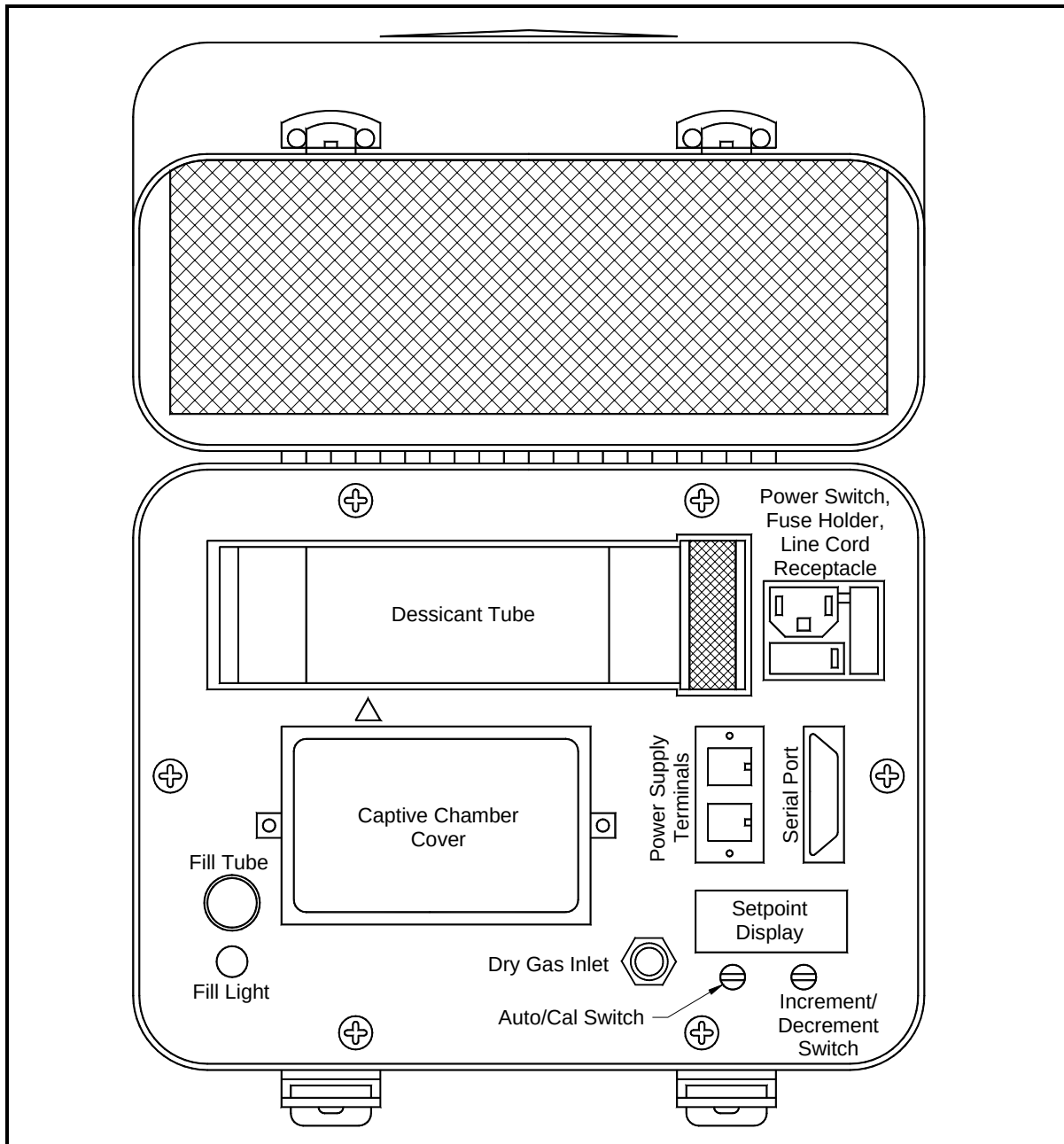


Figure 1: C-1 RH Features

Expected Sights and Sounds

The **C-1** contains a solenoid valve and an air pump. The air pump is quite loud and the entire instrument will make considerable noise in a quiet room. This is normal. When used with the SST, the additional air pump will add somewhat to the noise level.

