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## GENERAL DESCRIPTION

The AirGard® 385 continuously monitors fume hood face velocity by measuring the air velocity of clean air from the room passing through the air inlet on the front of the monitor. The unit then reports this information visually through a digital display and colored lights, as well as with a continuous audible alarm when the face velocity is in an alarm condition. This information can be sent to a remote location by means of a relay output and analog output.

Air is drawn into a fume hood by an exhaust system that produces a differential pressure between the interior of a fume hood and the surrounding laboratory. The average velocity of the air moving perpendicular through the front sash opening of the hood is called the face velocity. Adequate face velocity is necessary to protect fume hood users by containing all of the contaminants inside the fume hood.

Fume hoods vary in design and performance. Because each hood installation and its air flow patterns are unique, *the AirGard® 385 monitor must be calibrated in the field on the fume hood it is installed.*



Figure 1 —Front view of instrument

1. Mounting screws	Two #6-20 screws secure the monitor to the fume hood.
2. Digital display	Shows air flow velocity measurement either in feet per minute or meters per second. Status indicators and icons reflect the status of monitor features.
3. Alarm LED (red)	Indicates a high or low air flow alarm.
4. High warning LED (yellow)	Indicates the air flow is within the warning zone between normal and high alarm.
5. Normal LED (green)	Indicates a normal air flow condition.
6. Low warning LED (yellow)	Indicates the air flow is within the warning zone between normal and low alarm.
7. Up button	Up scroll button for configuration and calibration.
8. Down button	Down scroll button for configuration and calibration.
9. Air Inlet	Guides clean room air to the sensor.
10. Test/Reset button	If an alarm is present, pressing the Test/Reset button silences the alarm. If no alarm is present, the Test/Reset button is used to test the digital display, LEDs, audible alarm and relay output. This button is also used during calibration and configuration.

Table 1: Description of the front of the monitor. Reference Figure 1.

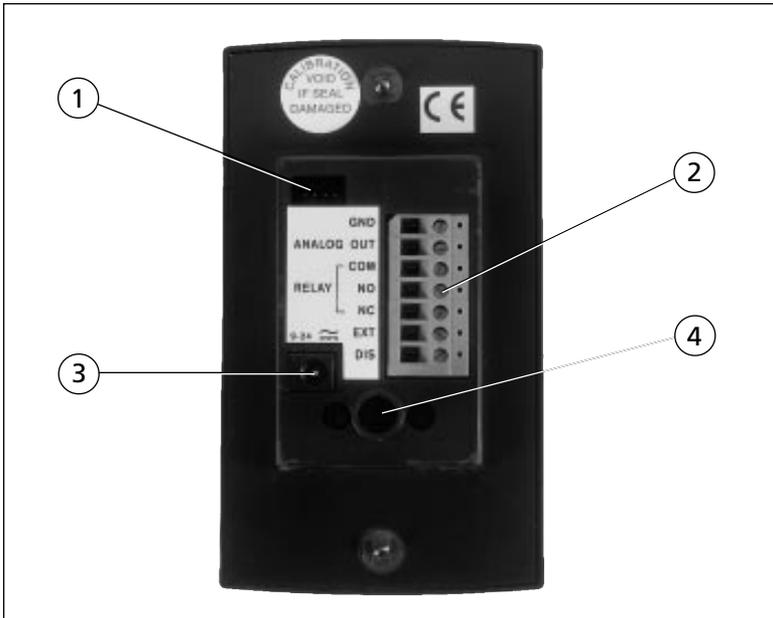


Figure 2—Rear view of instrument

1. Communications port	For factory use only.
2. Terminal block	Accepts 14-24 AWG wires. See the Electrical Wiring section for how to connect to the terminal block for input/output features.
3. Power jack	A suitable power supply is supplied for domestic units only. A 2.1 mm plug with 1.8 m cord is provided for export units.
4. Flow tube	Connects to the flexible air hose attached to the fume hood side wall.

Table 2: Description of the rear of the monitor. Reference Figure 2.

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# ELECTRICAL WIRING

## Power Jack

Power is connected to the unit through a power jack located on the rear of the monitor. For units shipped within the United States, a suitable power supply is supplied with the unit. Plug the power supply into 120 VAC nominal 60 Hz mains.

For units shipped outside the United States, a 2.1 mm plug with a 1.8 m cord is provided. See the power requirement in the Specifications section inside the front cover.

## Terminal Block

The monitor has a seven-pin screw terminal block connector protruding from the rear of the monitor. The terminal block accepts 14-24 AWG wires. These connections are for input/output features. See the Configuration Parameters section where indicated. The connections available are described below:

### ***Ground (GND)***

This is the ground used for the ANALOG OUT, EXT and DIS connections.

### ***Analog output (ANALOG OUT)***

This is the 0-4 V DC analog output feature (+) connection. Ground is made to the GND terminal.

### ***Relay output (COM, NO, NC)***

Connecting to the NO terminal, the contacts close during an alarm condition.

Connecting to the NC terminal, the contacts open during an alarm condition.

