

BIO-SAFETY MONITOR

ALNOR® AIRGARD® 315 BSC

OPERATION AND SERVICE MANUAL

P/N 116159355, REV 07
SEPTEMBER 2014



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Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at 1-800-874-2811 (USA) or (651) 490-2811.

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SECTION 1

Introduction

General Description

The AirGard[®] 315 BSC continuously monitors air velocity via a remote probe. The monitor then reports this information via audio and visual indicators.

Visual Indicators — LEDs light with universally recognized red (danger), yellow (caution) and green (safe) colors as the flow velocity changes.

Audible Indicator — A continuous audible alarm alerts of a dangerous situation when the measured velocity is in an alarm condition.

Alarm information can be sent to other personnel in a remote location by means of a relay output.

Read this manual entirely before installing, configuring, and using the AirGard[®] 315 BSC. If you need assistance or any further explanation regarding this instrument, please contact TSI.

Component Identification



Figure 1 — Front View of Instrument

Status LEDs	<p><u>Red (Low)</u> — Indicates a low airflow alarm;</p> <p><u>Yellow (Caution)</u> — Indicates the airflow is within the warning zone between normal and alarm;</p> <p><u>Green (Good)</u> — Indicates the airflow is within normal range.</p>
Up Button	Up scroll button for configuration and calibration.
Down Button	Down scroll button for configuration and calibration.
Test/Reset Button	Silences the audible alarm if an alarm is present. If no alarm is present, this button is used to test the LEDs, audible alarm and relay output. It is also used during calibration and configuration.
Air Probe	Contains the air flow sensors.
Mounting Bracket	Bolts or double stick tape secure the mounting bracket to the Biological Safety Cabinet.

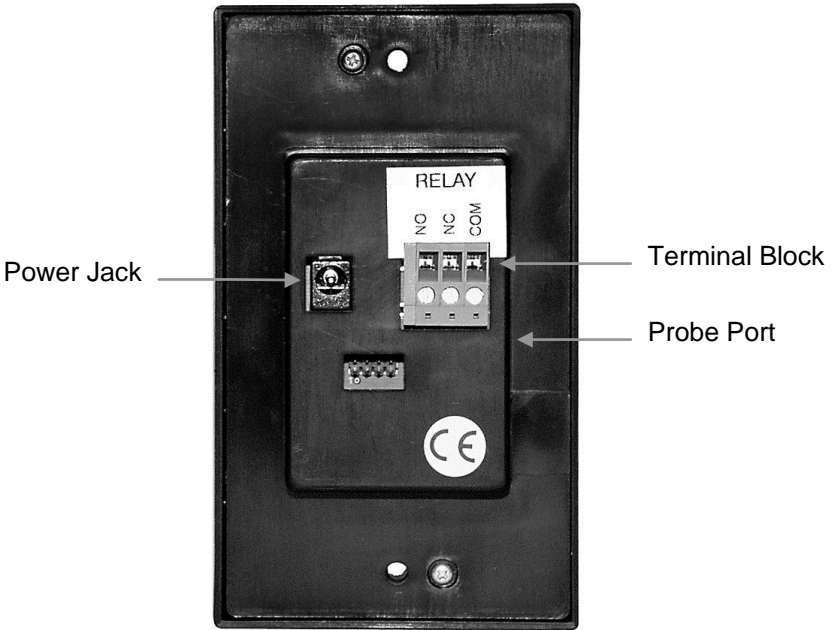


Figure 2—Back View of Instrument

Probe Port	Connects the air probe to the monitor
Terminal Block	Accepts 14-24 AWG wires. See the Installation section for wiring the monitor's various input/output features.
Power Jack	A suitable AC/DC power supply is supplied with domestic units; a 2.1 mm plug with 1.8 m power cord is provided with export units.

SECTION 2

Installation

Mounting the Monitor and Probe

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

DANGER: 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 configuring this monitor must be completely aware of the regulations and guidelines specific to its application.

1. Determine where the monitor will be mounted. The mounting bracket may be bolted or taped (double-sided tape provided) to a flat surface or the unit may be flush mounted within the front panel of the Biological Safety Cabinet. A mounting template is provided in the back of this manual for flush mounting purposes.
2. Determine the probe mounting position. The different mounting positions (described below) will give different velocity readings. Be certain of the parameter you wish to measure and mount the probe accordingly.

