INSTRUCTION MANUAL
GUARDIAN AIR MONITOR
MODEL NO. 49400, 49400-01
49400-02, 49400-03

LABCONCO

LABCONCO CORPORATION, 8811 PROSPECT, KANSAS CITY, MO. 64132, 816—333-8811

Dear Customer:

This letter is to ensure that you get the best performance from your Labconco product. We want to be sure you are satisfied. If damage has occurred in shipping, the customer must file a claim with the carrier **IMMEDIATELY! DO NOT** return any items to Labconco Corporation without written authorization from the factory. Contact Labconco Corporation directly for assistance on your equipment.

A great deal of care has gone into the engineering, production and ultimate quality control of your Labconco product. That is why we affix this badge to our products. Your satisfaction is of great concern to us.

We know that even the best products require service from time to time. So if this is ever true of your Labconco product, call the Labconco Service Dept. directly at (816) 333-8811, and ask for our service manager for all of the assistance that you need.

We suggest you keep all of this material together. It's nice to know you are protected, even though you may never need it.

WARNING: THE DISPOSAL OF SUBSTANCES USED IN CONNECTION WITH THIS EQUIPMENT MAY BE GOVERNED BY VARIOUS FEDERAL, STATE OR LOCAL REGULATION. ALL USERS OF THIS EQUIPMENT ARE URGED TO BECOME FAMILIAR WITH ANY REGULATIONS THAT APPLY IN THE USERS AREA CONCERNING THE DUMPING OF WASTE MATERIALS IN OR UPON WATER, LAND OR AIR AND TO COMPLY WITH SUCH REGULATIONS.

Sincerely,

LABCONCO CORPORATION

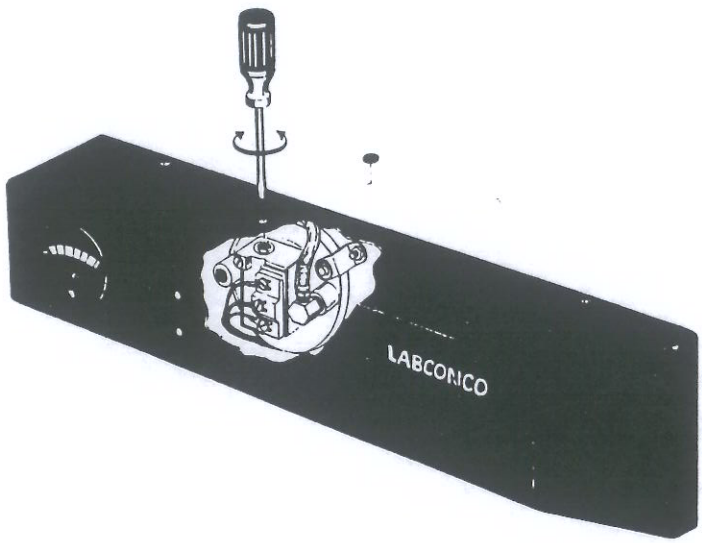
TABLE OF CONTENTS

FORM 49419 REV. B / ECO 6412 / PRINTED IN U.S.A.

INTRODUCTION

General Description

The Guardian Air Flow Monitor has been designed to alert the Fume Hood operator to low velocity conditions existing on his Protector Laboratory Fume Hood. The monitor can also be used as a safety interlock device on Protector Add-Air style hoods to insure that potentially hazardous fumes are not forced from the hood in the event that the exhaust blower should fail.



Monitor Performance

The Guardian Air Flow Monitor is designed for operation on new or existing remote-blower, non-explosion proof, Protector Laboratory Fume Hoods with vertical rising sashes. The monitor is available semi-installed at the factory or in kit form for field installation.

Detailed Function of Components

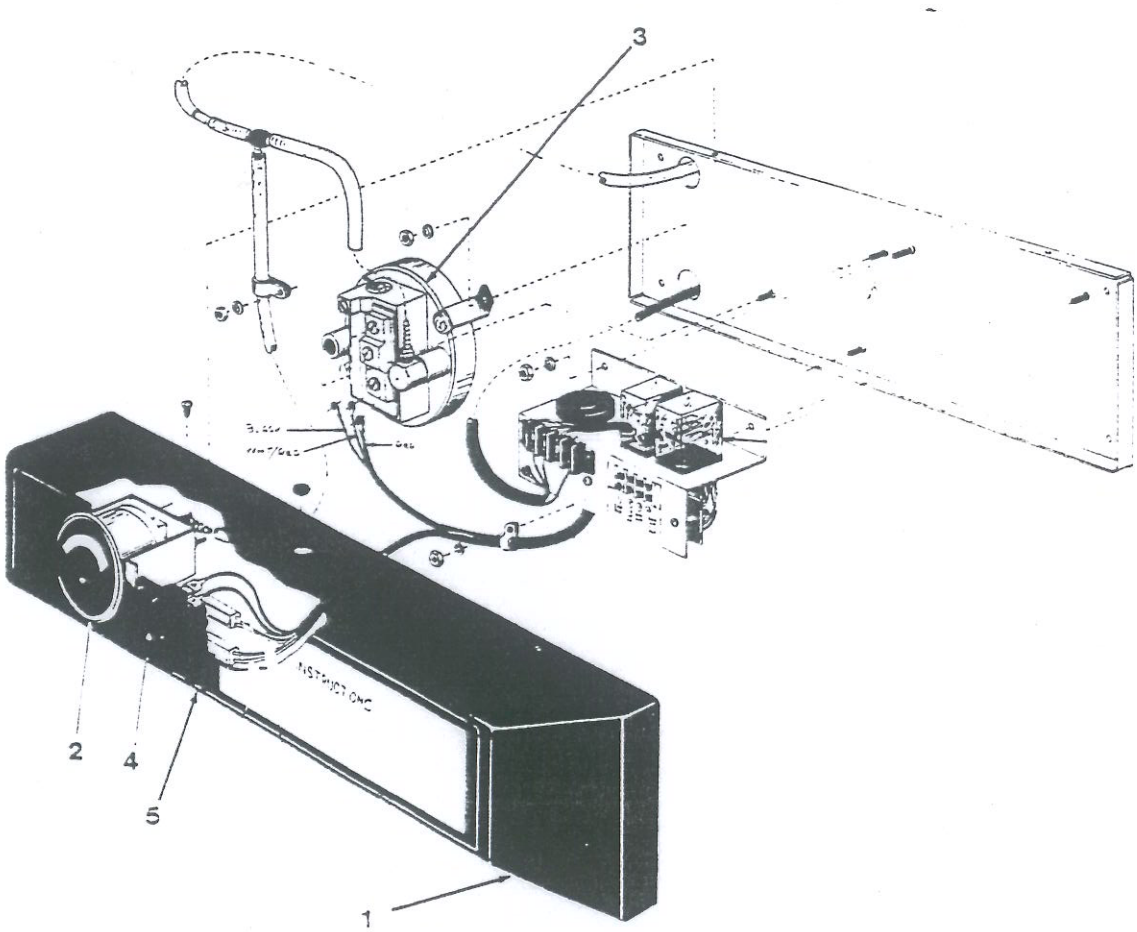
1. EXTERIOR HOUSING—The Guardian Air Monitor features a black thermal formed plastic housing that protects the interior components. The plastic housing conceals the metal mounting plate that is attached directly to the Protector Hood header panel. The housing itself has been rounded and sloped to eliminate sharp edges.

