SPECPOINT SYSTEMS

Instruction Manual

UVH20 A / UVH20 C / UVH22
Ammonia Detectors

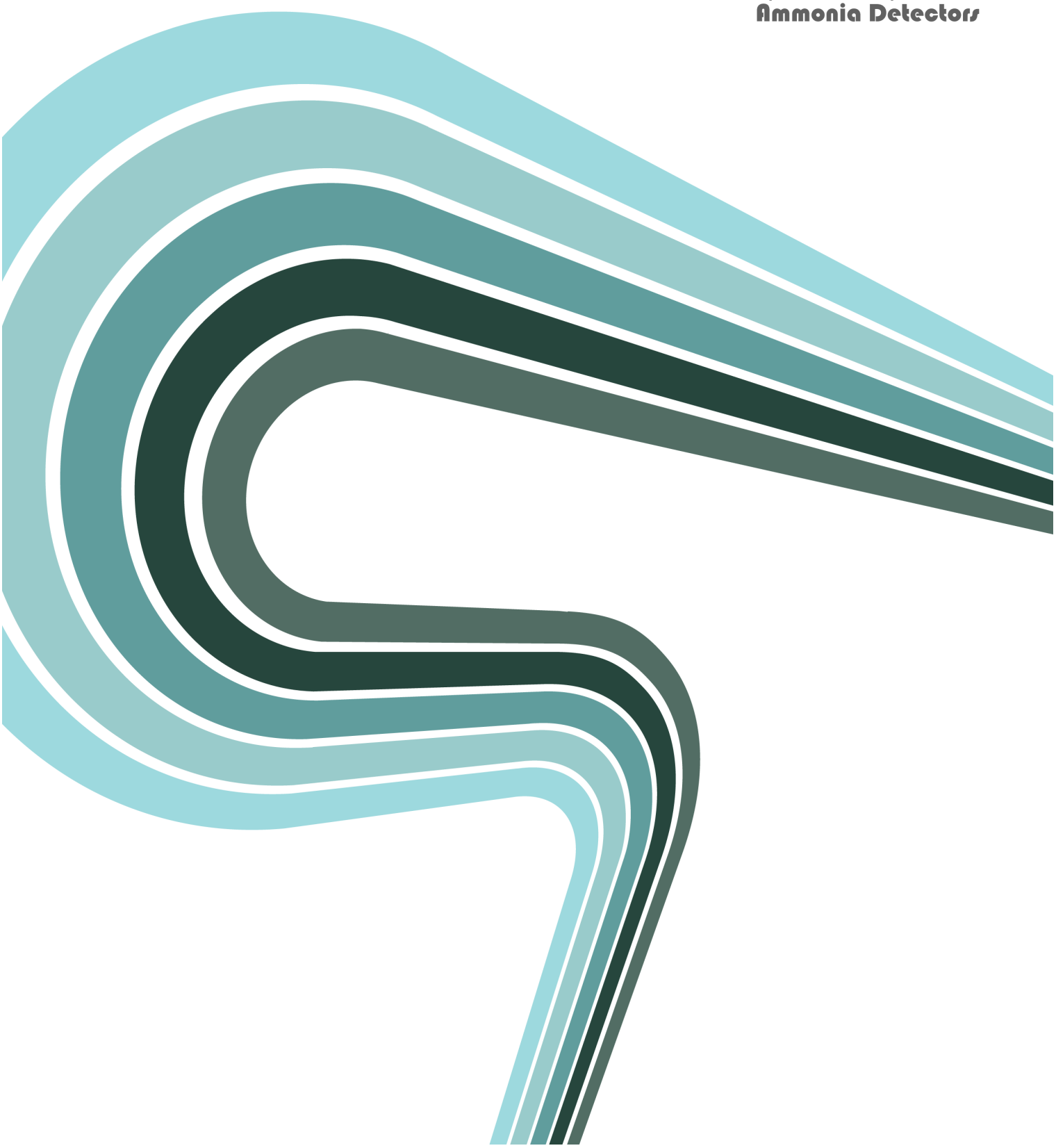


Table of Contents

- Applications 3
- Features 3
- Specifications 4
- Ordering Information 5
- Installation and Mounting 6
- Placing in Operation 7
- Maintenance 8
- Repair 9
- Calibration Procedure 11
- Troubleshooting Chart 12
- Parts List 13
- Diagrams 14
- Warranty 15

APPLICATIONS

UVH Series Ammonia Detectors are designed to sense low concentrations of ammonia and provide an alarm contact closure if concentration exceeds a specified level. The UVH-20-A model is calibrated for a 0 to 50 ppm ammonia concentration range; model UVH 20-C is calibrated for a 0 to 200 ppm ammonia concentration range. UVH-22 (two-in-one double units) can be the same or mixed ranges. These units are employed to detect ammonia leakage in refrigerated systems used to maintain a low temperature in cold storage warehouses.