Duct Mounting — Find a location at least 6 inches above the transition. Drill or punch an 11/16 inch hole in the duct for the compression fitting for the probe. Deburr the hole as needed. Install the compression fitting in the duct.

NOTE: Do **not** allow chips from drilling/deburring operations to come in contact with the HEPA filter. Sharp chips may damage the filter.

Cabinet Mounting — Find a suitable location just above the HEPA filter of the Biological Safety Cabinet. Secure the mounting bracket to the cabinet's studs or another available mounting location. Make sure the compression fitting is installed in the mounting bracket.

NOTE: Do **not** drill or otherwise perforate the cabinet in any way as this could violate the integrity of the cabinet's seal and cause the escape of contaminants to the surrounding environment.

Transition/Thimble Mounting — Some transitions have threaded ports available that can be used for probe mounting. Remove the threaded plug from the thimble connection and install the compression fitting in the threaded port. If no port is available, drill an 11/16 inch hole, deburr the hole, and install the compression fitting.

NOTE: Do **not** allow chips from drilling/deburring operations to come in contact with the HEPA filter. Sharp chips may damage the filter.

3. Insert the probe 3 to 6 inches into the compression fitting. The window on the probe must face the air flow, exposing the sensor to the flow.
4. Connect the input/output signal wiring, if required, to the terminal block on the back of the monitor. See the Electrical Wiring below.
5. Attach or mount the monitor to the Biological Safety Cabinet.
6. Plug the power supply into an appropriate electrical outlet.

Electrical Wiring

Power Jack — Power is supplied to the monitor through a power jack located on the back of the monitor. For units shipped within the United States and Canada, a suitable AC/DC power supply is supplied with the unit. Plug the power supply into 120 VAC nominal 60 Hz mains.

For monitors shipped outside the United States and Canada, a 2.1 mm plug with a 1.8 m cord is provided. See the Specification section on the inside front cover for power requirements.

Terminal Block — The monitor has a three-pin screw terminal block connector protruding from the back of the monitor. The terminal block accepts 14-24 AWG wires. These connections are for the relay output feature. The relay connection is described below:

RELAY (Relay): This relay has both normally open and normally closed contacts. The contacts change to the non-normal state when in alarm.

Relay Status Under Various Conditions

Monitor Status			
Wiring	Good	Low	Caution
NO	Open	Closed	Open
NC	Closed	Open	Closed

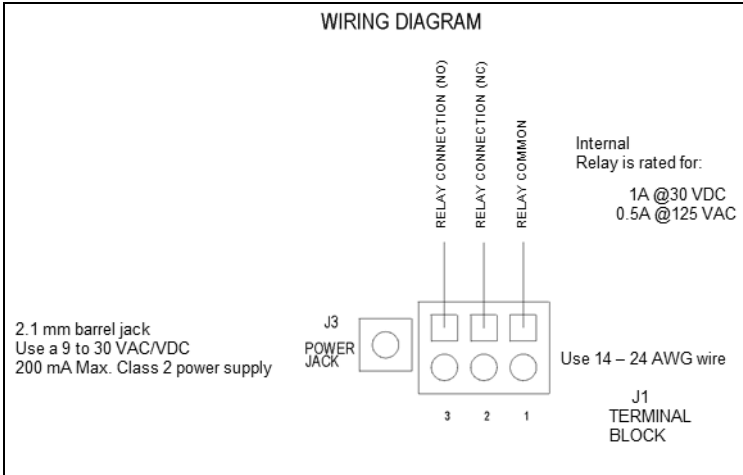


Figure 3 — Wiring Diagram

Low Alarm Setup

This Biological Safety Cabinet monitor must be setup before first use. The alarm setup is stored to nonvolatile memory and is not lost when the monitor loses power.

Because each installation and its air flow patterns are unique, this monitor must be set up in the field on the Biological Safety Cabinet and exhaust system it is installed. The Biological Safety Cabinet should be certified to its nominal airflow values before the monitor alarm setup procedure is performed.