2. INDICATOR GAUGE—The indicator gauge provides a continuous numeric reading which correlates to the actual face velocity of the laboratory fume hood.

3. PRESSURE SENSOR—Adjustable pressure switch measures pressure within the hood exhaust collar. The adjustment screw on the pressure switch allows you to set the pressure setting to activate the alarm system at face velocity ranges between 80 and 125 fpm.

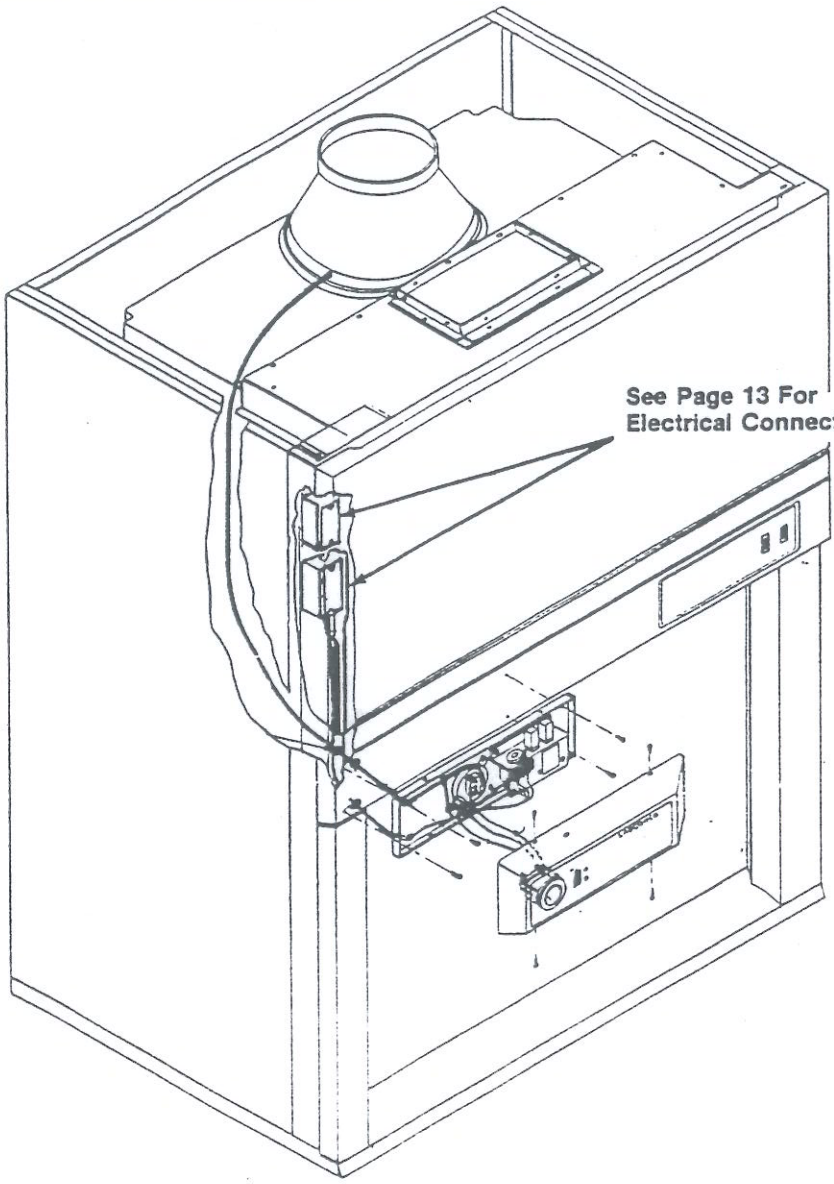
4. RESET SWITCH—The reset switch is used to mute the audible alarm during low velocity conditions. The switch is also used to deactivate the "RED" low air flow light and to reactivate the add-air blower once proper air flow has been restored to the hood.

5. WARNING LIGHTS—Both the normal "GREEN" and the low "RED" warning lights provide a visual indication of the face velocity of the laboratory fume hood.



INSTALLATION

The Guardian Air Flow Monitor is designed to be installed directly on the header panel of your ɔtector Laboratory Fume Hood. The monitor be shipped inside the fume hood if semi-installed at the factory or as a separate kit if ordered for field installation. Make sure to inspect the monitor carefully prior to installation and report any damage that may have occurred in transit directly to the freight carrier.



See Page 13 For Electrical Connection Diagram.

Installation Factors

The Guardian Air Flow Monitor can be purchased either semi-installed or as a kit.

When the Guardian Air Flow Monitor is factory installed, the Protector Hood header panel will be predrilled to accept the monitor system. The duct probe and vinyl tubing will be factory installed on the hood. All wiring for the monitor system will o be connected directly to the main hood ɔtion box.

If the Guardian Air Monitor system is ordered as a field installation kit, both written instructions and drill template are provided in this manual.

INSTALLATION—GENERAL
(Factory Installed Monitor)

The monitor has been packed inside the Protector Laboratory Fume Hood for shipment.

Installation of the monitor is as follows:

1. Unpack the monitor assembly located inside the fume hood during shipment.

2. Remove the four screws from the monitor housing to separate the housing from the mounting plate.

3. Mount the monitor mounting plate directly to the hood header panel. Use the four #8 screws provided, in this mounting procedure.

4. Pull the power cord and vinyl tubing through the access holes in the hood header panel and backplate for internal connection inside the monitor.

5. Connect the vinyl tubing directly to the dampening orifice connection on the backup plate as shown in Figure 1.

6. The power cord should now be wired directly to the terminal block on the monitor mounting plate. If an Add-Air blower is used, the Add-Air blower may be wired in one of two ways; (1) To automatically restart when sufficient airflow is achieved across the face opening of the hood; or (2) require the reset switch to be activated for this to happen.

   Reference wiring diagram page 13.

NOTE: It is the manufacturer's recommendation to make the connection that would require activating the reset switch to restart the Add-Air blower (terminal 4). If the automatic restart mode (terminal 3), is chosen, proper precautions must be taken to advise service/maintenance personnel that the Add-Air blower may start automatically.