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### ***External alarm input (EXT)***

This input can be configured for normally open (NO) or normally closed (NC) contacts. Normally closed indicates that closing the contacts causes this feature to be activated. Normally open indicates that opening the contacts causes this feature to be activated. Use configuration parameter P06. Connect through a switch to the GND ground terminal.

### ***Remote audible disable input (DIS)***

This input can be configured for normally open (NO) or normally closed (NC) contacts. Normally closed indicates that closing the contacts causes this feature to be activated. Normally open indicates that opening the contacts causes this feature to be activated. Use configuration parameter P07. Connect through a switch to the GND ground terminal.

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## **INSTALLATION PROCEDURE**

### **Tools Required**

1. Power drill
2. Drill bit size #37 (0.104")
3. <sup>33</sup>/<sub>64</sub>" diameter hole saw for cutting into side wall
4. Reciprocating saw with saw blades for cutting sheet metal
5. Pilot drill sized to fit the saw blade
6. Phillips head screwdriver with #1 point
7. Slotted screwdriver with <sup>3</sup>/<sub>32</sub> blade width



### **WARNING**

**If the monitor is to be installed on a hood with Hardiboard™ fiber-cement panels or similar material, use a special hole saw designed for glass and other hard, abrasive materials. Failure to do so may shatter or crack the panel.**

**DANGER**

**Always wear eye protection when using power tools. Observe all necessary precautions when installing or repairing monitors near electrical equipment.**

## Procedure

- Step 1: Determine the mounting location of the monitor. Use the cardboard template supplied as a guide for the size of the installed product and the hole needed to be cut out of the hood. The cutout required is 3" high by 2" wide, which is the typical size required for a single switch electrical box. If the cardboard template is not available, a dimensioned pictorial is at the back of this manual.
- Step 2: Using the template, mark off the 3" high by 2" wide hole necessary to clear the rear enclosure portion of the monitor. Mark off the two mounting screw hole locations.
- Step 3: Drill a pilot hole in each of the four corners. Use the saw to cut out the hole. A suitable nibbling tool may also be used.
- Step 4: Drill the two #37 mounting screw holes.
- Step 5: Drill one hole  $^{33}/_{64}$ " diameter in the side wall of the fume hood approximately 6" behind the sash and even with the sash bottom when it is fully open. Insert the side wall adapter from the inside of the hood and securely lock it in place from the back with the lock ring as shown in Figure 3.
- Step 6: Connect the input/output signal wiring, if required, to the terminal block on the back of the monitor. See the Electrical Wiring section for wiring information.
- Step 7: Connect one end of the supplied air hose to the side wall adapter. Route the hose as necessary to prevent kinks and bends which can affect the calibration. Trim slightly if required. Firmly connect the other end to the flow tube on the rear of the monitor.

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Step 8: Connect the power cord to the power jack.

Step 9: Screw the monitor to the fume hood.

Step 10: Plug the power supply into an appropriate electrical outlet.

The installation of the monitor is now complete.

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## GENERAL OPERATION

### Power Up Sequence

On power up, the digital display is initialized and every segment is turned on for two seconds. All four of the LEDs, the horn and the output relay are also turned on:



After the two seconds has expired, the unit will turn off the four LEDs, the horn and the output relay. It will then display the version number of the firmware on the display for two seconds.

### Run Mode

The digital display shows the air flow velocity measurement either in feet per minute (fpm) or meters per second (m/s). The Alarm LED (red) indicates an air flow alarm. The High Warning LED (yellow) indicates the air flow is within the warning zone between normal and high alarm. The Normal LED (green) indicates a normal air flow condition. The Low Warning LED (yellow) indicates the air flow is within the warning zone between normal and low alarm. These zones are determined by user programmable set points and set point offsets. Over range measurements are shown as Hi. Under range measurements are shown as Lo.

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## Monitor Test

During normal operation, while no alarm condition is present, press the Test/Reset button for up to four seconds to test the LCD, LEDs, horn and the output relay. All segments on the LCD, all LEDs, the horn and the output relay will be turned on.

## Horn

The horn will be activated whenever the Low or High Alarm zone has been reached, unless the horn is permanently disabled. If the horn comes on, then the horn will stay on for the duration of the alarm condition until it is temporarily or permanently disabled. If the horn is temporarily disabled, the horn will turn off and not come back on until either the temporary horn disable timer expires (configuration parameter P03) or until the unit re-enters another alarm zone. If the horn is permanently disabled, the horn will not come back on until the horn is re-enabled.

The horn will pulse intermittently when the external alarm input is active. The horn will remain on until the external alarm input is deactivated.

If the remote audible disable input (night set back mode) is active, the horn will be completely disabled until this input is deactivated.

## Temporary Horn Disable

Pressing the Test/Reset button temporarily silences the horn. If the horn is temporarily disabled, it will turn off and not come back on until either the temporary horn disable timer expires or until the unit re-enters another alarm zone at a later time. See configuration parameter P03 for setting up the timer.

