

54LO475 Alarm Setting Instructions

MONITOR ALARM OPTIONS:

Audible Alarm

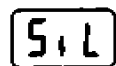


Visual Alarm



ACCESS THROUGH MENU SCREEN:

Audible Alarm



Visual Alarm



CHOICES: AUDIBLE ALARM

Low Alarm: Horn On



Horn Off



High Alarm: Horn On



Horn Off



CHOICES: VISUAL ALARM

Low Alarm: Light On



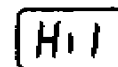
or



Light Off

In low flow conditions, the red light should always remain on for safety reasons.

High Alarm: Light On



Light Off



Methods to Disable Audible Alarm

● TEMPORARY DISABLE

Method Requires: Temporary press of the Test/Reset button

Enabled/Disabled Via: Re-enabled when monitor senses normal airflow has been restored.

● "PERMANENT" DISABLE

Method Requires: Through Test/Reset button, go into "SiL" menu screen and toggle between "B,P" and "SiL" until you get "SiL".

Enabled/Disabled Via: Operator can re-enable audible alarm by toggling to "BiP" or powering down and back up.

● SEPARATE SWITCH

Method Requires: Run 10 volts to pins 1 (-)& 2 (+), and to a separate external switch.

Enabled/Disabled Via: Horn disabled while 10 volts is applied.

● OUTLET POWERING THE MONITOR IS TIED TO FAN MOTOR SWITCH

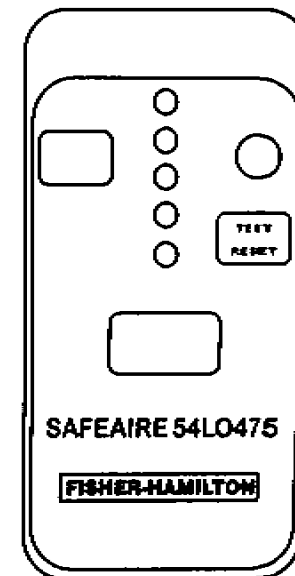
Method Requires: Run wire from the electrical box that has the hood's fan switch connected directly to the monitor.

Enabled/Disabled Via: When the hood's exhaust fan is turned off, the monitor is also turned off.

● BACKDRAFT DAMPER & TEMPORARY DISABLE

Method Requires: Install a backdraft damper (electrical or gravity) on the roof of the building.

Enabled/Disabled Via: When the HVAC exhaust goes off, there is still a release of excess pressurization that eliminates drafts through the system which may cause a temporary normal air flow condition which re-enables the alarm (see method 1).



Fume Hood Information

ROOM NUMBER/LOCATION:

HOOD NUMBER/LOCATION:

54LO475 Setpoints

	CALIBRATION		ALARM	
	LOW	HIGH	LOW	HIGH
Factory:	LOW Not set	HIGH Not set	LOW 80 fpm	HIGH 250 fpm
Field:	LOW	HIGH	LOW	HIGH

Before Calibrating

1. Set hood to low velocity (sash full open) and measure and record actual face velocity.



2. Set hood to high velocity (sash open 12") and measure and record actual face velocity.



To Set Calibration Points

1. Set hood to low velocity (sash full open) to begin calibration.



2. Press and hold Test/Reset button until the five beeps finish and the menu item scrolls through in the display window.



3. Release Test/Reset button when you see SET. (If you scroll past SET, the unit will scroll through the menu again.)



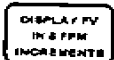
4. Press and hold Test/Reset button until you see CAL.



5. Release Test/Reset button when you see CAL. The unit will display FPN, and then begin to show values beginning with 50.



6. Feet per minute values will scroll continuously in increments of 5 fpm.



7. Press and release Test/Reset button when you see the value nearest the measured low face velocity (sash full open) value.



8. Wait 20 seconds while monitor takes sample readings. You will then see 3 dashed lines.



9. Quickly set hood to high face velocity (sash at 12" open).



10. The scrolling of the face velocity readings in 5 fpm increments will automatically begin.



11. Press and release Test/Reset button when you see the value nearest the measured high face velocity reading (sash at 12" open).