7. Reattach the monitor cover assembly to the plate using the four screws removed in Step #1.

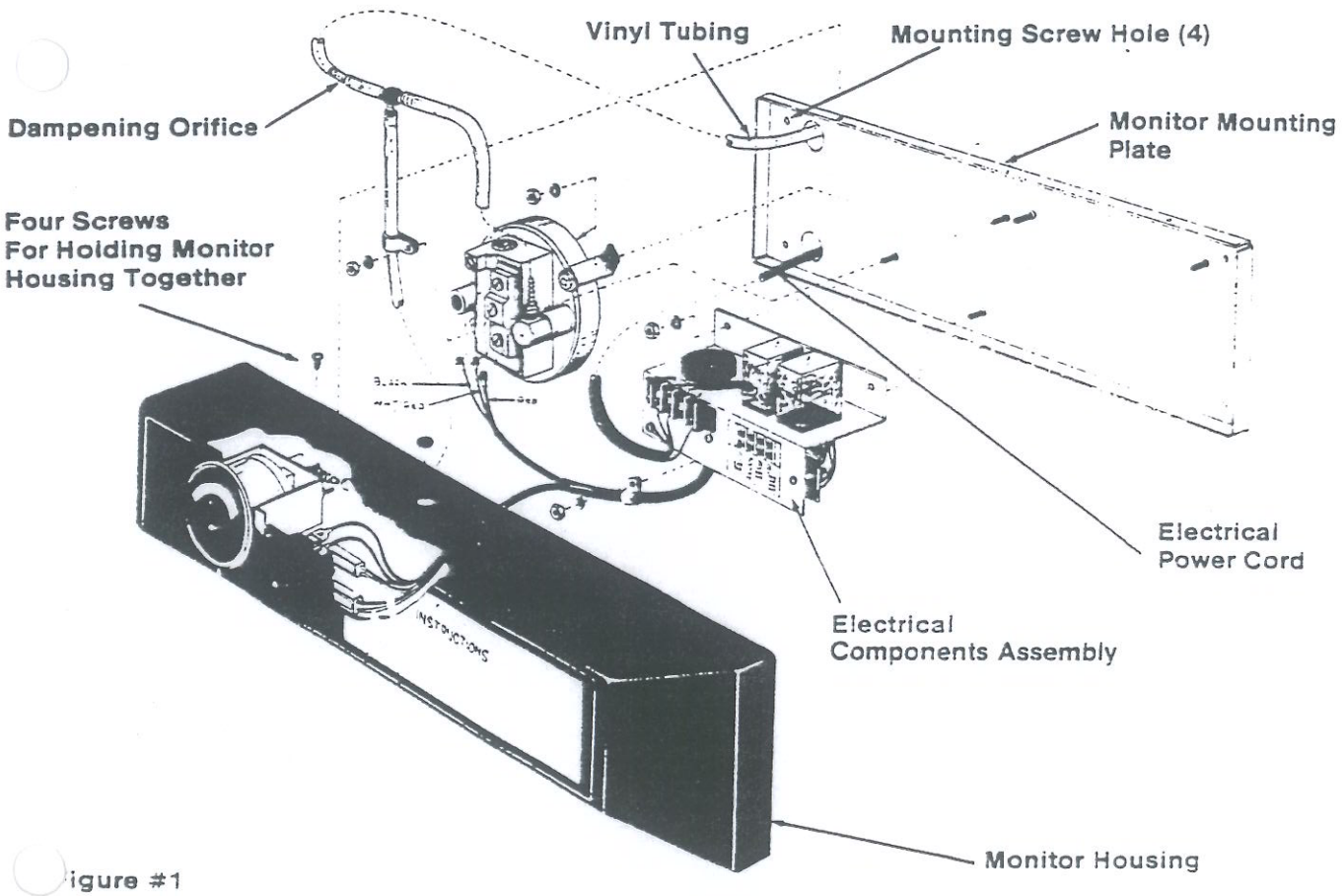


Figure #1

INSTALLATION—GENERAL
(Field-Installed Monitor Kit)

Field installation for the monitor is as follows:

1. Unpackage the monitor kit P/N 49400 or 49400-01. Locate the duct collar in the upper plenum area on your hood and drill a ½" diameter mounting hole for the duct probe. Location for this hole is as shown in Figures 2 & 3.
2. Remove any rough edge from around the hole and tap for ¼" NPT male connector. The external mounting threads in the connector should be coated with PVC cement or Silicone RTV adhesive/sealant, threaded into this hole and secured with locknut on the inside of the duct collar. Refer Fig. 3.
3. When the cement is set, remove the cap assembly from the male connector. Insert the pressure probe into the connector with the rounded end pointing into the exhaust ductwork.

   Install the grip ring on the probe at the proper location indicated for the specific size hood.
4. Reattach the cap on the connector and then attach one end of the vinyl tubing to the end of the pressure probe.

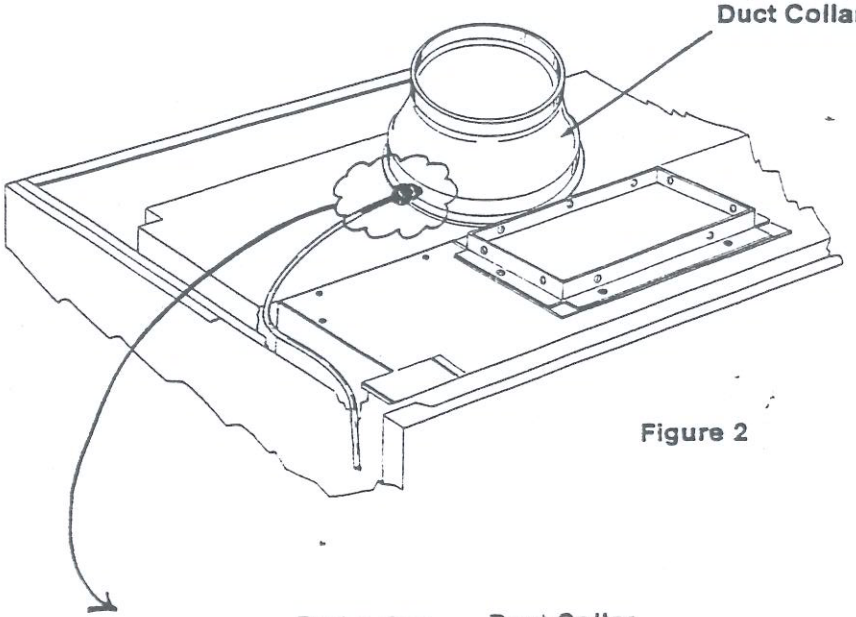


Figure 2

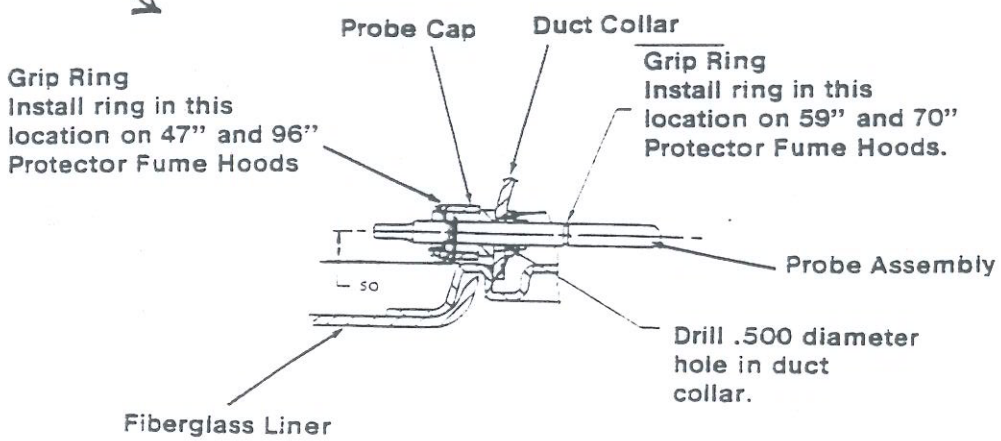
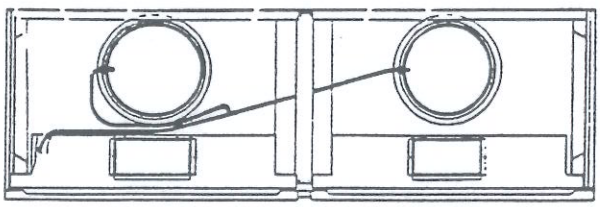
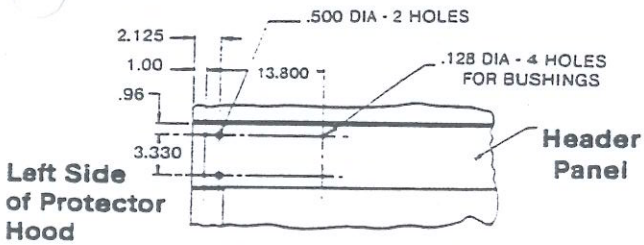