## Permanent Horn Disable

The horn can be permanently disabled during normal operation by pressing and holding the Test/Reset button for five seconds. After five seconds, the horn slash through icon will continuously

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flash on the display indicating that the horn is permanently disabled and will no longer sound in an alarm zone. Removal of power to the monitor does not change this setting. Upon power up, the horn will still be disabled in run mode. The horn can be re-enabled by pressing the Test/Reset button for five seconds. The flashing horn slash through icon will then be shut off.

## **Viewing Alarm Set Points**

The alarm set points can be viewed during normal operation by pressing the Up/Down buttons. A straightened out paper clip works well to access them. If the Up button is pressed, the display will toggle between the current reading and the High Alarm set point. If the Down button is pressed, the display will toggle between the current reading and the Low Alarm set point. The display will toggle between the current reading and the selected set point until there is no keypad activity for five seconds. After five seconds of no keypad activity, the unit will return to normal operation and display the current air flow reading.

## **Changing Alarm Set Points**

The alarm set points can be changed during normal operation and while viewing a set point by holding the Up button (high alarm) or Down button (low alarm) for five seconds. After the button is first pushed, the unit will toggle between the current reading and the selected set point. If the button is held for five seconds, the unit goes into a program mode that allows changing the selected set point. The corresponding LED will continuously flash and the display will turn on the PGM descriptor to indicate that the unit is in program mode.

The displayed setting is changed by pressing the Up and Down buttons. A straightened out paper clip works well to access them. The Up button will increment the set point by 1 fpm or by 0.01 m/s, depending on the units configuration. The Down button will decrement the set point by 1 fpm or by 0.01 m/s. When the desired setting is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the setting has been

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stored. After five seconds of no keypad activity, the unit will return to normal operation and display the current air flow reading.

## Terminal Block Features

### *Analog Output*

The unit has a 0-4 V DC analog output. The air flow readings are converted into an analog output signal. The scaling of the analog output is set at 4 volts equal to 250 fpm. See the Electrical Wiring section for wiring information.

### *Relay Output*

The output relay is activated whenever the Low or High Alarm zone is reached. See the Electrical Wiring section for wiring information. Connecting to the NO terminal, the contacts close during an alarm condition. Connecting to the NC terminal, the contacts open during an alarm condition. This output relay will remain on for the duration of the alarm condition. The High Alarm relay can be disabled through the configuration menu. See configuration parameter P10 to disable the high alarm relay activation. See the Electrical Wiring section for wiring information.

### *External Alarm Input*

The external alarm input causes the horn on the monitor to pulse intermittently and illuminate the EXT descriptor on the display, indicating that this is an external alarm. The local alarm (steady horn) will always take precedence over an external alarm event. The EXT descriptor will remain on until the external alarm input is deactivated. This feature can be used to connect to such input devices as a sash position switch. Note that this input will *not* cause the relay output to activate. See configuration parameter P06 to set the input for either normally open contacts or normally closed contacts. See the Electrical Wiring section for wiring information.

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### ***Remote audible disable (night setback)***

When activated, the remote audible disable input disables the horn and causes the display to flash diS (disabled) at a rate of once per second. See configuration parameter P07 to set the input for either normally open contacts or normally closed contacts. See the Electrical Wiring section for wiring information.

## **Button Logic**

The configuration mode is entered by pressing and holding the Test/Reset button for 10 seconds. After the configuration mode is entered, the unit will stop monitoring the air flow and display the configuration menu selections. The configuration menu selections are CAL, P01, P02, P03, P04, P05, P06, P07, P08, P09, P10 and dEF.

The first menu selection displayed is CAL (calibration). To view the other parameter configuration menu selections, successively press the Test/Reset button. To quickly scroll through the selections, hold the Test/Reset button. When the desired configuration menu selection is displayed, press either the Up or Down button to enter. A straightened out paper clip works well to access them. Within a selection, pressing the Up button will scroll forward and pressing the Down button will scroll backward. To quickly scroll, hold the button. The scrolling will wrap around when the allowable range is exceeded. When a configuration menu selection is entered and a setting is changed, the Test/Reset button must be pressed to save the change. The PGM (program) descriptor on the display will flash once to indicate that the parameter has been stored. The unit will then time out and exit each of the configuration menu selections after five seconds has elapsed with no keypad activity. If the Test/Reset button was not pressed to save the change, the value will return to its previous setting when exited.

Summary: Pressing the Test/Reset button for 10 seconds gets into the configuration menu. Each press of the Test/Reset button advances to the next parameter. The Up and Down buttons navigate within a selection. Pressing once manually scrolls. Holding scrolls quickly. Pressing the Test/Reset button after a change has been made saves it. Not pressing the Test/

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Reset button keeps the current setting. The unit will time out and exit each of the configuration menu selections after five seconds has elapsed with no keypad activity.

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## CALIBRATION

This fume hood monitor must be calibrated before first use and annually thereafter. The calibration is stored to nonvolatile memory of the instrument and is not lost when the unit loses power.

Fume hoods vary in design and performance. Because each hood installation and its air flow patterns are unique, this monitor must be calibrated in the field on the fume hood it is installed.