Ammonia Detectors can actuate either alarms or valves to alert user or initiate control well before ammonia concentration becomes critical. Locations include: compressor rooms, warehouses, packing houses, food processing, plants, dairies, breweries, and places where items are stored in a controlled atmosphere, such as controlled atmosphere apple storage. These detectors are used in a wide range of commercial and industrial applications.

FEATURES

- No electro chemical cell.
- Continuous monitoring of room atmosphere.
- Not influenced by carbon dioxide or nitrogen.
- Ultraviolet detection principle samples controlled atmosphere without conditioning it.
- Fail safe relays de-energize to sound alarm; internal electrical failures also sound alarms.
- Readout meter for continuous indication of ammonia concentration.
- Can continuously read ammonia concentration without experiencing degraded performance or accuracy.

SPECIFICATONS

Special ranges are available upon request

Models

UVH-20A: For sampling the controlled environment. Operates alarm at a low level of ammonia concentration (0 to 50 ppm).

UVH-20C: For use in compressor rooms. Operates at higher levels of ammonia concentration (0 to 200 ppm).

UVH 22 Dual instrument, same or mixed ranges as 20 series.

Size of protected areas

One detector can monitor a room (zone). Monitoring more than one room (zone) will affect the detector's response time if used with optional integral multi (zone) sequencer. Maximum limit UVH-20-A-8 (eight rooms (zones)) per instrument suggested (3 minute sample time per room (zone)).

Input Voltage and Frequency

UVH-20A: 120 VAC, 60 Hz.

UVH-20C: 120 VAC, 60 Hz.

Power Consumption

10-15 VA

Alarm Contacts

3PDT, 10 amperes resistive, 5 amperes inductive

Manual reset

Warning Lights Contact

SPST, 5 ampere

Auto reset

Sample Flow

Required 5 to 25 SCFH

From customer supplied oil less sample pump.

Temperature Range

Operational: 0 C (32 F) to + 46 C (+115 F).

Storage: -34 C (-30 F) to +66 C (150 F)

Output

4-20 MA (1-5 VDC)

Accuracy

+/1% of range

Sensitivity

+/.25% of range

Mounting

Lugs provided for surface mounting on wall or panel. Case not suitable for mounting in unprotected outdoor environments. Do not drill holes in case or break its seal.

ORDERING INFORMATION

Specify-

Model number UVH-20A (0-50ppm), for cold storage, food processing areas and others needing low range.

Model number UVH-20C (0-200ppm), for compressor room use or processes requiring higher range. Other ranges available upon request.

Model number UVH-22 dual instrument, same or mixed ranges, special ranges available.

Order From

Specpoint Systems

P.O. Box 11279

Yakima, WA 98909 U.S.A.

509-965-9532

www.specpointsystems.com

INSTALATION AND MOUNTING

Customer Supplies Items

Sample pump: Grainger #4Z026 (up to 200 feet) www.grainger.com

Filter: Grainger #4ZL17 www.grainger.com

Flowmeter: Dwyer (0-30 SCFH) VFA-6 www.dwyer.com

Sample line: ¼" braided vinyl hose (beverage grade). For freezing areas use heat traced Teflon from Thermon, Inc. ¼" I.D. (3/8" O.D.) www.thermon.com

Select Mounting Location

Mount the detector where it can be conveniently monitored and serviced. Note that the detector case is not suitable for mounting in unprotected outdoor environments.

Mounting and Piping

1. Carefully unpack detector, inspect it for shipping damages and immediately report these to carrier. The detector is shipped as a complete unit with all components in place, and only needs to be mounted, piped and wired for operation.
2. Mount detector vertically on wall or panel using lugs provided. Do not drill holes in the detector case.
3. A suggested sample pickup point is the area above the coil or refrigeration piping. This is the most likely point for early pickup of an ammonia leak.
4. Use an oil-free positive displacement sample pump capable of 20-60SCFH for long sample line runs.
5. Vent the sample return line out of the control room.
6. Sample intake line must be open for proper detector operation. Sample lines ¼ inch braided vinyl are typically used. Heat traced sample lines from Thermon, Inc. are very good and are recommended for freezing areas.