Figure 3

5. Drill a ⅜" to ½" diameter hole through the fiberglass liner and corner post for the vinyl tubing access (refer to Figure 4). Run the tubing across the top of the hood liner, over and down the side of the hood and through the entrance hole in the liner and corner post to the header panel. If you are installing the monitor #49400-01, on a Protector-96 Laboratory Hood, you will need to insert two pressure probe assemblies–one into each of the hood exhaust collars. A tee has been supplied to connect both sections of vinyl tubing into one combined run leading to the pressure sensor in the monitor housing assembly.



Probe Installation — 96" Hood
Figure 5

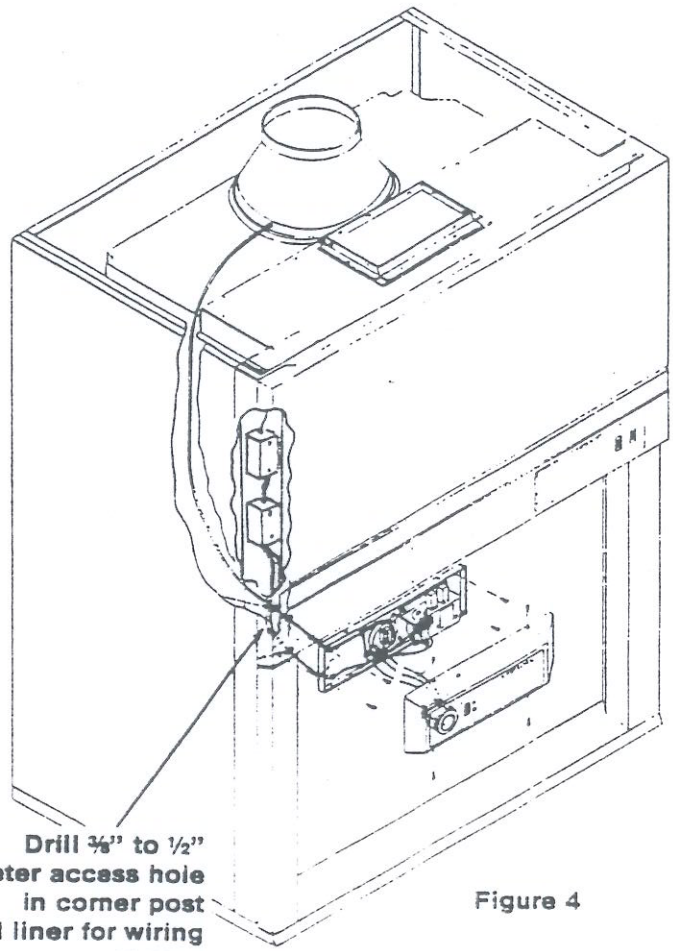


Mounting Plate Hole Pattern in Hood Header Panel
Figure 6

6. Connect the power cord supplied to the hood junction box and run it down the inside of the left corner post to the hood panel.

7. Position the drill template (p/n 49422) supplied with the hood, directly to the header panel.

8. Drill four ⅛" diameter mounting holes and the two ½" diameter access holes in the hood panel.



Drill ⅜" to ½" diameter access hole in corner post and liner for wiring access

Figure 4

9. Remove the four screws from the monitor housing to separate the housing from the mounting plate.

10. Mount the monitor mounting plate directly to the hood header panel. Use the four ½" #8 screws in this mounting procedure.

11. Pull the power cord and vinyl tubing through the access holes in the header panel and backplate for internal connection. Install two plastic bushings. (Slide onto tubing and power cord and snap into ½" holes, per Figure 6.)

12. Connect the vinyl tubing directly to the dampening orifice connection on the mounting plate as shown in Figure 1, page 4.

13. The power cord should now be wired directly to the terminal block on the monitor mounting plate. If an Add-Air blower is used, the Add-Air blower may be wired in one of two ways; (1) to automatic restart when sufficient airflow is achieved across the face opening of the hood; or (2) require the reset switch to be activated for this to happen.

Reference wiring diagram page 13.

14. Reattach the monitor cover assembly to the mounting plate using the four screws removed in Step #1.

NOTE: It is the manufacturer's recommendation to make the connection that would require activating the reset switch to restart the Add-Air blower (terminal 4). If the automatic restart mode (terminal 3) is chosen, proper precautions must be taken to advise service/maintenance personnel that the Add-Air blower may start automatically. Correct terminal block locations are highlighted for this wiring (see page 13).