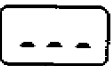
12. Wait 20 seconds while monitor takes sample readings. You will then see 3 dashed lines.



13. In a successful calibration, you will continue to see 3 dashed lines for 10 seconds, followed by 475, followed by the display of actual face velocity.



14. If you see this, accompanied by a series of beeps, the calibration was not successful and needs to be done again. If unsuccessful on several attempts, call Alnor at (800)424-7427.



To Set Alarm Points

1. Press and hold Test/Reset button until the five beeps finish and the menu item scrolls through in the display window.



2. Release Test/Reset button when you see SET. (If you scroll past SET, the unit will scroll through the menu again.)



4. Release when you see LO, which indicates you can now set the low alarm set point.



5. The unit will automatically scroll through face velocity values.



6. Press Test/Reset when you get to the desired low alarm set point.



7. The unit will automatically show HI, which indicates you can now set the low alarm set point.



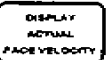
8. The unit will automatically scroll through face velocity values. Display FV in 5 FPM increments window.



9. Press Test/Reset when you get to the desired high alarm set point.



10. Normal operation and display of actual face velocity resumes.



GENERAL DESCRIPTION

This monitor continuously measures air flow through fume hoods, and can be installed on the surface of a hood. It provides visual, audible, and remote alarms under abnormal air flow conditions. It displays face velocity numerically and features a column of lights to display air flow trends. Additionally, it will print and store in memory air flow measurements at periodic intervals, operate from a battery back-up power source, and supply a voltage output proportional to air flow. The monitor must be calibrated in the field for accurate operation. Read this manual entirely before installing, calibrating, and using this monitor.

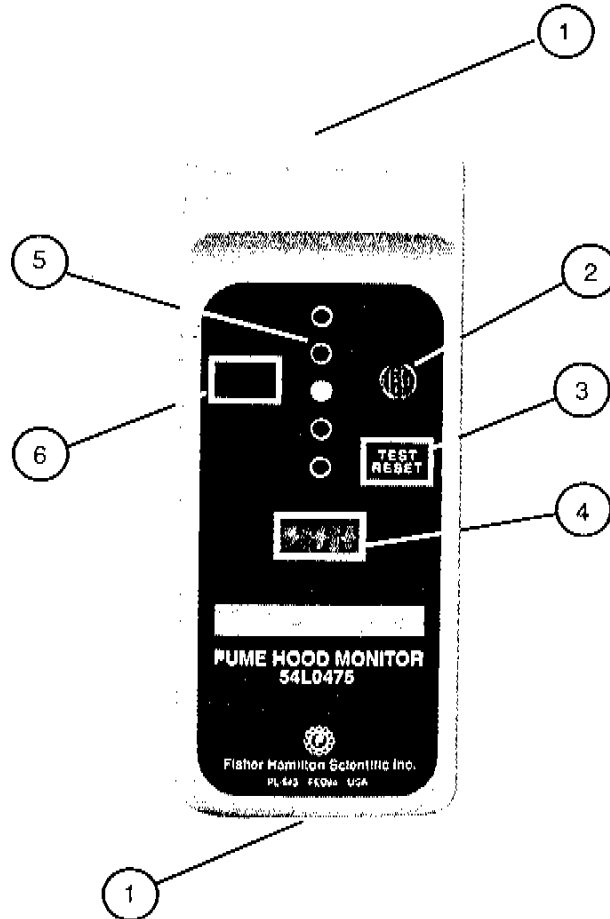


Figure 1.

MODEL:

54L 475

Table 1. Description of the Front of the Monitor, reference figure 1.

Index	Name	Description
1	Mounting screws	Two screws secure the monitor to the back plate which is then secured to the fume hood.
2	Air Inlet	Guides air to sensors.
3	Test/Reset button	Pressing this button silences an alarm and tests display and audible and visual alarms.
4	Digital Display	Shows measurement in ft/m or cm/s.
5	Analog Display	Shows air flow measurement as a bar graph. Also shows an external alarm condition when it is blinking.
6	Visual Alarm	Indicates an air flow alarm when it is lit.

Installation
Figure 2.
installation

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Table 2. Description of the Rear of the Monitor, reference figure 2.