Wiring and Power

NOTE: All wiring must comply with local codes, regulations, and ordinances.
Remove the junction box cover for access to the terminal connections. The detector case is connected to ground terminal. Wire to the proper lug for the available power. Observe color code when connecting power leads to the terminals. Output: 4 to 20MA. Connect this to plant DCS or PLC system.

Alarm

Make connection to 3PDT alarm relay contacts to obtain desired alarm action. Figure 2 shows typical alarm connections for powered and reset position. It is recommended to connect the alarm to a third party security company for monitoring. Plant DCS or PLC systems can fail, but the alarm will continue to function.

PLACING IN OPERATION

The procedures for placing the detector in operation assume that the detector has been completely installed- mounted, piped, and wired.

Startup

Turn the detector's "ON-OFF" switch to "ON" position. Observe the meter reading and use the "standardize' adjustment knob on the detector's front panel to bring the meter pointer near zero scale. Adjust the "standardize" knob in small steps, waiting a couple of minutes between steps, to obtain the best zero.
Important: Detectors employed in low oxygen atmospheres, such as the controlled atmosphere storage of fruit, require centering about zero +/- 3ppm. Low oxygen atmosphere approximately -3ppm and open rooms at +3ppm. This is normal and desired.

Checking the Alarm Point

The alarm relay is factory-adjusted to actuate at approximately midscale, 25ppm for the 0 to 50 range, or150 ppm for the 0 to 200 ppm range, the alarm relay actuation point is adjustable from 35% of scale. Proceed as follows to readjust or check the alarm point.

1. Push reset button on front panel to manually reset alarm relay.
2. Change alarm actuation point by adjusting "trip-out" point adjustment on circuit board. Turn switch "OFF". Using a small screwdriver, change "trip-out" point adjustment. Remove screwdriver and turn switch "ON". Allow a few minutes for detector to warm up and repeat until desired alarm actuation point is reached.
3.

Warning ("Trouble") Light Operation

The warning light signals early warning of an ammonia concentration or signals time for cleaning. The warning light actuation point is not individually adjustable, but will always occur approximately 50% below alarm point setting. For example, if alarm point is set a 25ppm, warning light blinking signal will occur at 12 to 13 ppm.

Check for Proper Operation

To verify detector operation, moisten a cotton swab with ammonia water and place it near intake. This should actuate the warning ("trouble") light and then the alarm relay within 20 to 30 seconds response time. If not, check for a blocked sample pipe or air leaking into the sampling system.

The detector will return to normal operation within 1 minute after the removal of the cotton swab.

Depress the reset button on the detector's front panel to manually reset the alarm relay. Red alarm lamp will go out.

Operation Considerations

The presence of dust and organic vapors in the air sample forms an oily film in the sample pipe and on the surfaces of the ultraviolet source lamp and the detector tube. Sources of such organic vapors are internal combustion engine exhaust, crank case emissions, drying paints, vapors from cooking oils, etc. This film absorbs the ultraviolet radiation and causes an upward drift in meter reading.

Using a good sample filter minimizes this. The optical path must be cleaned as described in the Maintenance paragraph.

Avoid using chemical solvents, such as lacquer thinners, in the sample area because the presence of their vapors in the air sample can cause a meter indication or activate the detector's alarm relay.

MAINTENANCE

To ensure optimum performance, perform the following maintenance procedures at regular intervals.

1. Clean the optical path of dust film.
2. Change in line (sample filter) as required.

The maximum recommended interval is:

UVH 20-A 1 to 3 months (0to50 ppm)

UVH 20-C 3 to 6 months (0 to200ppm)

UVH-22according to ranges

If filter becomes dirty before scheduled interval or frequent "standardize" adjustments are required to rezero pointer, establish a more frequent maintenance interval based on

these requirements.

Cleaning the Optical Path

1. Inactivate alarm circuit and turn “ON-OFF” switch to “OFF” position.
2. Loosen three case door latches and swing door open.
3. Unhook spring clip securing aluminum sample pipe to its mounting bracket.
4. Swing sample pipe outward and unscrew it from tee fitting and union.
5. Use thick paper towels moistened with alcohol or pure acetone to swab inside the sample pipe. You can use a shotgun cleaning rod or wooden dowel for this. Reinstall sample pipe.
6. Clean upper surface of ultraviolet detector tube with cleaning tissues and alcohol or pure acetone.
7. Disconnect electrical plug from ultraviolet source lamp.
8. Unscrew threaded source lamp holder from tee fitting. DO NOT remove source lamp from its holder for routine cleaning.
9. Clean source lamp with cleaning tissue and alcohol or pure acetone.
10. Carefully screw source lamp holder into tee fitting. Reconnect electrical plug.
11. Close case door and secure latches.
12. Turn switch “ON”, and allow restabilizing time before taking readings.