When operating, the **C-1** setpoint display will indicate setpoint in percent RH followed by the letter "H". When properly filled with distilled water, the fill light will be off. When the **C-1** is set between 10% and 98% RH, there will be a noticeable rhythmic surge of the water level in the fill tube when viewed from above. This is normal.

Operation

Getting Started - Stand Alone

Note: *The C-1 is fully calibrated as shipped from the factory.*

Filling the C-1

To begin operation, place the **C-1** on a level surface and add 800ml of distilled water to the water chamber through the fill tube.

Power Connection

Plug the **C-1** into an outlet supplying 100/110/220/230 VAC 50/60 Hz according to the proper voltage and frequency marked on the instrument.

Checking the Desiccant Tube Seals

Check to see that the desiccant tube is properly seated with its rubber gaskets inserted into the receptor tubes, and turn the unit on. After a three second initialization routine, the **C-1** will begin to generate the humidity displayed on the setpoint indicator.

General Operating Procedures

After startup, set the **C-1** to 25% RH and allow the unit to run for 15-20 minutes. This clears ambient air from the internal plumbing of the **C-1**. The generated humidity may now be raised or lowered by operating the increment/decrement switch. When the switch is released it will return to operate position and the new displayed humidity will be generated. The **C-1** chamber will equilibrate at the new humidity in less than fifteen minutes.

In normal stand alone operation (no monitor attached) the AUTO/CAL switch should not be activated. If it is switched to the calibrate position the unit will immediately start a self calibration routine. With no serial port connection, the **C-1** will lock onto a 10% RH setting and disable the increment/decrement switch. To recover, turn the **C-1** off and then back on again. This will reset the normal operation. All data generated during a calibration run is held until the end of the run and only then dumped to the main memory. Therefore, calibration runs which are interrupted before completion are not used. Operation of the CAL switch with no monitor attached will not result in any loss of calibration data, as the calibration procedure cannot be completed.

If an automatic test is inadvertently started, the test can be terminated by turning the power off and then back on. The **C-1** is shipped from the factory with a standard test routine in memory; a slow one hour sweep from 0% to 100% RH and then back.

*General Operating
Procedures (cont.)*

To use the **C-1** for testing the humidity dependent behavior of objects, circuits or sensors it may be necessary to create holes or feed-throughs through the cover in order to provide access for wires, screwdrivers, etc. Remember that the generated humidity is only accurate inside the test chamber below the indentation which runs about an inch below the cover. Three covers are provided for your convenience.

Drilled holes should be relatively tight to the devices which will pass through them and should be sealed when not in use. The cover should sit flat when in use so that there are no gaps around the edge. Use of the cover hold down devices will provide correct positioning and sealing of the chamber. Under no circumstances should the chamber or the edges of the cover be sealed, as the resulting back pressure may cause water to flow out of the fill tube or into the test chamber.

Feedback Operation

When used in conjunction with a precision humidity measurement device with serial communications capability (such as a **Model M2**, **M3**, or **M4** from GE Infrastructure Sensing with appropriate sensors and sampling system), the **C-1** can be driven to agree with **M2/M3** within 0.1% RH. When the serial port on the **C-1** is connected to the serial port on the monitor, the **C-1** will listen to the instrument and continuously correct itself to make it's setpoint.

Serial Connection

The connection must be made using a NULL MODEM CABLE DB-25 male >-< male. Communications is at 1200 baud RS-232-C and the **C-1** listens for the character string "**RH = ###.###xx**" ("**R**", "**H**", space, "=", space, floating point number between 0 and 100 of arbitrary precision) which it takes to be the correct relative humidity. The format of the data word is as follows: 8 data bits, 1 stop bit, no parity. If there is a disagreement between the **C-1** setting and the number read in by the serial port, the **C-1** will make a minute adjustment to the timing on the proportioning valve and compare the new information on the serial port to the set point. This procedure will continue until the two instruments agree. The user requirement is to ensure a proper sampling system (see *SST Sample System* on page 14).