Index	Name	Description
1	Cover holes	Two holes accept screws to secure the front of the monitor to the back plate.
2	Mounting holes	Two holes for screws to secure the back plate to the fume hood.
3	Back plate	Secures the monitor to the fume hood.
4	Flow tube hole	For the optional side wall air hose.
5	Power cord hole	For the power supply when routed through the rear of the monitor.
6	External interface	To connect external devices to the monitor.
7	Flow tube	Accepts optional air hose to the fume hood.
8	Communications port	Connects to printer or computer.
9	Power jack	Accepts power cord.
10	Power cord	From the power supply provided.
11	Wiring hole	Routes external wiring to the monitor.



INSTALLATION

Installation of the monitor requires drilling holes in the fume hood as shown in Figure 2. Additionally, many fume hoods will require a side wall adapter hose installation as shown in Figure 3.

WARNING

ALWAYS WEAR EYE PROTECTORS WHEN USING POWER TOOLS. ALSO, OBSERVE ALL NECESSARY PRECAUTIONS WHEN INSTALLING OR REPAIRING MONITORS IN THE VICINITY OF ELECTRICAL EQUIPMENT.

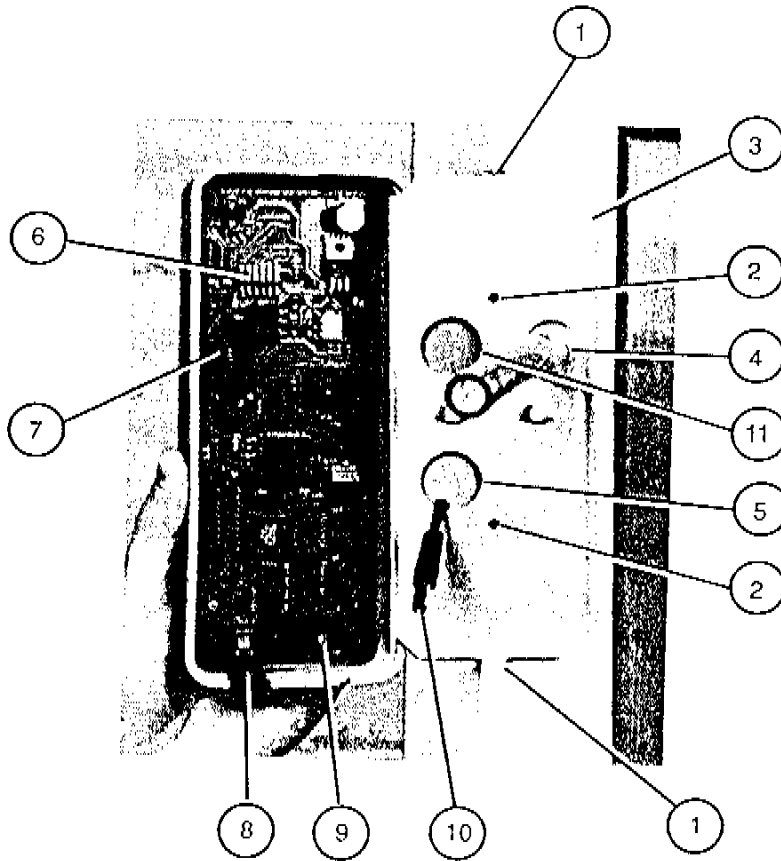


Figure 2.