 **DANGER** Calibration and configuration 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.

If you need a reference on performing traverses on fume hoods, please consult ANSI/ASHRAE 110-1995 *Method of Testing Performance of Laboratory Fume Hoods*, section 6.2 Face Velocity Measurements.

### Tools Required

A calibrated thermo-anemometer is required. Suggested instruments include the Alnor APM 360 and 175 or 275 probe. A small pointed tool is necessary to press the recessed Up and Down buttons. A straightened out paper clip works well.

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## Procedure

- Step 1: Ensure that the monitor was properly installed. The flexible air hose should be attached securely to both the fume hood side wall and the back of the monitor.
- Step 2: The power supply plug should be firmly in the power jack on the rear of the monitor and the power supply should be plugged into an appropriate live electrical outlet. The monitor must be warmed up for at least 10 minutes to reach a stable operating temperature.

**Note:** *For the two point field calibration, high and low face velocities need to be determined. These two values must be between 70–250 fpm. An accurate calibration requires that the low and high calibration points be separated by an adequate velocity. Therefore, a minimum separation value is set at the factory. After calibration is finished at the low point, the display will jump ahead to the lowest allowable value for the high calibration point. Typical values for calibration are 70 fpm for the low and 150 fpm for the high.*

- Step 4: While the monitor warms up, use a calibrated thermo-anemometer to determine the velocity through the face of the hood by taking two detailed traverses. Take one traverse at low flow with the sash true full open (beyond the sash stop) and another at high flow with the sash at twelve inches. For each traverse, divide the area under the sash into equal areas and measure at the center of those areas. Do not move more than six inches between readings. A minimum of sixteen readings must be taken per traverse. Record the average velocities and sash heights where they were taken.
- Step 5: Move the sash back to the true full open position which is the point where the low flow face velocity traverse was conducted.
- Step 6: Press and hold the Test/Reset button for 10 seconds to access the calibration menu. CAL will be displayed.

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Immediately press either the Up or Down button. If the button is not pressed within five seconds, the unit will time out of the Calibration menu and return to the run mode. After pressing one of the Up/Down buttons, Lo will be displayed for two seconds and then a low calibration reference starting point. Either use the Up or Down button to change this value to match the actual measured low face velocity (sash fully open). Press the Test/Reset button when the desired value is displayed.

Calibrate the monitor to match the measured value at the low face velocity:



- Step 7: A five second delay starts, allowing the user to step away from the face of the hood. The digital display shows the countdown. Then, the monitor will take readings while the display counts down from 20 to 1. The first half of the calibration is complete. Hi will be displayed for two seconds and then the lowest allowable value for the high calibration point will be displayed.

Calibrate the monitor to match the measured value at the high face velocity:



- Step 8: Move the sash to the twelve inch open position which is the point where the high flow face velocity traverse was conducted.
- Step 9: Use either the Up or Down button to change this value to match the actual measured high face velocity (sash at the twelve inch open position). Press the Test/Reset button when the desired value is displayed.

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Step 10: A five second delay starts, allowing the user to step away from the face of the hood. The digital display shows the countdown. Then, the monitor will take readings while the display counts down from 20 to 1.

Step 11: A test is conducted by the unit to determine if the calibration was successful. If a correct calibration has been determined, the unit will sound two quick beeps of the horn and the new values are stored to memory. The unit will return to the CAL configuration menu selection. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

If an incorrect calibration has been determined, the unit will display an error message and sound the horn for 2 seconds. After the two seconds expires, the unit will return to the CAL configuration menu selection so that another calibration can be attempted. The incorrect values will not be stored to memory. The unit will continue to use the previous calibration values until a correct calibration is successfully completed. The error message displayed is:



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## CONFIGURATION PARAMETERS

Configurable parameters are stored to nonvolatile memory of the instrument and are not lost when the unit loses power. The configuration mode is entered by pressing and holding the Test/Reset button for 10 seconds. After the configuration mode is entered, the unit will stop monitoring the air flow and display the configuration menu selections. The configuration menu selections are CAL, P01, P02, P03, P04, P05, P06, P07, P08, P09, P10 and dEF.

The table below shows the factory defaults that are stored in the memory of the instrument. Note that resetting to the factory defaults are only for user configurable parameters and has no effect on the calibration of the instrument.