When operating in the feedback mode (or "handshake mode"), all features of the **C-1** are available. The increment and decrement switches will raise and lower the humidity setpoint and the error corrections will begin at the new setpoint immediately. If you press **Auto** the **C-1** will run through the automatic test routine in the handshake mode with continuous error corrections. If you press **Cal** the **C-1** will recalibrate itself to agree with the instrument and will retain this calibration in memory even when disconnected. The new calibration data will supersede all existing calibration data, which will be dumped from memory.

Note: *Field calibration of your C-1 should not be necessary. If you undertake this procedure, be sure that all supporting instrumentation and equipment is in good working order. Allow at least 7 hours for the calibration routine, and be sure that there is adequate desiccant/dry gas supply. Errors in the calibration procedure will adversely affect Stand Alone operation and unsupported Automatic operation.*

If you inadvertently press **Cal** and you do not want to recalibrate the **C-1**, turn the power off before the end of the calibration routine and restart as desired. During a calibration routine, all switches except the power switch are disabled.

Automatic Operation

Automatic test profiles (RH vs. time with ramps and step changes) can be loaded into the **C-1** memory from an IBM-compatible computer using the optional Pro-Step software provided by the factory.

Automatic operation requires a computer system as follows: IBM 286 machine, RS-232 serial port, null modem cable (at one end, a DB-25 male, at the other end, your computer).

Loading the Software

GE Infrastructure Sensing provides the **C-1** Pro-Step software on a CD. To start the software, place the program disk in your computer drive, click on that drive, and at the prompt type "**C1Text**". The main menu will appear:

```
Q. QUIT
0. SELECT TIME SCALE
1. RETRIEVE FILE
2. CREATE NEW FILE
3. DOWNLOAD FILE
4. SAVE CURRENT FILE
5. SELECT MODE
```

If your computer has a hard drive, you can load the **C-1** test software onto that drive. To do so, place your program disk in your computer drive, click on that drive, and at the prompt type "**INSTALL**". Follow the instructions as they appear on the screen. The install command creates a subdirectory under your C: drive root directory called C1GENA, and places a batch file called C2.BAT in the root directory. You can now start the program at the "**C:\>**" prompt by typing "**C2**". The main menu will appear.

Note: *If your computer is part of a LAN, the **C-1** test software may not operate properly if there are any TSR programs in your computer.*

The Menu Selections

Use the following selections to:

QUIT: Escape from the program and return to DOS.

SELECT TIME SCALE: Specify the length of automatic test run in hours (decimal hours are used, i.e. 1.5, or 0.25). This applies only to profiles created in the graphic mode.

RETRIEVE FILE: Retrieve a previously saved file by name.

CREATE NEW FILE: Create a new test profile in text or graphic mode.

DOWNLOAD FILE: Transfer the current file to the **C-1**.

SAVE CURRENT FILE: Save the file you are working on under the name of your choice.

SELECT MODE: Choose graphic mode or text mode for the creation of test profiles.

Creating a Test Profile in the Graphic Mode

At the main menu, type "5" to select the screen mode. The following will appear:

0. TEXT

1. GRAPHIX (HERC MONO)

MODE=TEXT

SELECTION

Type "1" and press **Return**. You have selected the graphic mode and it will return to the main menu.

At the main menu, type "2" to create a new file. The screen will change to an x,y graph with time on the horizontal axis and percent RH on the vertical axis. A crosshair will appear. Control the crosshair by using the arrow keys. It will be necessary to press the up arrow and right arrow to see the crosshair because its beginning position is 0 time and 0% RH, where the lines of the crosshair line up with the axes of the graph. Select a point by pressing **Return**. As you move the crosshair through the graph, note that time and %RH are displayed at the top of the screen for the current crosshair position. Follow the directions on the right side of the screen for changing the increments in which the crosshair moves, selecting a point, etc. Start your first point at time 0.

The graph that first appears will allow you to create a test profile with a total run time of three hours. If you want to adjust total run time, return to the main menu and type "0" to select a new time scale. Follow the instructions to select a time suitable for your needs, then type "2". The graph will appear with the new time scale on the horizontal axis (see Figure 3 below).

When you are satisfied with the test profile, return to the main menu and type "4" to save the file. The program will prompt for a name. Once your file is named, you can call it up for editing, downloading, etc. Create and save as many profiles as you need.