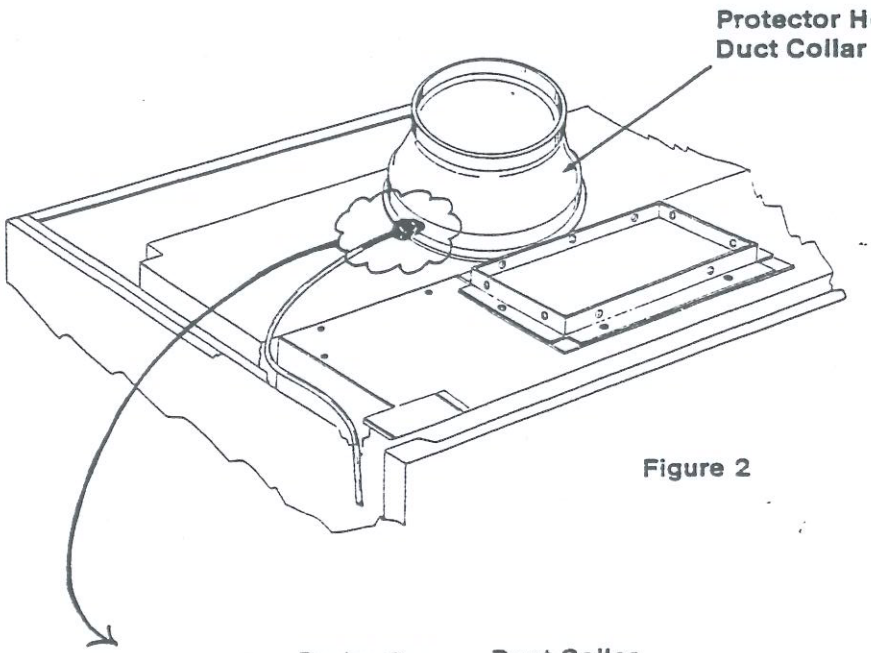


Figure 2

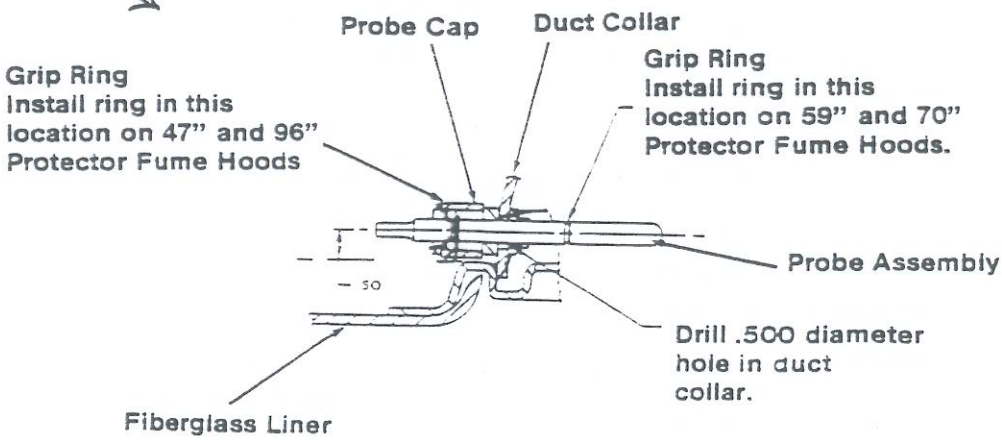


Figure 3

ELECTRICAL

The electrical power connections for the monitor will be made in the hood junction box.

The monitor is wired parallel with the exhaust blower switch so that the air flow through the hood will be monitored anytime the exhaust blower switch is placed in the "ON" position.

If you are using the monitor as a safety interlock system for the Add-Air blower, you will also need to place a motor contactor switch directly in line prior to wiring to the relays located inside the monitor assembly. A motor contactor switch is required in the application. Failure to use a motor contactor switch will result in damage to the internal relay components and pressure switch which are rated at 3 amps maximum. A wiring diagram for the installation of the Guardian Air Flow Monitor is shown on Page 13 for your reference.

AIRFLOW—INITIAL MEASUREMENT

The Guardian Air Flow Monitor is a warning/safety device that operates based upon the air flow measured across the sash opening of the Protector Laboratory Fume Hood. At the time the Guardian Air Flow Monitor is placed into service, and at least once a year thereafter, you must measure the air flow across the fume hood sash opening to check the accuracy of the alarm setting.

The air flow can be measured by a pitot traverse of the exhaust duct, by measuring the face velocity, or by other means as appropriate for the hazard level of the materials being used in the fume hood itself. The face velocity method is most often used and may be accomplished as follows:

1. Grid the sash opening on your fume hood into equally sized areas, (approximately one square foot).

2. Turn on the exhaust blower for the laboratory hood.

3. Measure the air flow using a thermal anemometer or other air flow sensing device at the center of each of the grids. Average these measurements in accordance with the SAMA specification LF-1980 or ASHRAE standard #110-1985 to determine your average face velocity.

4. If the face velocity is acceptable for your application, proceed with setting the alarm. Should the air flow be either too low or too high for your particular application, adjust the damper (if applicable), or exhaust blower to correct this air flow problem. Once the air flow has been re-adjusted, retest the fume hood in accordance with step numbers 1 thru 3 until the proper air flow across the face opening on your hood has been achieved.

5. When testing the face velocity on Protector Add-Air Hood, make sure that the Add-Air blower is not operating. The Add-Air blower will disturb the face velocity patterns across the sash opening of the hood and give false readings.

   If you are unable to achieve the desired air flow across your hood sash opening by readjusting the blower, consult your maintenance personnel, dealer service personnel or Labconco for assistance in resolving this problem prior to setting your alarm system.

LARM—SETPOINT ADJUSTMENT

ıe Guardian Air Flow Monitor alarm system has een set to activate the alarm when the air flow elow 100 FPM for the 5 ft., 6 ft., and 8 ft. ro or Style Laboratory Fume Hoods. The arm activates when the face velocity falls below 10 FPM for the 4 ft. Protector Style Laboratory ume Hoods.

ıe indicator gauge on the front of the monitor ousing shows the approximate face velocity hen used in conjunction with the chart on page). The chart itself lists the approximate gauge adings that can be associated with specific ce velocities on the various sizes of Protector aboratory Fume Hoods. The chart can be used s a quick reference in order for you to estimate ıe face velocity of the air flow into your hood.

ıe initial setup for the alarm system is as follows:

Turn the exhaust system blower on. This will activate the monitor alarm in the muted phase and illuminate the low flow warning light to signal that the monitor is functioning and awaiting the blower to come up to normal operating speed. Because the monitor alarm system has been factory set for a 100 feet per inute face velocity on a 5-foot, 6 foot, and 8- Protector Fume Hood, this will provide approximate indication of fume hood face velocity. The chart on page 10 lists approximate gauge readings which may be used as a quick reference to estimate the face velocity of the hood.

If the muted alarm is not silenced after approximately 30 to 60 seconds, the fume hood has insufficient air flow. Check the gauge reading against the chart on page 10. If the air flow has been previously measured as adequate for your specific operations, then adjust the alarm point to the face velocity previously verified with the thermal anemometer.

Please keep in mind that the alarm systems are factory set in factory conditions. The setting may not correlate directly with your installation as obstructions in the duct near the probe assembly may require a higher and or lower set point to achieve the correct face velocity and you should measure and set the alarm yourself for a proper application.

Once proper setting of the alarm has been achieved, the indicator gauge reading should be recorded and used as a visual indicator for fume hood efficiency. This recorded number can be used as a spot check method against the chart located on page 10 of this manual for the approximate face velocity being achieved on your fume hood.

2. To adjust the alarm setting, proceed as follows:

   A. Remove the hole plug located on top of the monitor housing. This will allow access to the adjustment screw on the pressure sensor located inside the monitor housing.

   B. Insert a thin bladed screwdriver through the hole in the housing cover to the adjustment screw location. To lower the alarm set point, turn the adjustment screw counterclockwise until the alarm stops.

NOTE: As you approach the new setpoint, turn the adjustment screw slowly so as not to overshoot the correct setpoint for the alarm.

Activate the blower switch and listen to the "MUTED" alarm sound with the low flow indicator lit until the blower comes up to speed.

Record the number shown on the indicator gauge at this time, as it is the approximate set point indicator for this installation. This value should be checked against the values shown in Figure 7, for a quick verification of airflow.

3. If properly set, the alarm will cease when the blower comes up to full speed and at such time the "RED" low flow indicator will go out, the muted alarm will stop and the "GREEN" normal flow light will activate. The alarm is operating at the correct setpoint for normal operation.

4. When the audible alarm becomes silent, stop turning the adjustment screw and press the restart switch located on the front of monitor housing. The "RED" low flow warning light will now go off and the "GREEN" normal flow indicator light will activate. This will then constitute the normal operating level for your monitor alarm system. To check the alarm setpoint, turn off the exhaust blower system for your hood. If wired properly, Guardian Air Flow Monitor will stop operating.