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 setting up this monitor must be completely aware of the regulations and guidelines specific to its application.

Alarm Setup Procedure:

Verify that the monitor was properly installed. The probe connector should be attached securely into the back of the monitor.

The power supply plug should be firmly in the power jack on the back 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.

Press and hold the Down Button for 5 seconds to access the low alarm setup menu (all LEDs will turn off when five seconds have passed).

The red LED will then flash to indicate that the monitor is in the low alarm setup mode.

There are two low alarm setup procedures that can be used depending upon the installation requirements.

1. Press the Test/Reset button to set the low alarm default setting of 15% below the current air flow. Please note, through testing on several Biological Safety Cabinets, the default 15% exhaust velocity alarm set point has been shown to provide an inflow volume low alarm set point of 20%. However, the alarm set point should be

verified through site installation assessment test to verify low alarm set point.

2. The low alarm setting can be set by adjusting the Biological Safety Cabinet's airflow (inlet volume) down to the low alarm level. Then, press the Up button to set the low alarm at the current airflow. Then raise the Biological Safety Cabinet's airflow (inflow volume) back up to its nominal or certified value.

With either setting, the warning point (yellow LED) is set to 2% above the low alarm set point.

The Monitor returns immediately to the normal operating mode.

SECTION 3

Normal Operation

Power Up Sequence

On power up, all three of the LEDs and the horn are activated for two seconds. After the two seconds has expired, the three LEDs and the horn will turn off.

Run Mode

The Good LED (green) indicates a normal airflow condition. The Caution LED (yellow) indicates that the airflow is within the warning zone between normal and low alarm. The Alarm LED (red) indicates an airflow alarm.

These Good, Caution, and Alarm zones are determined by a user programmed low alarm set point and fixed set point offset.

Monitor Test

During normal operation, pressing and holding the Test/Reset Button for 2 to 5 seconds will activate all the LEDs as well as the horn and the alarm relay output.

Horn

The horn will be activated whenever the Low Alarm zone has been reached (unless the horn has been permanently disabled).

Once the horn has been activated due to an alarm condition, it will stay on until it is temporarily or permanently disabled. If the horn is temporarily disabled, the horn will turn off until another alarm condition is detected or the Test/Reset button is pressed. If the horn is permanently disabled, the horn will not come back on until the horn is re-enabled.

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 the monitor detects another alarm condition.

NOTE: *To remind the operator that the alarm horn is temporarily disabled, it will “chirp” every 15 seconds.*

Permanent Horn Disable — The horn may be permanently disabled during normal operation by pressing and holding the Test/Reset button for five seconds. Removal of power to the monitor does not change this setting; upon restoration of power, the horn will still be disabled. The horn may be re-enabled by pressing the Test/Reset button for five seconds.

NOTE: *To remind the operator that the alarm horn is permanently disabled, the red LED will turn off for one second every 15 seconds.*

SECTION 4

Troubleshooting and Service

Error Codes

Error checks are continuously performed on the monitor. In the event the monitor detects an error, the LEDs will light and the horn will sound to alert the user. The number of beeps after the long beep relates to the specific error found. Errors cannot be cleared; the monitor needs to be returned to the factory for service. Please contact TSI for assistance.

Troubleshooting Guide

Problem	Possible Cause / Corrective Action
No lights.	The power supply cord is not plugged into the monitor or live AC outlet. Plug it in.
No audible alarm.	Audible alarm disabled. Press Test/Reset button for 5 seconds to re-enable.
Alarm does not activate immediately. Alarm does not de-activate immediately 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.
Monitor keeps bouncing back and forth between adjacent zones.	The monitor is being influenced by an external air source. Remove the source of drafts.

Service Requests

If you need assistance, please contact TSI.