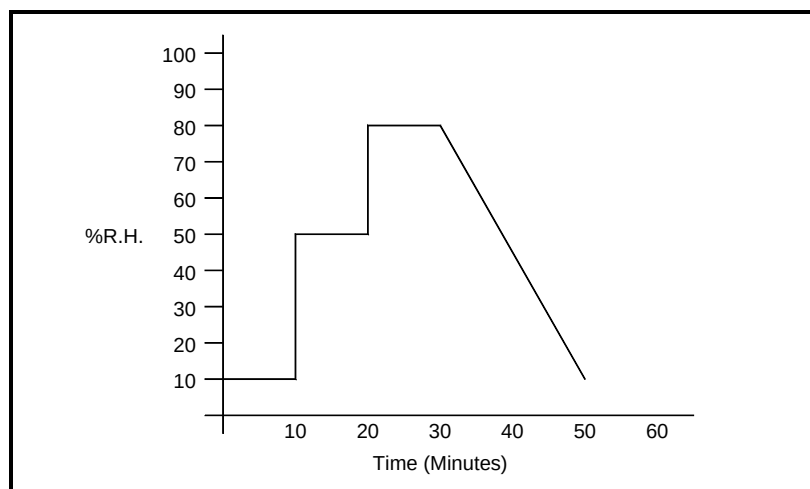


Figure 2: Sample Humidity Profile

Creating a Profile in the Text Mode

If your computer does not have graphics capability, all test profiles must be created in the text mode. At the main menu, type "5" to select the screen mode. Type "0" and press **Return** to choose the text mode and return to the main menu. Then type "2" to create a new file.

A box will appear with a menu bar at the top. The three choices on the menu bar are **EDIT**, **SAVE** and **QUIT**. Use the arrow keys to highlight the different choices. Now highlight **EDIT** and press **Return**. Two columns will appear in the box. The left column is %RH and the right column is TIME-LENGTH (MINUTES). Follow the instructions at the bottom of the screen to move the highlighted box. Enter a value in the % RH column, press **Return**, and then use the arrow keys to move to the right to enter a time segment. Continue in this way until your profile is complete.

When working with profiles in the text mode, remember that you are defining individual segments of a graph. Refer to Table 1 below to see what the text version of a graphic profile looks like. The first two lines of the text version define the first line segment of the graph. The text version instructs the **C-1** to be at 10% RH at time 0, and to be 10% RH at time 10 minutes. The third line of text tells the **C-1** to be at 50% RH at time 0. Remember that each new segment starts at time 0, not the cumulative time of the entire profile. The fourth line tells the **C-1** to be 50% RH at time 10 minutes, thus completing a second step in the graph.

Table 1: Profile - Text Version

%RH	Time Length (Min.)
10	0
10	10
50	0
50	10
80	0
80	10
10	20

To save a profile in the text mode, press **ESC**, than use the arrow keys to highlight **SAVE** on the menu bar. Press **Return**. You will be prompted to enter a name. Enter a name, press **Return**, and you are free to move around in the program.

Downloading a Test Profile to the C-1

To download a test profile to the **C-1**, you will need to connect your **C-1** to the serial port of your computer with an appropriate cable (see the introduction section of *Automatic Operation* on page 7 or refer to Figure 3 below). If your computer has more than one serial port, use the COM1 port, or the primary port. Turn your **C-1** on and type "3" to download a test profile. You will be prompted to name the program you want to download. Follow the prompts. If you have been using the software, the profile you have worked on most recently will download automatically. The word "**DOWNLOADING**" will appear on the screen until the download is complete. After you have completed the downloading, you can disconnect your data cable.

The **C-1** will store only one profile at a time. The program is kept in nonvolatile memory, so it will not be lost when the **C-1** is turned off. When a new profile is downloaded, the existing profile is dumped from memory.