The restabilizing time requiring is related to the length of the time the power was “OFF”. Normally, it will take from 1 to 3 minutes for detector to restabilize after routine cleaning. Use “standardize” knob to obtain a stable zero. Reactivate the alarm circuit.

REPAIR

Replacement procedures for the following detector components are outlined in the following.

1. Ultraviolet Source Lamp.
2. Ultraviolet Detector Tube.
3. Amplifier/ Alarm circuit board

Replacing the Ultraviolet Source Lamp (Part number 50034E)

1. Inactivate alarm circuit and turn “ON-OFF” switch to “OFF” position.
2. Loosen 3 case door latches and swing door open.
3. Disconnect electrical plug from ultraviolet source lamp. Unscrew threaded source

lamp holder from tee fitting. The source lamp is sealed in its holder and is replaced as an assembly.

4. Screw new source lamp and holder assembly (50034E) into the tee fitting.
5. Connect electrical plug to source lamp.
6. Close case door and secure latches.
7. Turn switch “ON” and allow restabilizing time before taking readings.
8. Set meter.
9. Reactivate alarm circuit.

Replacing the Ultraviolet Detector Tube (Part number124932H)

1. Inactivate alarm circuit and turn “ON-OFF” switch to “OFF” position.
2. Loosen 3 case door latches and swing door open.
3. Carefully unplug electrical connector from tube.
4. Screw new detector tube into tee.
5. Reconnect electrical connector.
6. Close case door and secure latches.
7. Turn “ON-OFF” switch to “ON” position and allow restabilizing time before taking readings. Reactivate alarm circuit
8. Set meter to zero.

It will be necessary to do a minor recalibration after detector tube is replaced. Contact factory for procedure to set gain adjustment.

Amplifier/ Alarm Circuit Board

1. Inactivate alarm circuit and turn “ON-OFF” switch to “OFF” position.
2. Loosen 3 case door latches and swing door open.
3. Remove and replace defective circuit board.
4. Refer to calibration procedure.
5. Close case door and secure latches
6. Turn “ON-OFF” switch to “ON” position and allow restabalizing time before taking readings. Reactivate alarm circuit.

CALIBRATION PROCEDURE

A factory authorized service organization should be retained to perform scheduled calibration, inspections and cleaning of detector and sampling systems. **Note:** To satisfy E.P.A., OSHA and insurance industry underwriters, service calibration records must be kept on site for audit.

To perform the following procedures, you will need a span screen calibrator.
Caution: Be very careful when working around the electronic package of this instrument with power "ON". Upper portion of the circuit board (H.V. regulator area) receives aprox. 345 VDC. For adjustment of various potentiometers use a small insulated screw driver of instrument quality.

Be sure the meter readings have stabilized as described under the Start up paragraph and a stable zero reading has been obtained before proceeding.

1. Loosen 3 case door latches and swing door open.
2. Replace upper union half with calibrator fixture.
3. Close door and allow reading to stabilize for 3 to 5 minutes. Record the reading.
4. Use value stamped on Calibrator
5. Compare recorded reading with calculated calibration point. If readings differ by more than +/- .5PPM full scale, use gain adjustment to correct. Use potentiometer P-2.
6. Recheck zero and cal span points until correct.
7. Remove cal span fixture and return union half.
8. Close case door and secure latches.

TROUBLESHOOTING CHART

The following chart is designed to locate the problem area rapidly by using meter indication as symptom guide. The chart lists some symptoms, probable causes, and suggested remedies.

Troubleshooting Chart

Symptom	Probable causes	Remedy
Detector dead, Power light out with power switch “ON”.	Blown Fuse Faulty power connection	Replace fuse Check connections and tighten
Sample pump running, meter does not respond to presence of vapor	Blocked sample intake pipe- check for air flow through system by placing your fingers near sample return outlet. Dirty filter Check sample sequencer, sample pump & integrity of sample lines as well as location of sample lines	Open sample intake pipe Replace filter
Meter pointer drives above full scale, regardless of “standardize” knob position	Ultraviolet source lamp defective- check for blue violet glow by placing a mirror under end of sample pipe with detector turned “ON” Defective ultraviolet detector tube If meter does not respond, source lamp is weak and must be replaced.	Replace source lamp. See repair paragraph Replace detector tube. See repair paragraph. Replace source lamp. See repair paragraph
Checks reveal ultraviolet source lamp and detector tube are operative but detector is malfunctioning.	Faulty amplifier board.	Replace circuit board. See repair paragraph.