PROCEDURE

- Step 1: Detach the back plate from the monitor by unscrewing the top and bottom screws (figure 1, item 1).
- Step 2: Use the back plate (figure 2, item 3) as template to drill 2 holes, 0.104" diameter, (figure 2, item 2) to secure the back plate to the fume hood.
- Step 3: Use the back plate (figure 2, item 3) as template to drill 1 hole, 0.75" diameter, (figure 2, item 4) for air flow from the monitor to the fume hood.
- Step 4: If the power cord is routed through the face of the fume hood, use the back plate (figure 2, item 3) as template to drill 1 hole, 0.875" diameter, (figure 2, item 5) to route the power cord from the back of the hood to the front. The power cord can be also routed from the front of the monitor, in which case this hole is not needed.
- Step 5: If the monitor will be connected to external devices (such as a relay indicator), then use the back plate (figure 2, item 3) as template to drill 1 hole, 0.875" diameter, (figure 2, item 11) to route external wires to the "external interface" (figure 2, item 6) of the monitor.
- Step 6: In some applications, leaving the flow tube exposed to the interior of the fume hood will provide good results. However, many installations will require using a side wall adapter to guide air flow from the monitor to the fume hood as shown in Figure 3. In these cases, drill a 0.515" hole in the side wall of the fume hood, approximately 6" behind the sash and even with its bottom when fully open. Insert the side wall adapter from the inside of the hood and lock with the lock ring.
- Step 7: If a side wall adapter is used, connect the supplied air hose between the side wall adapter (figure 3) and the flow tube (figure 2, item 7) through the back plate orifice (figure 2, item 4). Secure hose firmly, and cut to length as necessary, to prevent accidental kinks and bends which can affect calibration.
- Step 8: Mount back plate to fume hood and assemble prommets into wiring holes.

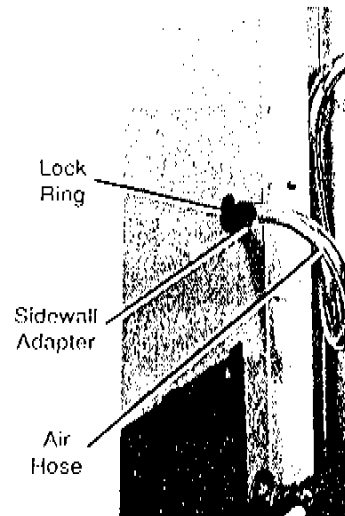


Figure 3.

- Step 9: Connect the power cord (figure 2, item 10) to the power jack (figure 2, item 9). The power cord is shown routed from the rear of the fume hood, but may be also routed from the front side.
- Step 10: Secure the monitor to the back plate using a screw on the top, and a screw at the bottom (figure 1, item 1). If front power cord routing is used, be careful to place the cord into the notch provided in the bottom of the front cover before securing the screws.
- Step 11: Plug the power supply to a power source. See Specifications section for ratings.

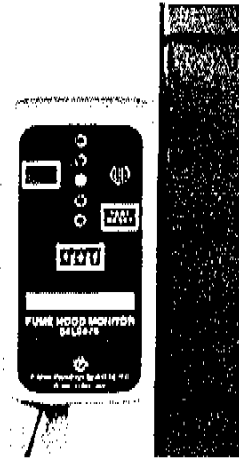


Figure 4.

The installation of the monitor is complete. The instrument should look as shown in Figure 4. Proceed now to the Calibration section.

CALIBRATION

Field calibration must be performed with each monitor because each hood installation is unique. This calibration procedure will program the monitor to operate between a low flow set point and a high flow set point. Both set points must be within the range of the monitor.

WARNING

CALIBRATION OF THIS MONITOR MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL. PROPER GUIDELINES FOR MONITORING ANY VENTILATION APPARATUS ARE ESTABLISHED ON THE BASIS OF TOXICITY OR HAZARDS OF THE MATERIALS USED, OR THE OPERATION CONDUCTED WITHIN THE VENTILATION APPARATUS. PERSONNEL CALIBRATING THIS MONITOR MUST BE COMPLETELY AWARE OF THE REGULATIONS AND GUIDELINES SPECIFIC TO ITS APPLICATION.

EQUIPMENT REQUIRED:

Use a calibrated ALNOR thermoanemometer (ALNOR 8500, 8575, APM360) or similar instrument capable of displaying air flow in "feet per minute".

PROCEDURE:

Step 1: Confirm that the monitor was installed properly.

Step 2: Apply power to the monitor and wait at least 10 minutes for the monitor to reach a stable operating condition.

Step 3: Set the fume hood to a low air flow, usually around 50 to 100 ft/m. *- FULLY OPEN SASH & OBTAIN*

Step 4: Using the calibrated thermoanemometer, determine the velocity through the face of the hood by taking a detailed velocity traverse. Divide the face area of the hood into equal increments. A six inch grid area is recommended for an accurate traverse. Compute the average velocity for this area. For this example, assume that the traverse resulted in an average velocity of 62 ft/m.