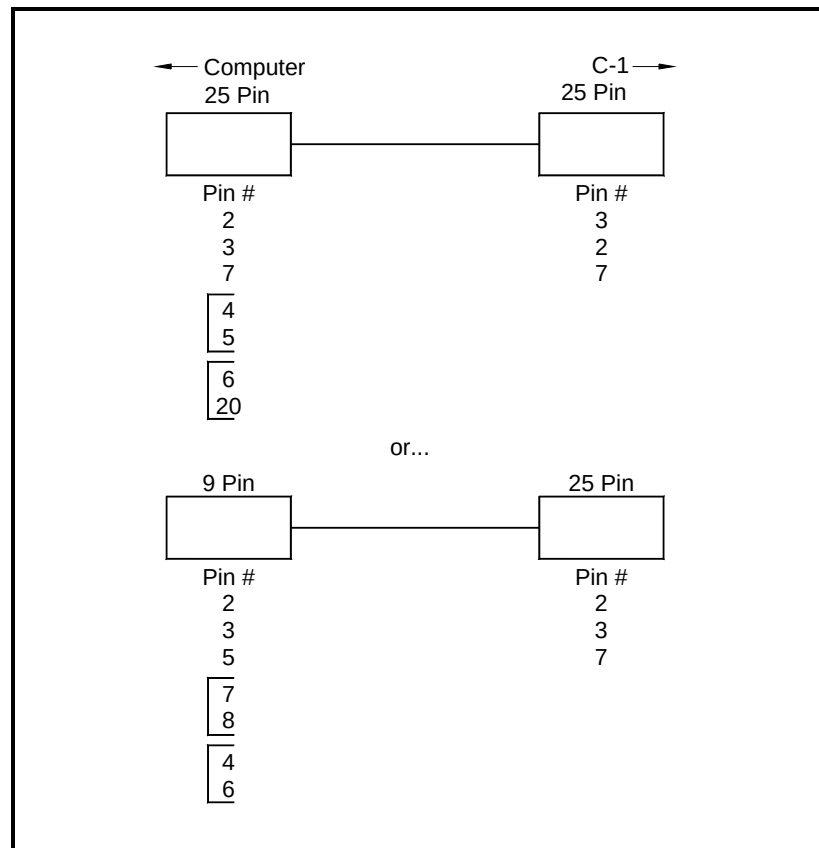


Figure 3: Cable Configurations

Using the C-1 in the Auto Mode

To initiate an automatic test profile, turn on the **C-1** and follow the start up procedure in *General Operating Procedures* on page 4. When you are ready to begin the profile, flip the AUTO/CAL switch to the auto position. The test profile will start immediately. If you leave the switch in the AUTO position the test profile will repeat itself continuously. Once a test profile is started it can only be interrupted by turning the **C-1** off. While a profile is running, the **C-1** display will indicate the % RH being generated at the time. In the case of ramp changes, the display will scroll through discrete steps.

Remember when you create a test profile that there are certain limitations to what you can do, based on the response time of the **C-1**, as well as any sensor that may be under test. Because the **C-1** requires fifteen minutes to reach a new setpoint, step changes of less than fifteen minutes duration (or steep ramps) will do little to generate useful data.

Maintenance

Regular use of the **C-1** will require routine maintenance of the desiccant and the distilled water.

Replacing the Desiccant

The desiccant should be changed when the pink reaches the "CHANGE WHEN PINK" mark. The desiccant, which is anhydrous CaSO₄, may be rejuvenated by baking it on a cookie sheet in a single layer for two hours at 400° to 450° F. Replacement desiccant is available from the factory.

To replace the desiccant, turn the **C-1** off, grasp the desiccant tube with both hands, and pull upward slowly. The tube should come out slowly and easily with a lightly-greased feel. If it does not, work it slowly from each end, rocking it lightly from side to side.

IMPORTANT: *The seals on the tube are delicate. Do not apply excessive force.*

Once the desiccant tube is removed, unscrew the cover and remove the spring plate. Remove the pad and empty the used desiccant. If the desiccant sticks, tap the tube lightly. Fill the tube with fresh desiccant to the proper level, and tap lightly to settle the desiccant. Replace the pad and spring plate, carefully check the position of the O-Ring, and screw the cover on snugly. Make sure the rubber gaskets are well lubricated with O-Ring grease. Line up the gasket connectors with the receptor tubes and ensure that even contact occurs on both tubes. Then press down slowly and firmly until the tube is seated. Follow the start up procedure after replacing desiccant.

Replacing the Desiccant (cont.)