INDICATOR GAUGE READINGS (approx.)		
Face Velocity FPM	Hood Size 4'	5', 6', & 8
80	3.0	3.8
90	4.0	5.0
100	5.0	6.1
110	6.0	7.4
120	7.0	8.7
125	7.6	9.8

Figure 7

NORMAL OPERATION

Once the initial setup of the Guardian Air Flow Monitor is complete, the monitor alarm setting requires no adjustment unless changes and/or fluctuations in the face velocity readings across the face of the Protector Laboratory Fume Hood are experienced.

The monitor's alarm will activate every time the hood's exhaust blower system is turned on. Upon start-up, the monitor will emit a muted alarm signal and activate the "RED" low flow warning light until the blower has come up to normal operating speed. At such time, the monitor alarm will stop (if properly set), and the "RED" low flow alarm or warning light will deactivate and the "GREEN" normal flow light will activate to indicate proper air flow through your hood.

The monitor alarm is set to activate should the face velocity of the fume hood drop below approximately 85% of the alarm set point.

When the alarm is activated, the "RED" low flow warning light illuminates and the alarm sounds at full level, and continues to sound until the airflow is either restored or the monitor itself is turned off. Should airflow be restored after an initial failure, the alarm will stop, but the "RED" low airflow warning light will remain on. This indicates that the hood has experienced a low airflow problem but it has been corrected at the present time.

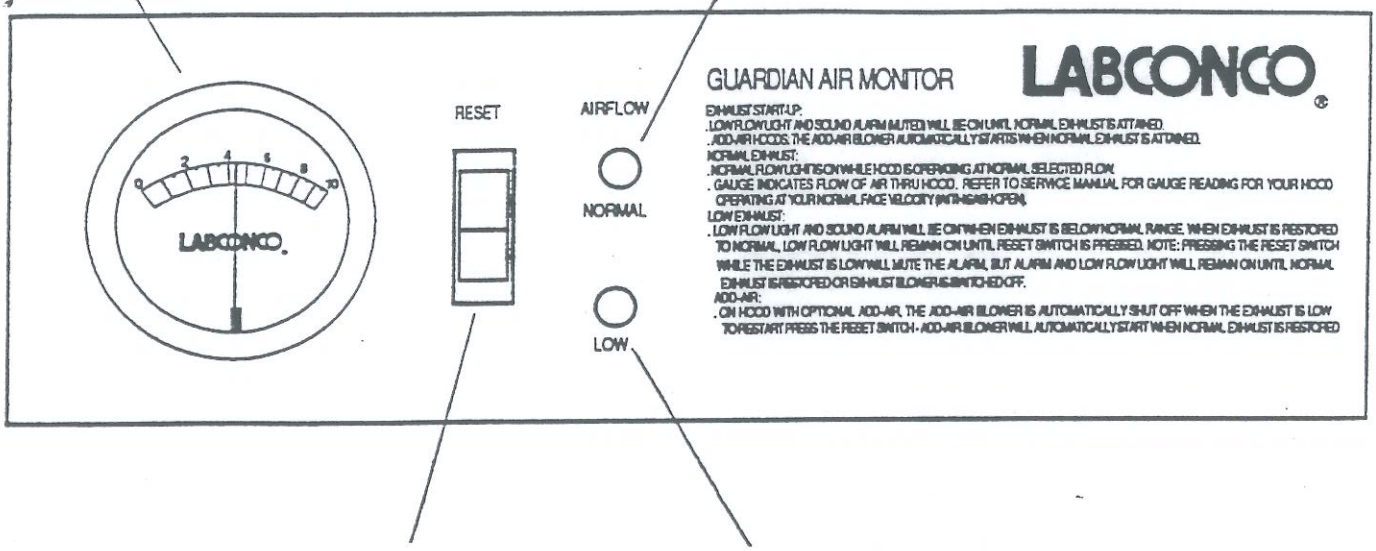
Activate the reset switch located on the front housing of the monitor to turn off the "RED" low flow warning light and activate the "GREEN" normal flow light (and to re-start the Add-Air blower, if applicable).

Labconco Corporation recommends that the fume hood face velocity be remeasured on an annual basis or more frequently if recommended by your own in-house safety officer. If your face velocity is shown to be significantly different during this retesting, you should check not only the duct conditions but also the exhaust blower itself to determine the cause for these changes.

Location of the warning lights, reset switch, indicator gauge, and operating instructions on the monitor are as shown.

Airflow velocity indicator gauge gives a numeric reading that correlates with the hood's velocity. The gauge provides a continuous indication of face velocity at a glance.

"Normal" airflow light glows green when normal airflow is detected.



Reset switch mutes the audible alarm during low velocity conditions. When the system returns to normal the switch deactivates the red "LOW" airflow light. On Protector® Hoods with Add-Air, the switch restarts the Add-Air blower once normal airflow resumes following low exhaust conditions.

"Low" airflow light glows red when airflow drops below a preset normal range. The red light remains on until normal airflow resumes and the reset switch is pressed.

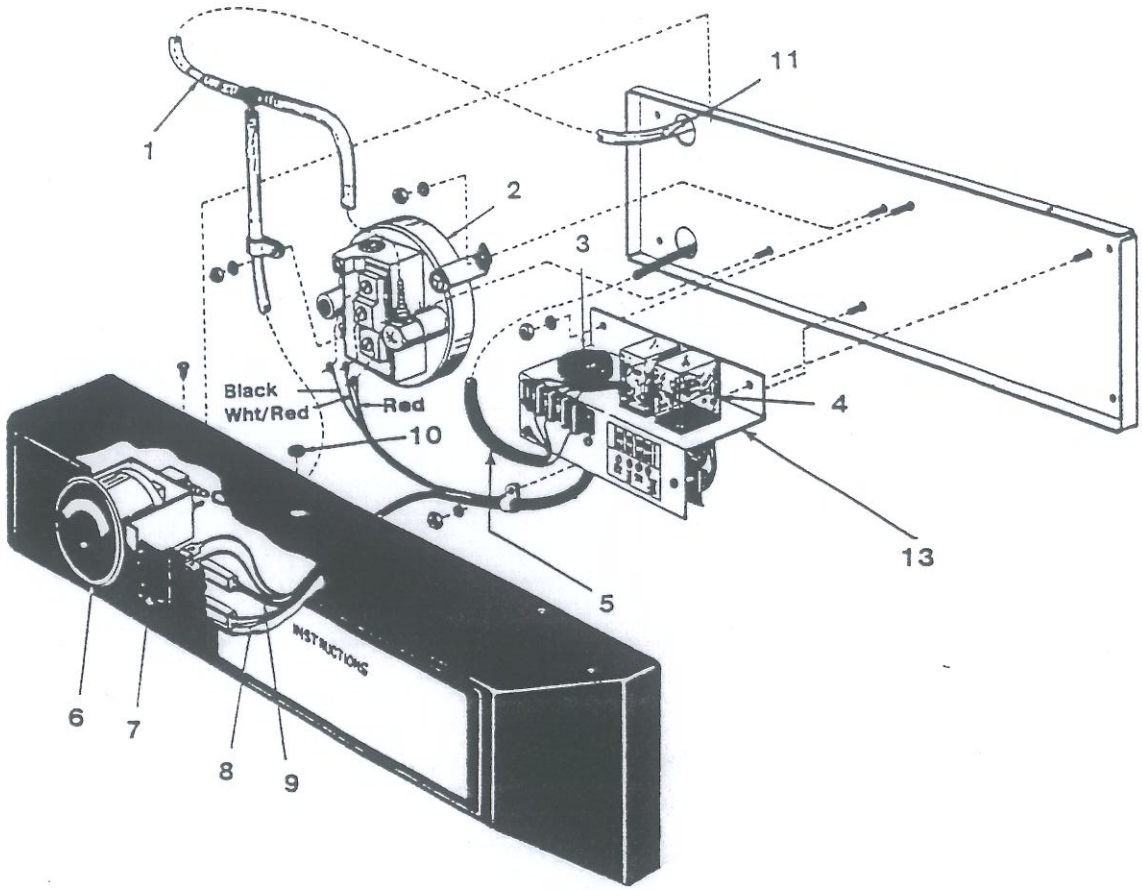
CAUTION: The fume hood face velocity should be checked at least once a year. See airflow measurement instructions located on page 8.