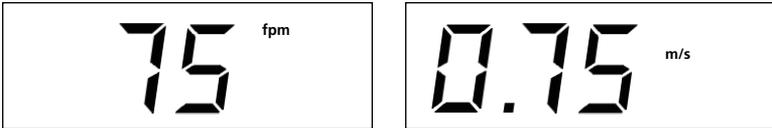
<b>Configuration Parameter</b>	<b>Factory Default</b>
CAL Calibration	(A field calibration is required. See the Calibration section)
P01 Setting of the units	English (feet per minute)
P02 High alarm disables	None are disabled
P03 Temporary horn disable timer	255 (infinite)
P04 Warning-to-alarm transition delay timer	5 seconds
P05 Alarm-to-warning transition delay timer	5 seconds
P06 External alarm input	NC (activates with contact closure)
P07 Remote audible disable input	NC (activates with contact closure)
P08 Low alarm warning offset	20 fpm
P09 High alarm warning offset	20 fpm
P10 High alarm relay disable	ON
dEF Default reset	(Resets P01-P10 parameters to factory defaults)

Table 3: Configuration parameter factory defaults

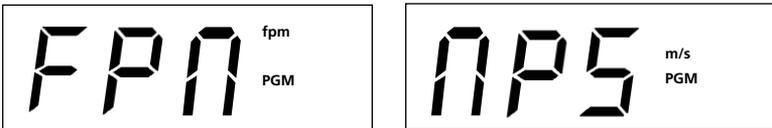
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## P01—Setting of the units English/Metric

The velocity can be displayed either in feet per minute (fpm) or in meters per second (m/s) using this configuration parameter. The applicable unit descriptor (fpm or m/s) will be on during normal run mode. For example:



After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current units as FPN for feet per minute or NPS for meters per second:



Press either the Up or Down button to alternate between the two settings. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored. The applicable unit descriptor (fpm or m/s) will then be on during normal run mode.

The unit will return to the P01 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

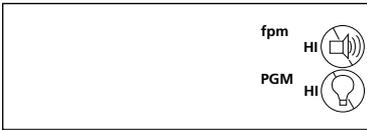
## P02—High alarm disable

When the face velocity is in an alarm condition, this information is reported visually through a digital display, a red LED and a continuous audible alarm. An alarm condition is defined by the alarm set points. If not warranted for the application, the high alarm can be disabled. The horn, the light or both can be disabled. See also configuration parameter P10 regarding disabling the alarm relay. Note that the unit will still display Hi when a value is over range.

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This configuration parameter disables the audible alarm and the alarm light while in the high alarm zone. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the icons to reflect the current configuration of the high alarm disable. The horn slash through icon with the HI indicator on indicates that the alarm audible is disabled for the high alarm zone. The HI light bulb slash through icon indicates that the alarm light is disabled for the high alarm zone.

If the unit is configured to disable both the horn and the alarm light while in the high alarm zone, the display will show:



If the unit is configured to disable just the horn while in the high alarm zone, the display will show:



If the unit is configured to have both the horn and the alarm light on while in the high alarm zone, neither of the icons will be on and the display will show:



Press either the Up or Down button to toggle through the three available options. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored. The applicable high alarm disable icons will then be on the display during normal run mode.

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The unit will return to the P02 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

### **P03—Temporary horn disable timer**

During an alarm condition, the alarm can be acknowledged by pressing the Test/Reset button. This temporarily silences the horn. Normally, the horn will be silenced for the duration of the current alarm condition. The unit can be configured to have the horn come back on after a specified number of minutes or so that the horn can not be silenced at all by pressing the Test/Reset button.

This configuration parameter sets the temporary disable timer. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current value for the temporary horn disable timer. This timer can be set to a value from 0 to 255. A setting of 255 indicates that when the alarm is temporarily silenced by pressing the Test/Reset button, the horn will not come on again until this alarm condition clears and another alarm event occurs. A setting of 0 indicates that the horn can not be silenced by pressing the Test/Reset button. Any value between indicates the time in minutes when the horn will come back on if the condition was not yet corrected. For example, if the unit is currently configured for a temporary horn disable time of 60 minutes, the display will show:



Press the Up button to increment the value by 1 minute or the Down button to decrement the timer value by 1 minute. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P03 configuration menu selection when there is no keypad activity for five seconds. Press the Test/

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Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **P04—Warning-to-alarm transition delay timer**

The warning (yellow) to alarm (red) transition time is the delay period in seconds that an air flow condition must remain present before the unit will go into the appropriate alarm zone. This feature prevents the unit from toggling back and forth between zones when a condition is on the border. This timer is the same for both the high and low warning.

This configuration parameter sets the warning-to-alarm transition timer. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current value for the warning-to-alarm transition timer. This timer can be set from 0 to 255 seconds. For example, if the unit is currently configured for a warning-to-alarm transition time of five seconds, the display will show:



Press the Up button to increment the value by 1 second or the Down button to decrement the value by 1 second. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P04 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **P05—Alarm-to-warning transition delay timer**

The alarm (red) to warning (yellow) transition time is the delay period in seconds that an air flow condition must remain present before the unit will go into the appropriate warning zone. This

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feature prevents the unit from toggling back and forth between zones when a condition is on the border. This timer is the same for both the high and low alarm.

This configuration parameter sets the alarm-to-warning transition timer. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current value for the alarm-to-warning transition timer. This timer can be set from 0 to 255 seconds. For example, if the unit is currently configured for an alarm-to-warning transition time of five seconds, the display will show:



Press the Up button to increment the value by 1 second or the Down button to decrement the value by 1 second. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P05 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **P06—External alarm input normally open/closed**

When activated, the external alarm input causes the horn on the monitor to pulse intermittently and illuminate the EXT descriptor on the display to indicate that this is an external alarm. The local alarm (steady horn) will always take precedence over an external alarm event. The EXT descriptor will remain on until the external alarm input returns to not active. This feature can be used to connect to such input devices as a sash position switch.