Parts List

UVH-20 A-E
UVH-22

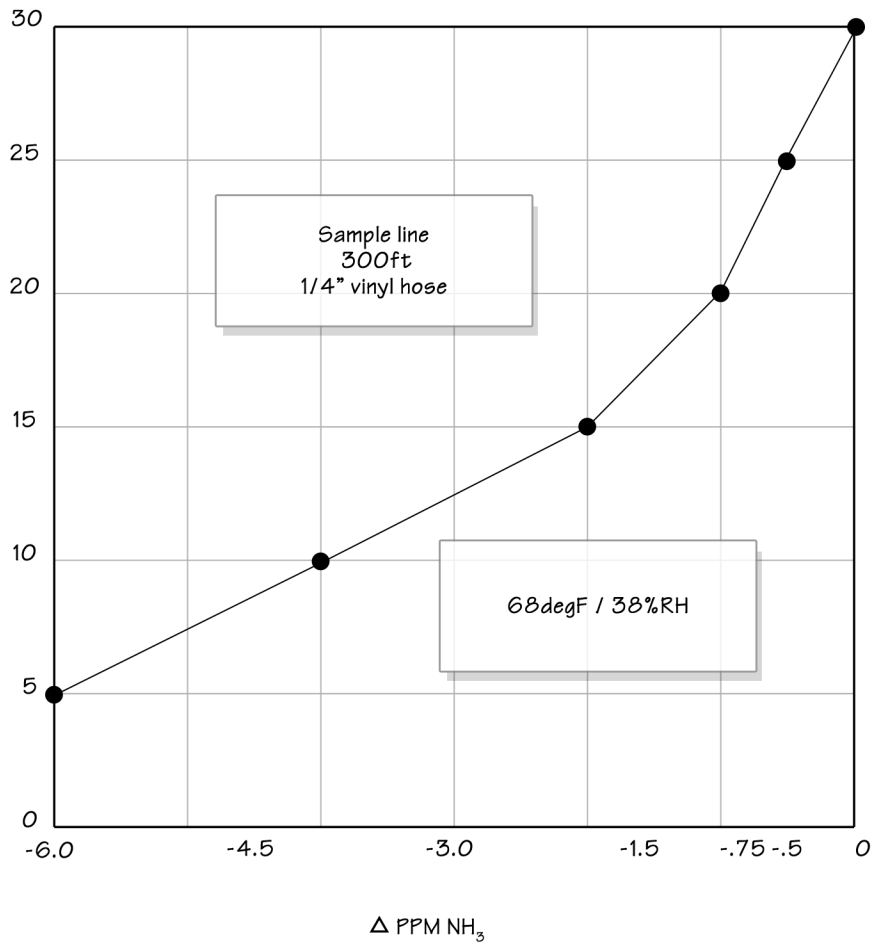
Replacement Parts List

The following parts have been selected as those most likely to be needed to support repair and maintenance of the Detector. It is advisable to order those parts and keep them in your maintenance stock.

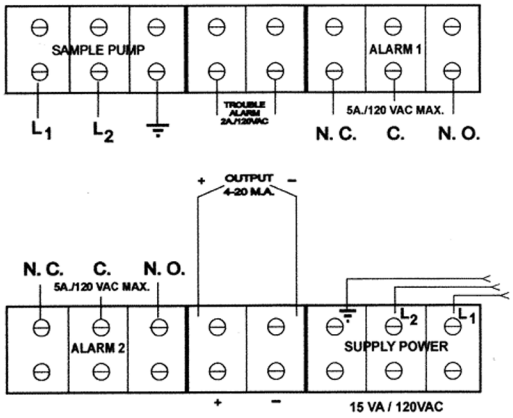
Part No.	Description	Recommended Spares Spare parts per 1	10
50026	Filter bag (Royal Dirt Devil U)	1	3
50029	Filter bag retainer (metal spring ring)	1	3
Bussman AGC 2	Fuse, 2 ampere		
50034E	Ultraviolet source lamp	1	3
124932H	Ultraviolet detector tube	1	3
	Amplifier/Alarm Board		
50023A-B.1	0-50ppm	--	1
50023B-B.1	0-200ppm	--	1
	Power Transformer		
50089	120 vac		
	Motor and Blower Assembly		
50090	120 vac		
50010	Green		
50011	Amber		
50009	Potentiometer (standardize)		
50004	Alarm Relay (3pdt)		
	Accessories		
50906-A	Span screen kit 0-50ppm		
50905-C	Span screen kit 0-200ppm		
50095	Inlet flange adapter		