Step 5: Press and hold the Test/Reset button until only the center LED is lit in the Bar Graph.

This process will take at least 5 seconds.

Step 6: Release the Test/Reset button while the center LED is lit on the Bar Graph. The monitor will be ready for field calibration of a low set point, and a high set point.

Step 7: The analog display will increment from 50 to 250 ft/m by moving the needle from left to right. The left most position is 50 ft/m. The red-yellow boundary is 100 ft/m. The yellow-green boundary is 150 ft/m. The green-red boundary is 250 ft/m. Press the Test/Reset button for 1 second when the displayed value approximates the set point value ("62" in this case).

Step 8: The monitor will wait at least 5 seconds to allow the user to step away from the face of the hood.

Step 9: The monitor will then measure air flow at the low set point for approximately 20 seconds.

Step 10: Now set the fume hood for a high air flow, usually 120 ft/m or higher, but not to exceed the range of the monitor. Using the calibrated thermoanemometer, determine the velocity through the face of the hood by taking a detailed velocity traverse. Divide the face area of the hood into equal increments. A six inch or smaller grid area is recommended for an accurate traverse. Compute the average velocity for this area. For this example, assume that the traverse resulted in an average velocity of 124 ft/m. *(12") PARTIAL CLOSING THE SASH A.*

Step 11: 7

Step 12: 7

Step 13: 7

Step 14: 7

Step 15: 7

Step 16: 1

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EXTERNAL INTERFACE

External electrical connections can be made to the monitor using the "External

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ity for this area. For this example, assume that the traverse resulted in an average velocity of 124 ft/m.

- Step 11: The monitor will scroll through values from 50 to 250 ft/m, in increments of 5 ft/m. Since the face velocity in this example was measured as 124 ft/m, the nearest set point value will be 125 ft/m. Press and hold the Test/Reset button for 1 second when the displayed value matches the set point value ("125" in this case).
- Step 12: The monitor will wait at least 5 seconds to allow the user to step away from the face of the hood. During this time, it will display a countdown with negative numbers, and sound the audible alarm about once per second.
- Step 13: The monitor will then measure air flow at the high set point for several seconds. During this time, the monitor will display a countdown with positive numbers.
- Step 14: The monitor will sound the audible alarm 3 times and show a dashed line to indicate that the measurements were completed.
- Step 15: The monitor will compute a new field calibration. This process takes approximately 30 seconds.
- Step 16: If the field calibration was successful, the monitor will display

475

and operate with the new calibration. Otherwise, it will show a dashed line and sound the audible alarm once per second. In this latter case, press the Test/Reset button for 1 second to terminate the field calibration procedure and allow the monitor to continue operating with factory default settings. Check that the monitor was installed properly and that the fume hood is operating correctly. Then repeat this calibration procedure.

NORMAL OPERATION

Local Alarm Acknowledgement

The audible alarm can be silenced by pressing the Test/Reset button. The audible alarm will remain silenced until the air flow condition is corrected. The visual and remote alarms cannot be acknowledged; they remain active until the alarm condition is corrected.

Remote Alarm Acknowledgement

The audible alarm can be silenced by joining the "remote acknowledge input" pins in the external interface connector. The audible alarm will remain silenced until the alarm condition is corrected.

Alarm Test

The audible and visual alarms can be tested by pressing and holding the Test/Reset button for up to 4 seconds. During this time, both alarms will be cycled on-off in 1 second intervals.

Remote Alarm Output

The remote alarm activates a relay to signal a remote location. This alarm can not be acknowledged and remains active while the alarm condition exists.

Alarm Disabling

Alarms can be disabled through the Test/Reset button. See the Custom Monitor Configuration Through Keypad section of this manual.