In run mode, the display might show:



This configuration parameter sets the input for normally open contacts or normally closed contacts. Normally closed indicates that closing the contacts causes this feature to be activated. Normally open indicates that opening the contacts causes this feature to be activated. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current setting.

If the unit is configured for a normally closed external input, the display will show:



If the unit is configured for a normally open external input, the display will show:



Press either the Up or Down button to alternate between the two settings. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P06 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

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## P07—Remote audible disable (night setback)

When activated, the remote audible disable input disables the horn and causes the display to flash diS (disabled) at a rate of once per second. This message will continue to flash until the remote audible disable input is returned to its not active state. The unit is then in a night setback mode of operation.

In run mode, the display will flash:



This configuration parameter sets the input for normally open contacts or normally closed contacts. Normally closed indicates that closing the contacts causes this feature to be activated. Normally open indicates that opening the contacts causes this feature to be activated. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current setting.

If the unit is configured for a normally closed remote audible disable input, the display will show:



If the unit is configured for a normally open remote audible disable input, the display will show:



Press either the Up or Down button to alternate between the two settings. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

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The unit will return to the P07 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **P08—Low alarm warning offset**

The low warning offset defines when the low warning zone starts. It is a value in the current unit of measurement that is added to the low alarm set point. This will be when the yellow low warning light comes on. For example, if the low alarm is set at 70 fpm and the low alarm warning offset is set at 15 fpm, the yellow low warning light at the bottom will come on at 85 fpm.

This configuration parameter sets the low alarm warning offset. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current value for the low alarm warning offset. For example, if the unit is currently configured for a low alarm warning offset of 15 fpm, the display will show:



Press the Up button to increment the value by 1 measurement unit or the Down button to decrement the value by 1 measurement unit. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P08 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **P09—High alarm warning offset**

The high alarm warning offset defines when the high warning zone starts. It is a value in the current unit of measurement that is subtracted from the high alarm set point. This will be when the

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yellow high warning light comes on. For example, if the high alarm is set at 250 fpm and the high alarm warning offset is set at 15 fpm, the yellow high warning light at the top will come on at 235 fpm.

This configuration parameter sets the high alarm warning offset. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current value for the high alarm warning offset. For example, if the unit is currently configured for a high alarm warning offset of 15 fpm, the display will show:



Press the Up button to increment the value by 1 measurement unit or the Down button to decrement the value by 1 measurement. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P09 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **P10—High alarm relay disable**

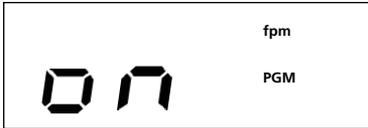
The alarm state can be sent to a remote location by means of a relay output. The relay can be disabled for the high alarm if it is not warranted for the application.

This configuration parameter disables or enables the high alarm relay activation. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and display the current value for the high alarm relay activation.

If the unit is configured for the relay to be disabled for the high alarm, the display will show:



If the unit is configured for the relay to be enabled for the high alarm, the display will show:



Press either the Up or Down button to alternate between the two settings. When the desired configuration is displayed, press the Test/Reset button. The PGM descriptor will flash once to indicate that the parameter has been stored.

The unit will return to the P10 configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

## **dEF—Reset configuration to factory default settings**

All the parameters configurable by the user can be reset to the factory defaults located in the memory of the fume hood monitor. This has no effect on the calibration of the instrument. After this configuration menu selection is entered, the unit will turn on the program mode PGM descriptor and the display will show:



Press the Test/Reset button to reset all the configuration parameters. The PGM descriptor will flash once to indicate that the configuration settings have been set to their factory defaults. If this menu selection is entered but a reset to defaults is not wanted, do not press anything; let the instrument time out of this menu.

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The unit will now return to the dEF configuration menu selection when there is no keypad activity for five seconds. Press the Test/Reset button to advance to another configuration parameter. To return to the run mode, do not press any buttons for five seconds.

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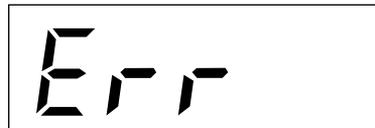
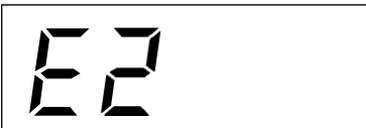
## TROUBLESHOOTING GUIDE

Error checks are continuously performed on the unit. In the event the monitor detects an error, an error message will continuously flash on the display to alert the user. The unit will lock up so as not to give erroneous readings. Please contact the factory for assistance.