Maintenance

The Guardian Airflow Monitor does not require any additional adjustment once it has been properly set during the intitial installation.

The face velocity at the hood face should be checked periodically to assure that proper airflow is being achieved. as the monitor is set to react only when the face velocity drops below approximately 85% of the initial setting.

REPLACEMENT PARTS DIAGRAM

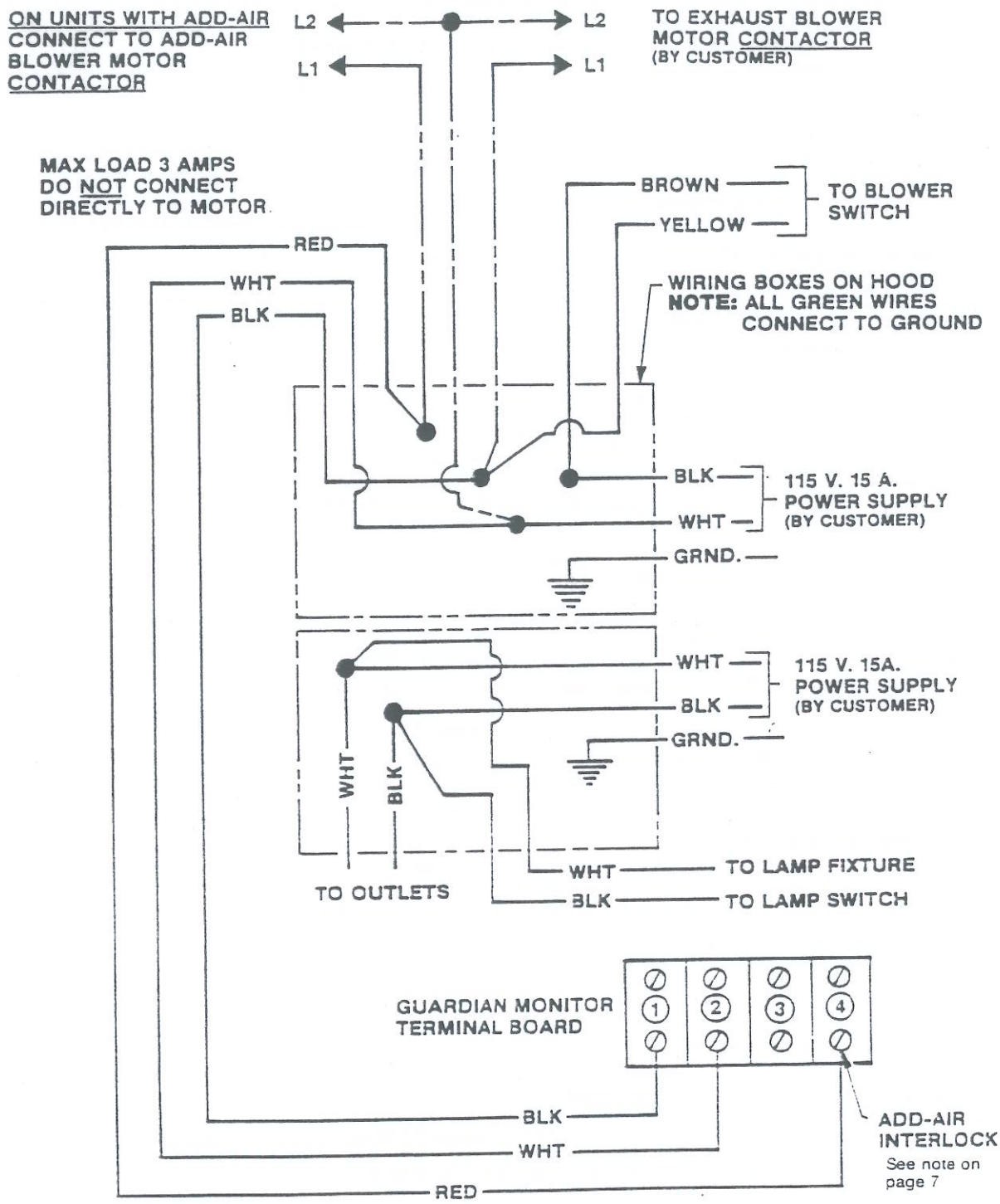


REPLACEMENT PARTS LIST

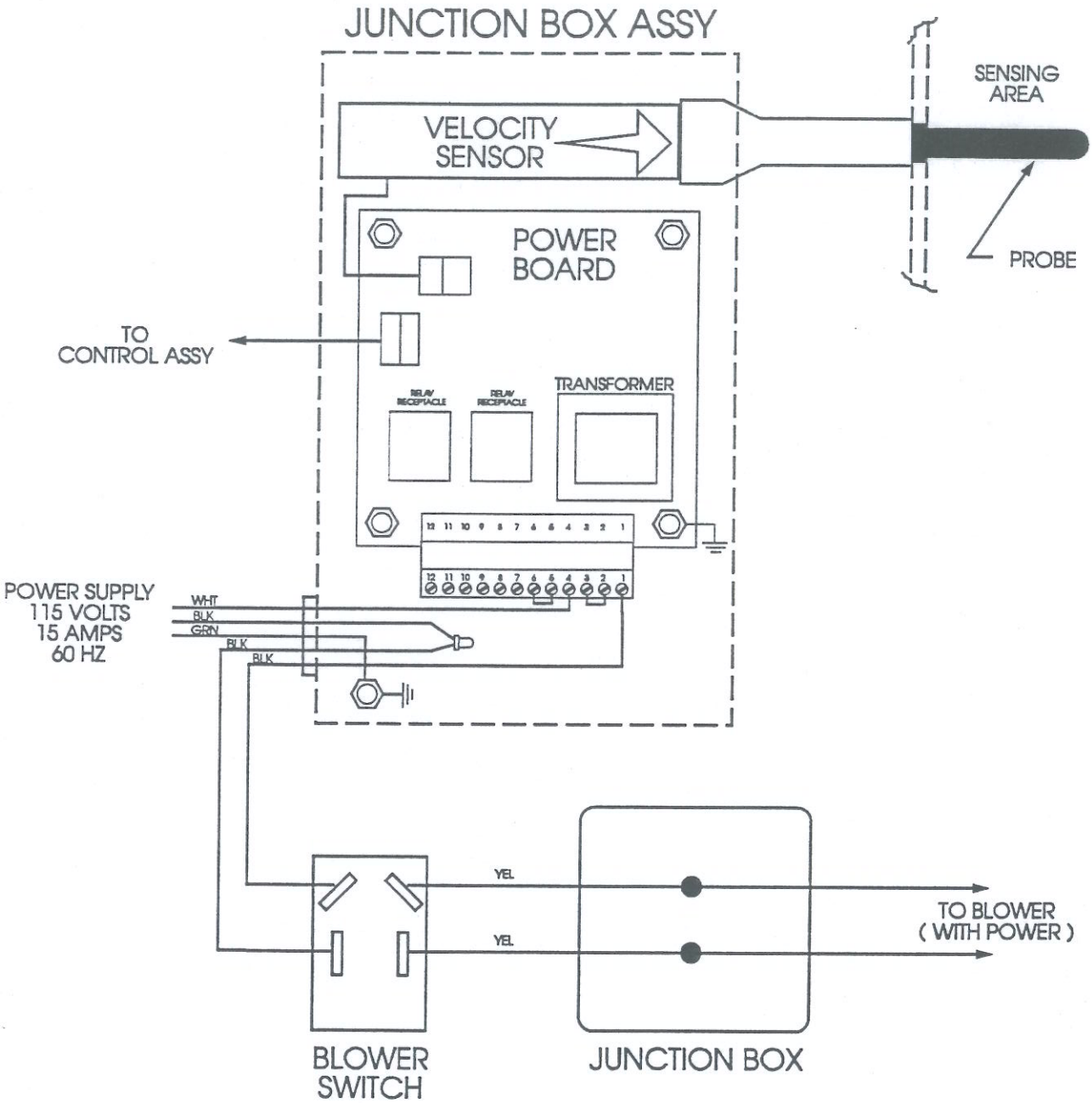
Item No.	Description	Part Number
1.	Dampening Orifice	49417
2.	Pressure Switch	13283
3.	Alarm - Audible	13281
4.	Relay	13279
5.	Power Cord	49420
6.	Gauge - Indicator	19523
7.	Switch Reset	13280
8.	Lamp - Indcator Assy. - Red	49403
9.	Lamp - Indicator Assy. - Green	49403-01