Desiccant life is determined by ambient humidity, since all air entering the **C-1** passes through the desiccant. Desiccant life can be extended indefinitely by connecting a source of dry gas to the dry gas port. Set the flow from your gas source to 8 scfh. Higher flow rates are acceptable, however, anything beyond 8 scfh will be vented to atmosphere and therefore wasted. A gas entering the dry gas inlet passes through the desiccant, so any source dryer than ambient will extend the life of the desiccant.

Adding Distilled Water

Distilled water should be added to the **C-1** before start up or whenever the fill light comes on during operation. Do not overfill.
USE DISTILLED WATER ONLY.

The **C-1** should be completely emptied of water before transport (even local transport around a lab or a building). Pump water from the chamber by inserting the hand pump into the fill tube and pump it dry. Always keep the **C-1** in an upright position.

Replacement desiccant tubes, power cords, chamber covers, etc. are available from the factory. Contact the factory for information on parts or repairs.

Troubleshooting

Things to Watch Out For (Do's and Don'ts)

Heat in the Test Chamber

The proportionality of wet and dry air mixing to relative humidity can be affected by the generation of heat in the test chamber. Therefore, when testing electronic devices which generate heat, the generated humidity will not be the same as the humidity in the air around the device. This problem can be corrected only by feedback operation (sensors from an **M2**, **M3**, or **M4** monitor actual chamber dew point and temperature; the **C-1** is prompted to adjust its output accordingly).

Transporting the C-1

When transporting the **C-1**, changes in temperature can temporarily affect the accuracy of the unit. This is due to the varying thermal time constants of the components in the **C-1**. Proper operation of the **C-1** requires that the **C-1**, water bath, and instruments in the test chamber be at the same temperature. If the **C-1** or the water to be used has experienced a temperature change of 15° F or more, allow at least one hour for temperature equilibration. If the **C-1** is colder than ambient temperature, be especially cautious of generating high humidities where the dew point of the generated humidity may be higher than the temperature of the internal parts of the **C-1**. In this case condensation will occur and may take several hours to dry out.

Reaching a Setpoint

In stand alone operation, the **C-1** will reach setpoint in under fifteen minutes. When the setpoint is changed, the **C-1** immediately begins to generate a gas mixture of the new value. Ten minutes are required to displace the existing chamber environment with the new gas.

Instruments in the chamber will lag considerably behind the **C-1**. This is a function of that instrument, not of the **C-1**. All sensors should be allowed to equilibrate after the **C-1** has had fifteen minutes to reach setpoint.

Audio-Visual Clues

The **C-1** should hum loudly when it is running. This is the sound of the internal pump. With humidity set between 10% and 90% RH there should also be a quiet pulsating hissing noise, audible from the fill tube. If either sound is missing there is a problem with the air delivery system of the **C-1**. Contact the factory.

If the **C-1** does not power up when switched on, unplug the power cord and check the fuse. Use a small screwdriver to pry out the fuse holder that is built into the line cord receptacle. If the fuse is blown, replace it with a spare from the holder next to it and re-install. If the **C-1** still won't power up, contact the factory.

The **C-1** should not gurgle. If it gurgles, then it has been over-filled, or tipped when full. Drain and re-fill the **C-1**. Operate at 25% RH for one to two hours to dry out internal systems, then test for proper operation.

Overfilling or tipping the **C-1** when it is full may cause water to enter the test chamber. Wipe any water from the chamber and operate as above.

As the **C-1** runs without an external dry gas supply, the blue desiccant should slowly turn pink, and the line between the pink and the blue should slowly move from right to left (assuming no use of the dry gas inlet). If this line fails to move over the course of a few hours of operation, turn off the **C-1** and inspect the desiccant tube for proper seating of the gasket seals to the receptor tubes. In a typical room environment, the tube of desiccant will last for about 24 hours of continuous use.

General Guidelines

Best performance from the **C-1** will result when the unit is operated in a temperature-stable environment. Attention to detail and procedure when setting up your instrument will help to eliminate problems and produce useful test results. If everything seems to be operating fine but your results are not as expected, check your assumptions! If you are still in doubt, contact the factory.