The unit will conduct an error check on the thermistor air flow circuit. An error condition could occur due to a broken air flow sensor. If an error condition is found, an error message will be displayed. This error message cannot be cleared in the field and the unit needs to be sent back to factory. The unit will lock up and the display will toggle back and forth between:



The unit will conduct an error check on the memory. An error condition could occur due to an electrical disturbance. If an error condition is found, an error message will be displayed. This error message cannot be cleared in the field and the unit needs to be sent back to factory. The unit will lock up and the display will toggle back and forth between:



<b>Problem</b>	<b>Possible Cause/ Corrective Action</b>
No display or lights.	The power supply cord is not plugged into unit or live AC outlet. Plug it in.
No audible alarm when display shows Lo or Hi.	The audible alarm was disabled. If the horn slash through icon is flashing, the horn has been permanently disabled. Press the Test/Reset button for five seconds to re-enable.
No audible alarm only when display shows Hi.	The High Alarm audible is disabled. This is indicated by the horn slash through icon with the HI indicator on. See configuration parameter P02 to re-enable the high alarm audible.
Pulsed audible alarm.	This is an indication of an external alarm. The EXT descriptor on the LCD is also on. Attend to the external alarm event. See configuration parameter P06.
Alarm is not activated immediately. Alarm does not come out of alarm right away when good air flow is restored.	The alarm or clear condition must exist for a predetermined time period before it is interpreted as a true event by the monitor. See configuration parameters P04 and P05 to set the transition delays
Monitor does not display the expected air flows.	1. The blower speed has changed. Use a thermo-anemometer to perform a traverse to check the true face velocity.

*Continued on next page*

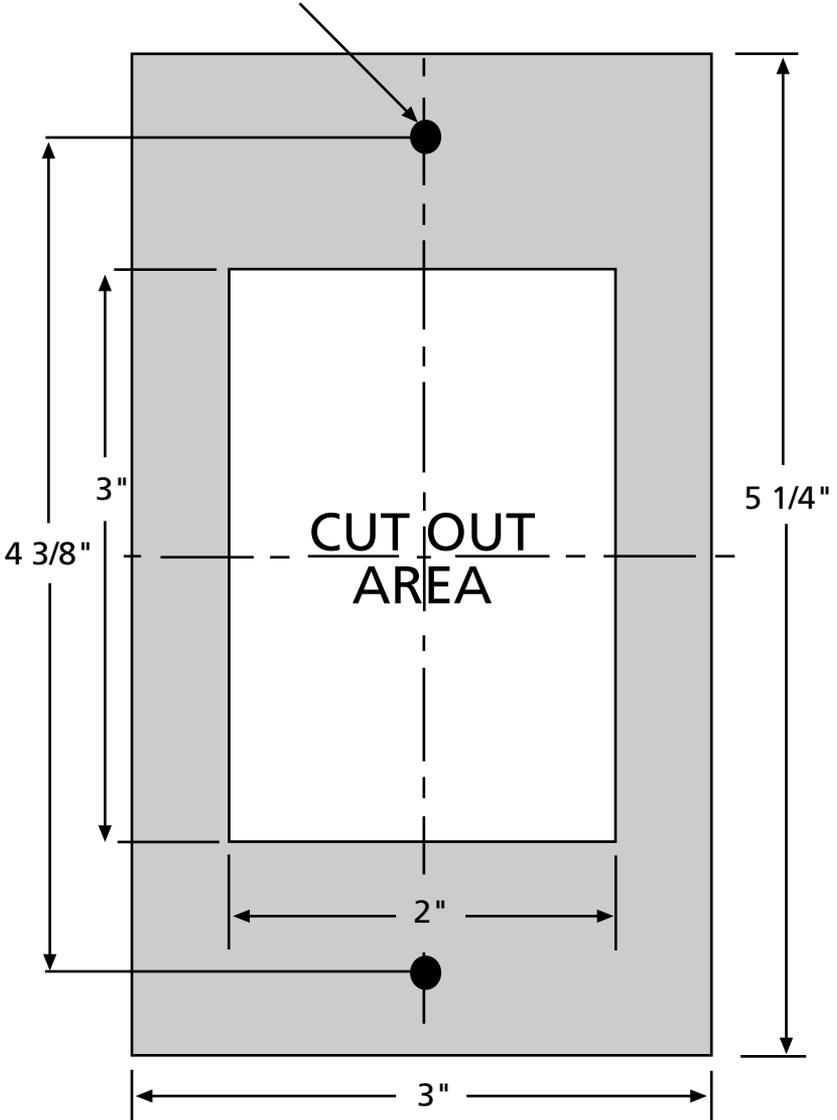
*Continued from previous page*

	<p>2. The flexible air hose from the monitor to the side wall sensing hole may be kinked or bent and is restricting the true air flow. The hose may be disconnected. Reroute the hose and recheck the connections at each end.</p> <p>3. If the calibration of the monitor is suspect, recalibrate as outlined in the Calibration section.</p>
Can not temporarily silence the horn using the Test/Reset button.	The temporary disable timer is set at 0. See configuration parameter P03 to set the temporary disable timer.
Monitor is flashing diS.	The unit is in night set back mode and is disabled. See configuration parameter P07.
Monitor keeps bouncing back and forth between adjacent zones.	The monitor is being influenced by an external air source. Remove the source of drafts. See configuration parameters P04 and P05 to set the transition delays.
Green light does not come on when display is showing normal air flow.	Overlapping warning zones. The zones are too wide for the difference between the low and high alarm settings. See the General Description section to change alarm set points.