10.	Hole Plug	15956-01
11.	Vinyl Tubing 78" (49400)	49415-04
11.	Vinyl Tubing 36" (49400-01)	49415-03
*12.	Pressure Probe Assy.	49416
13.	Electrical Components Assem.	49410

*Not shown

WIRING DIAGRAM



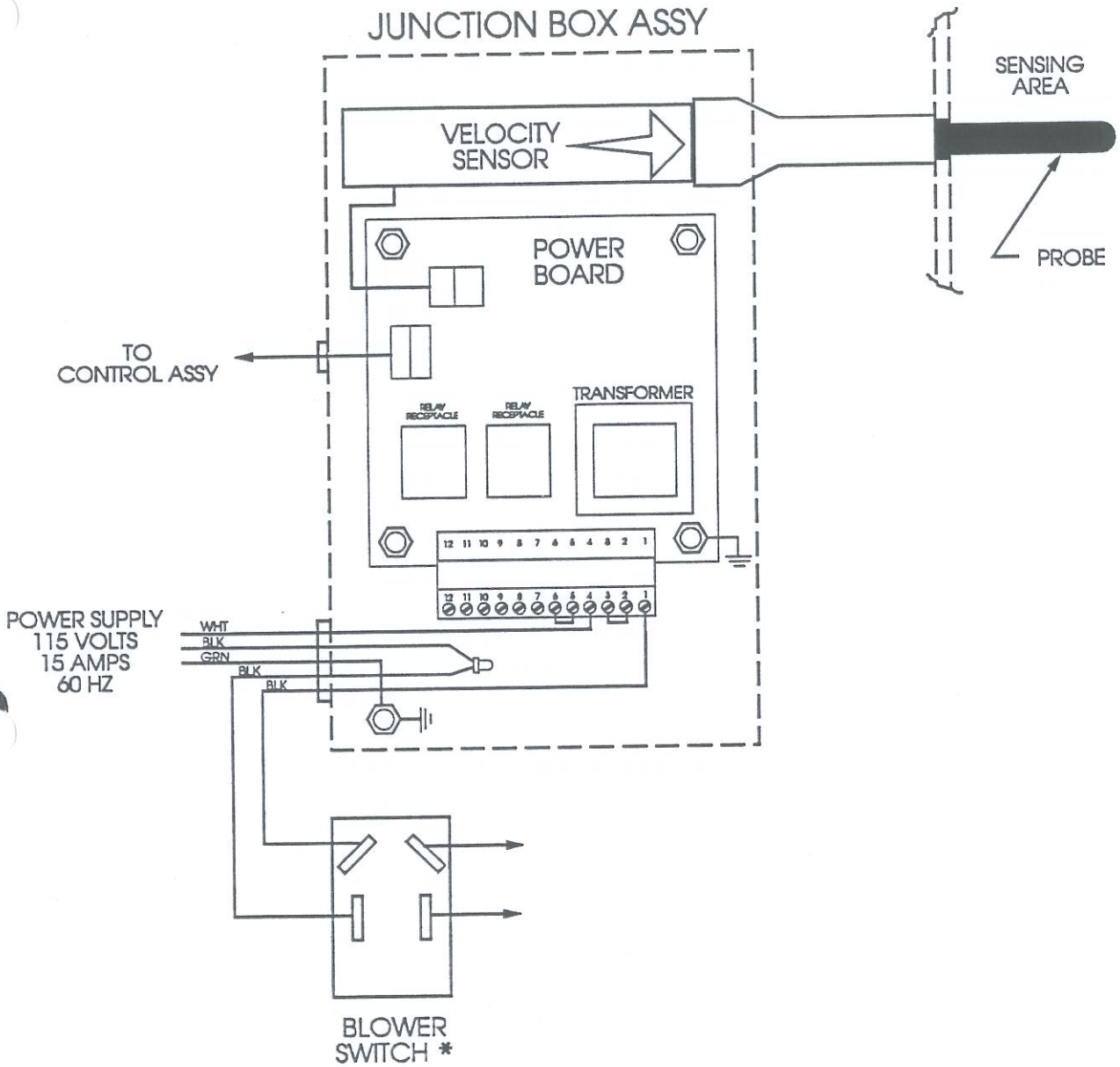
GUARDIAN WIRING CONNECTION DIAGRAM



PROTECTOR HOOD MODELS

48800	60803	72807	48821	72823
48801	60804	72810	48822	72824
48803	60807	96810	48823	48705
48804	60810	96830	48824	60705
48807	72800	96840	60821	72705
48810	72801	60825	60822	48707
60800	72803	72825	72821	60707
60801	72804	96825	72822	72707
				48806

SEE THE INSTRUCTION MANUAL FOR YOUR SPECIFIC HOOD FOR ADDITIONAL WIRING DIAGRAMS



MODELS 28044, 28046, 22464, 22474

SEE THE INSTRUCTION MANUAL FOR YOUR SPECIFIC HOOD FOR ADDITIONAL WIRING DIAGRAMS

*THIS SWITCH IS PROVIDED ON MODELS WITH BLOWERS