Digital Display

The digital display shows air flow in units of "ft/m" or "cm/s". Only the value is displayed. The unit of measurement is not displayed. Air flow above the high set point will be shown as:

H_i

and air flow below the low set point will be shown as:

L_0

Analog Display and External Alarm Input Indicator

The analog display consists of 5 LEDs displaying air flow trends. The bottom LED corresponds to the low flow set point, and the top LED corresponds to the high flow set point. Set points are defined as 50 and 250 ft/m at the factory, but may be altered during field calibration. The analog display also works as the indicator for the external alarm input. When the external alarm input pins in the external interface connector are separated or "open", the analog display segment in use will flash. When the external alarm input pins are joined or "closed", the analog display segment in use will remain lit constantly.

Alarm Delay Timing

The monitor will time its reaction to alarms. It waits for an alarm condition to exist for a period which exceeds the "Delay Phase". Then it will activate all alarm outputs. If the alarm condition is still present when the "Active Phase" expires, then the monitor will silence the audible alarm, for a period of time equal to the "Alarm Phase". The visual and relay alarm outputs are not suspended. If the alarm condition is still present when the "Rearm Phase" expires, then the "Active Phase" and "Rearm Phase" will repeat.

DATA STORAGE

The monitor has capacity to store 100 measurements. Memory is updated at periodic intervals. Once the memory space is filled, the monitor will continue to update memory with the newest 100 entries. Memory is erased each time power is applied to the monitor. In addition, memory back-up power is not available; stored data will be lost during power failures unless an external back-up source is provided by the user.

DATA PRINTING

The monitor sends each measurement that is stored in memory as part of the data storage function to the "communications port" (refer to Table 2).

A typical output line without alarms is:

100 ft/m EOK

A typical output line with user alarm only is:

100 ft/m EAL

A typical output line with flow overrange alarm is:

HI ft/m EOK

A typical output line with flow underrange alarm is:

LO ft/m EOK

A typical output line with flow underrange and user alarms is:

LO ft/m EAL

CUSTOM MONITOR CONFIGURATION THROUGH KEYPAD

Pressing and holding the Test/Reset button for more than 5 seconds activates a custom configuration menu. Choices are:

<i>S, L</i>	Disable/enable the audible alarm
<i>CAL</i>	Perform field calibration
<i>Prn</i>	Send stored data to communications port
<i>H, R</i>	Disable/enable high flow alarms
<i>End</i>	End configuration menu

Choice descriptors are scrolled one each second. To execute a choice, release the Test/Reset button when the desired choice descriptor is displayed.

Disable/Enable Audible Alarm

This choice toggles the audible alarm output from active to inactive, and vice versa. The monitor will display:

B, P to indicate an active audible alarm

or

S, L to indicate an inactive audible alarm

The audible alarm is enabled each time power is applied to the monitor.

Perform Field Calibration

This choice activates the field calibration procedure described in detail in the Calibration section of this manual.

Send Stored Data to Communications Port

This choice will send stored data to the "communications port". The monitor will send the oldest entry first. Unused memory locations will not be transmitted.

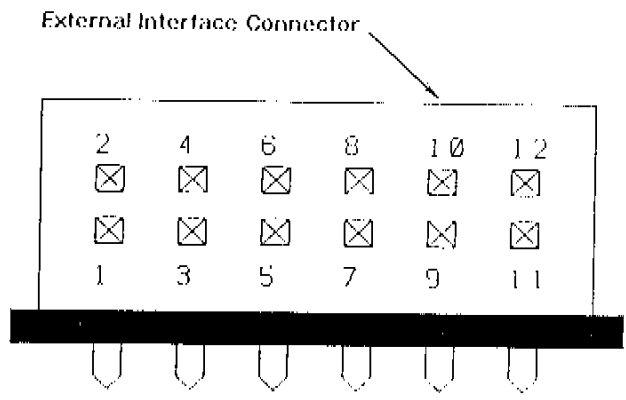
End Configuration Menu

Exit this custom configuration menu. The monitor returns to normal air flow measurement mode.