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## MOUNTING TEMPLATE

MOUNTING HOLES  
#6-20 SCREWS



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## SERVICE REQUESTS

If you need assistance, please contact your Alnor reseller.

### **Ship to:**

ALNOR INSTRUMENT COMPANY

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Skokie, Illinois 60077 USA

Toll-Free (800) 424-7427

Telephone (847) 677-3500

Fax (847) 677-3539

[www.alnor.com](http://www.alnor.com)

OWNER'S MANUAL

# AirGard® 385 Fume Hood Monitor



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## AIRGARD® 385 MONITOR SPECIFICATIONS

Digital Display	3 digit, 7-segment liquid crystal display.
Display Units	Feet per minute (fpm) or meters per second (m/s). User selectable through menu.
Display Range	70 to 250 fpm (.35 to 1.25 m/s). Over range measurements shown as Hi. Under range measurements shown as Lo.
Resolution	1 fpm or .01 m/s.
Accuracy	±10% or 10 fpm, whichever is greater.
Alarm Range	70 to 250 fpm (.35 to 1.25 m/s).
Alarm Delays	User configurable through menu from 0 to 255 seconds.
Audible Alarm Indication	85dB @ 4 inches (10 cm).
Visual Alarm Indication	Red LED.
Visual Warning Indications	Yellow LEDs for low flow and high flow warnings zones. Warning offsets are user configurable through menu.
Relay Output	Nominal switching capacity 1A @ 30V DC, .5A @ 125V AC, form C relay.
High Flow Alarm Disable	Audible, visual and relay disable.
Horn Silence	Temporary & permanent.
Night Set back	Unit can be disabled remotely.
User Alarm Input	Intermittent audible and LCD status indicator indicate external alarm.
Analog Output	0 to 4V DC.
Calibration	Two point field calibration required.
Instrument Dimensions	
Front Faceplate	5.25L x 3.0W x .5D inch (13.3L x 7.6W x 1.3D cm).
Rear Enclosure	3.0L x 2.0W x .5D inch (7.6L x 5.0W x 1.3D cm).
Mounting	Flush. (3.0L x 2.0W inch cut out required on hood surface).
Operating Conditions	55 to 86°F (13 to 30°C), 5% to 95% RH, non-condensing.
Storage Temperature	-40 to 150°F (-40 to 65°C), 5% to 95% RH, non-condensing.
Power Requirement	9 to 24V AC/DC. (Wall plug in power supply supplied for domestic units).

The calibration and configurable parameters are stored to nonvolatile memory of the instrument and are not lost when the unit loses power.

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# LIMITATION OF WARRANTY AND LIABILITY

Seller warrants that this product, under normal use and service as described in the operator's manual, shall be free from defects in workmanship and material for a period of twenty-four (24) months, or the length of time specified in operator's manual, from the date of shipment to the customer. This limited warranty is subject to the following exclusions:

1. With respect to any repair services rendered, seller warrants that the parts repaired or replaced will be free from defects in workmanship and material, under normal use, for a period of 90 days from the date of shipment to the customer.
2. Seller does not provide any warranty on finished goods manufactured by others. Only the original manufacturer's warranty applies.
3. Unless specifically authorized by seller in a separate document, seller makes no warranty with respect to, and shall have no liability in connection with, any goods which are incorporated into other products or equipment by the buyer.

The foregoing is IN LIEU OF, all other warranties and is subject to the conditions and LIMITATIONS stated herein. NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE.

THE EXCLUSIVE REMEDY OF THE USER OR PURCHASER, AND THE LIMIT OF THE LIABILITY OF SELLER FOR ANY AND ALL LOSSES, INJURIES, OR DAMAGES IN CONNECTION WITH THIS PRODUCT (INCLUDING CLAIMS BASED ON CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT, OR OTHERWISE) SHALL BE THE RETURN OF THE PRODUCT TO THE FACTORY OR DESIGNATED LOCATION AND THE REFUND OF THE PURCHASE PRICE, OR AT THE OPTION OF SELLER, THE REPAIR OR REPLACEMENT OF THE PRODUCT. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES.

SELLER SHALL NOT BE RESPONSIBLE FOR INSTALLATION, DISMANTLING, REASSEMBLY, OR REINSTALLATION COSTS OR CHARGES. NO ACTION, REGARDLESS OF FORM, MAY BE BROUGHT AGAINST THE SELLER MORE THAN ONE YEAR AFTER THE CAUSE OF ACTION HAS OCCURRED.

The purchaser and all users are deemed to have accepted the terms of the LIMITATION OF WARRANTY AND LIABILITY, which contains the complete and exclusive limited warranty of seller. This LIMITATION OF WARRANTY AND LIABILITY may not be amended or modified nor may any of its terms be waived except by a writing signed by an authorized representative of seller.



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