SST Sample System

If you have purchased an SST sample system from the factory, please take a few minutes to read this section of the manual and familiarize yourself with the SST.

The SST is designed to integrate the **C-1** with a GE Infrastructure Sensing **Hygro M2, M3, or M4** chilled mirror dew point hygrometer. The SST consists of a mounting plate, air pump, flow restrictor, pre-configured **C-1** chamber cover, data cable, and all of the hardware and tubing necessary to create a complete system.

Before setting up your system, it is recommended that you read the appropriate user's manual for your dew point hygrometer and sensor. Also, re-read *Feedback Operation* on page 6 of this manual. This will help to assure proper **C-1** and instrument operation.

Setup

The SST mounting plate is designed to hang off the left side of the **C-1**, providing for a short sample line. It comes with the air pump attached and with provisions for mounting either a **1211H** or **D2** optical dew point sensor. Mount your dew point sensor on the plate with the sensor cable connection facing away from the air pump. Connect one end of the clear plastic tubing, with flow resistor in the middle, to the air pump (the nipple labeled "vac"), and the other end to the gas port on the sensor that faces down. Be sure that the arrow on the flow restrictor points from the sensor toward the air pump (the direction of air flow). Hang this entire assembly from the left side of the **C-1**.

Attach the pre-configured chamber cover to the **C-1** with the fittings on the left side. The final piece of tubing should be attached to the dew point sensor and run through the fitting on the chamber cover. The ferrule should be crimped so that the tubing extends two inches into the **C-1** chamber. The second fitting is for the T100 temperature probe from the **M2/M3/M4**. The tip of the T100 should be close to the bottom of the chamber, but not touching. Connect the T100 and the dew point sensor to the **M2/M3/M4**.

Operation

With the **M2/M3/M4** and **C-1** running, simply plug in the sample pump (115 VAC, 60 Hz). The pump provides gas flow over the chilled mirror sensor at a rate between 1 and 2 scfh. The **M2/M3** will calculate and display the relative humidity in the **C-1** chamber by measuring the chamber temperature and dew point. If feedback operation is desired, connect the data cable between the **C-1** and the **M2/M3**.

Specifications

C-1 RH Generator

<i>Generation Method</i>	Divided Flow
<i>Operating Range</i>	0%-99% RH, 35° to 100°F (2° to 38°C)
<i>Repeatability</i>	0.2% RH
<i>Accuracy</i>	0%-10% $\pm 4.0\%$ 10%-20% $\pm 2.0\%$ 20%-80% $\pm 1.0\%$ 80%-90% $\pm 2.0\%$ 90%-99.9% $\pm 4.0\%$
<i>Response Time</i>	Less than 15 minutes*
<i>Stability</i>	0.2% RH
<i>Storage</i>	Full: 33° to 100°F (0.5° to 38°C) Drained: -65° to 120°F (-54° to 49°C)
<i>Power</i>	100/120/240 VAC 50/60Hz**
<i>Integral Power Supply</i>	24 VDC unregulated
<i>Weight</i>	12 pounds
<i>Dry Gas Inlet</i>	¼" tube fitting
<i>Chamber Dimensions</i>	3.2" x 5.8" x 3.7" DP

*To within 1% of accuracy band. Response time will increase when used in feedback mode.

**Input power must be specified when ordering: not field changeable.

SST Sample System

Power 120 VAC 60Hz

Flow Rate 1 to 2 scfh

The mounting plate will accommodate a GE Infrastructure Sensing **1211H** or **D2** chilled mirror sensor.

C-1 Replacement Parts

Table 2: C-1 Replacement Parts

Part Number	Description
40088619	5 lb. jar of 8 mesh indicating Drierite
40093643	Desiccant tube with desiccant and gaskets
40096398	Cover for test chamber (new style)
40085664	Hand pump
40001372	Line Cord

Note: *Drierite (Anhydrous CaSO₄) can be purchased from the manufacturer. MSDS is available upon request.*

W.A Hammond Drierite CO.

P.O. Box 460

Xenia, OH 45385

(513) 376-2927



USA

1100 Technology Park Drive
Billerica, MA 01821-4111
Web: www.gesensing.com

Ireland

Shannon Industrial Estate
Shannon, County Clare
Ireland