EXTERNAL INTERFACE

External electrical connections can be made to the monitor using the "external interface" (figure 2, item 6). External wires are routed through the back plate (figure 2, item 11), and terminated with a 12-position socket carrier (supplied). The socket is then connected to the "external interface" of the monitor (figure 2, item 6). The signal lines in the "external interface" are numbered on the printed circuit board. Refer to the Specifications sections for ratings. Functions available are:

REMOTE ALARM SILENCE INPUT:	Positive input at pin 2. Negative input at pin 1.
USER ALARM INPUT:	Pins 3 and 4. Must be driven by isolated relay contacts.
BACK-UP POWER INPUT:	Signal at pin 12. Ground at pin 11.
ANALOG OUTPUT:	Signal at pin 10. Ground at pin 9.
RELAY ALARM OUTPUT:	Normally-open contacts: pins 7 and 8. Normally-closed contacts: pins 7 and 6.



Bar graph disp
blinking

Alarm not activ
immediately

Alarm inactive
at high flows

Figure 5.

Disable/Enable High Flow Alarms

This choice toggles the monitor's interpretation of high air flow as alarm or normal flow condition. The monitor will display:

H, I to indicate high flows will activate alarms

or

H, 0 to indicate high flows will not activate alarms

End Configuration Menu

Exit this custom configuration menu. The monitor returns to normal air flow measurement mode.

EXTERNAL INTERFACE

External electrical connections can be made to the monitor using the "external interface" (figure 2, item 6). External wires are routed through the back plate (figure 2, item 11), and terminated with a 12-position socket carrier (supplied). The socket is then connected to the "external interface" of the monitor (figure 2, item 6). The signal lines in the "external interface" are numbered on the printed circuit board. Refer to the Specifications sections for ratings. Functions available are:

REMOTE ALARM SILENCE INPUT:	Positive input at pin 2. Negative input at pin 1.
USER ALARM INPUT:	Pins 3 and 4. Must be driven by isolated relay contacts.
BACK-UP POWER INPUT:	Signal at pin 12. Ground at pin 11.
ANALOG OUTPUT:	Signal at pin 10. Ground at pin 9.
RELAY ALARM OUTPUT:	Normally-open contacts: pins 7 and 8. Normally-closed contacts: pins 7 and 6.

MAINTENANCE

The outside of the monitor may be wiped clean with mild soap (dish washing detergent) and water on a damp cloth to remove finger marks, oils or residue. Do not use abrasives or solvents. Do not immerse the monitor or allow liquids to enter the case. Dry the instrument thoroughly after cleaning.

TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE and CORRECTIVE ACTION
No display	Power supply not plugged into live AC outlet. Plug power supply into live outlet.
No Audible Alarm	Audible alarm has been disabled. Enable the audible alarm feature.
Display drifted	Blower speed has changed. Check for hose kinks or movement if a hose is used. Check for blockage in the flow tube and air inlet. Check blower speed. Adjust if required. Perform traverse to verify that the calibration has not changed. If the calibration is suspect, recalibrate monitor as instructed in the Calibration section.
<u>Analog display</u> blinking	Monitor is signaling an active external alarm. Correct external alarm source.
Alarm not activated immediately	The alarm condition must persist for a predetermined time period (see Specifications section) before it is interpreted as a true alarm by the monitor.
Alarm inactive at high flows	High flow alarm feature disabled. Enable the high flow alarm feature.

SPECIFICATIONS (Continued)

ANALOG OUTPUT:	0-to-5 VDC signal scaled to the alarm set points. Load: 2000 Ohms minimum, 40 picofarads maximum.
ALARM OUTPUTS:	2200 Hz, 85 dB (at 10 cm) buzzer. 0.75 x 0.5 in. red indicator. 120 VAC or 24 VDC, 0.3 A, form C relay. Flashing analog display for external alarm.
POWER SOURCE:	120 or 230 VAC 50/60 Hz, depending on model.
BACK-UP POWER SOURCE:	User provided 9 VDC, 300 mA source.
DATA STORAGE:	100 newest points stored at intervals from 1 per minute to 1 per 60 minutes. Factory set to 1 per minute. Storage interval set through communications port.
COMMUNICATIONS PORT:	RS-232C ASCII at 1200 baud, 8 bits, no parity.
STORAGE CONDITIONS:	-40 to 160°F (-40 to 71°C), non-condensing environment.
OPERATING CONDITIONS:	55 to 86°F (13 to 30°C), non-condensing environment.
DIMENSIONS:	7.8" x 3.2" x 1.8".