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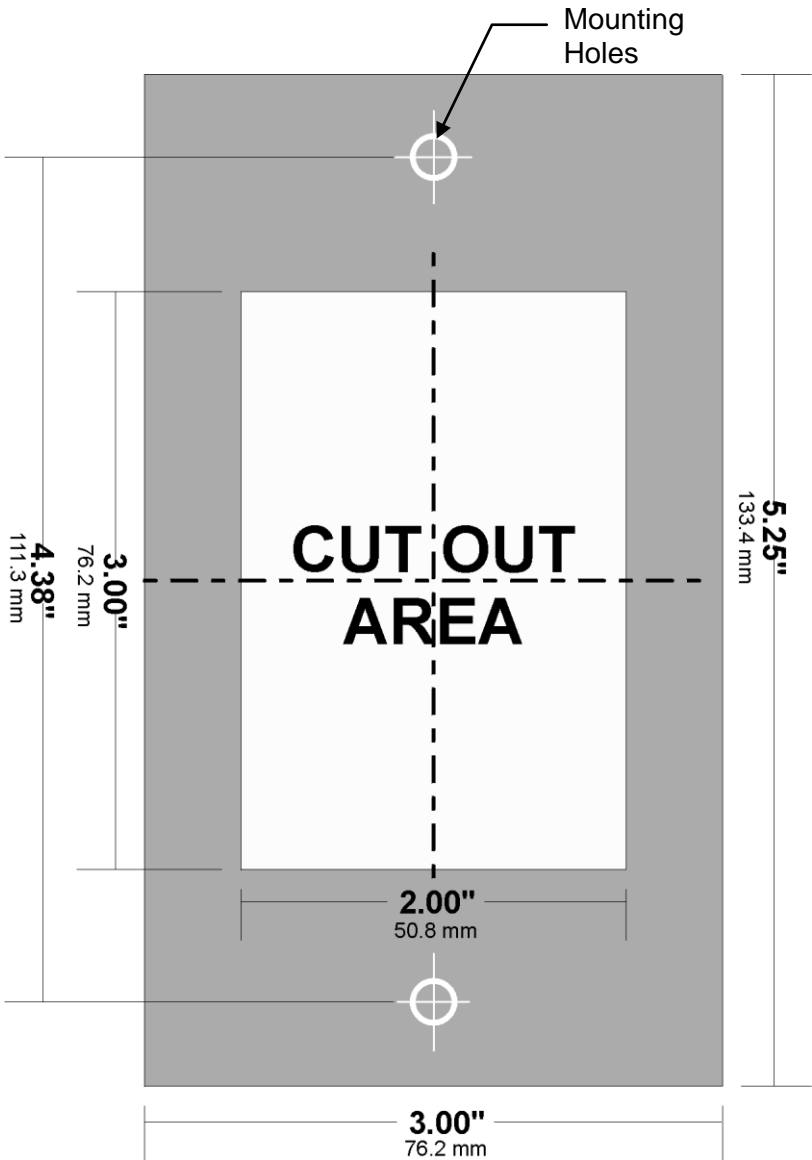
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www.tsi.com

SECTION 5

Mounting Template



AIRGARD® 315 BSC MONITOR SPECIFICATIONS

Accuracy	±5%.
Alarm Range	25 to 2000 fpm (0.13 to 10.2 m/s).
Alarm Delays	10 seconds.
Audible Alarm Indication	85 dB at 4 inches (10 cm).
Horn Silence	Temporary and permanent.
Visual Alarm Indication	Large red LED for low flow low alarm zone.
Visual Caution Indication	Large yellow LED for low flow caution zone.
Visual Normal Indication	Large green LED for normal flow zone.
Alarm Relay Output	Nominal switching capacity 1A at 30 VDC, 0.5A at 125 VAC; form C relay.
Instrument Dimensions	Front Faceplate — 5.25 (L) x 3.0 (W) x 5/8 (D) inches (13.3 x 7.6 x 1.5 cm); Rear Enclosure — 3.0 (L) x 2.0 (W) x 0.5 (D) inches (7.6 x 5.0 x 1.3 cm).
Mounting	Flush, 3.0 (L) x 2.0 (W) inch cutout required or bracket mount.
Operating Conditions	50° to 95°F (10° to 35°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 30 V AC/DC. Wall plug in power supply supplied with domestic units.

The configurable parameters are stored in the non-volatile memory of the instrument and are not lost when the monitor loses power.



Alnor Products, TSI Incorporated

Visit our website www.alnor.com for more information.

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