Flow SCFH

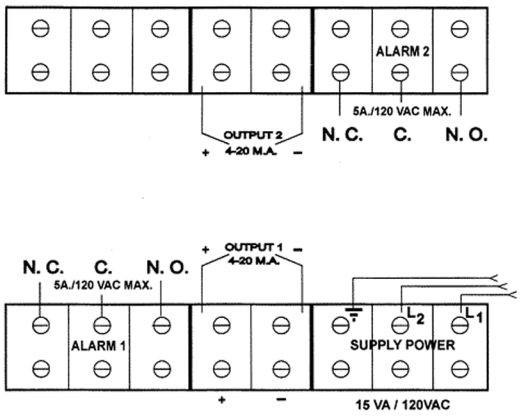
Typical absorption curve for PVC hose



Wiring diagram for UVH-20



Wiring diagram for UVH-22



LIMITED WARRANTY

Specpoint Systems, LLC hereby warrants that the product purchased from Specpoint Systems, LLC shall be free from defects in material and workmanship. This warranty is limited to ninety (90) days from the date of original installation, whether or not actual use begins on that date, or ninety (90) days from the date that the product is shipped from Specpoint Systems, LLC to the customer.

Specpoint Systems, LLC guarantees that the product furnished by Specpoint Systems, LLC will be capable of performing the work for which it is designed, provided, however, that purchaser has Specpoint Systems, LLC install and continue to maintain the product according to the standards as provided for in Specpoint Systems, LLC's operational manual of said equipment, or alternatively, that purchaser's personnel abide by the instructions given at the time of delivery/installation, and maintains the equipment and makes such adjustments as may be required during the use of the equipment, as provided for in Specpoint Systems, LLC's operation manual. It is necessary that purchaser strictly adhere to all maintenance, calibration, upkeep, and repairs as contained in the operation manual provided by Specpoint Systems, LLC. Purchaser acknowledges and agrees that even a minor deviation from those maintenance requirements voids this warranty.

The warranty provided for herein shall be void and of no effect in the event that:

(a) the product has been installed or operated outside its designed specifications, including recurring maintenance performed by Specpoint Systems, LLC or an authorized agent of Specpoint Systems, LLC;
(b) the product has been subject to misuse, neglect, accident, improper or inadequate maintenance, corrosive environment, environments containing airborne contaminants outside the parameters of the operational requirements contained in the operation's manual, or excess shock;
(c) unauthorized modifications are made to the product;
(d) the product is not installed or operated in compliance with the manufacturer's printed instructions; and. .
(e) the serial number of the product(has been altered, defaced, or removed.

The warranty provided herein is for repair or replacement only. Further, any repair shall include only the cost of the parts to be repaired or replaced. All labor associated with said repair or replacement shall be at the cost of the purchaser. Specpoint Systems, LLC shall not be liable for any loss, cost, damage or expense of any kind arising out of a breach of the warranty or failure of the equipment. Further, Specpoint Systems, LLC shall not be liable for any incidental, consequential, exemplary, special, or punitive damages, nor for any loss of revenue, profit or use arising out of a breach of this warranty, or in connection with the sale, maintenance, use, operation or repair of any Specpoint Systems, LLC product. In no event will Specpoint Systems, LLC be liable for any amount greater than the purchase price of a defective product. The disclaimer of liability included herein shall remain in effect, and shall continue to be enforceable in the event that any remedy herein shall fail of its essential purpose.

If a complaint is made by purchaser that the product is not meeting its operational standards as described in Specpoint Systems, LLC's operational manual, Specpoint Systems, LLC shall have the right to make a test of the product to such extent as determined reasonably necessary by Specpoint Systems, LLC to determine the performance of the product. Such test shall be conducted by personnel from Specpoint Systems, LLC, or alternatively, by personnel expressly approved by Specpoint Systems, LLC.

This warranty is the sole and exclusive warranty for Specpoint Systems, LLC products, and is in lieu of all other express and implied warranties. Specpoint Systems, LLC specifically disclaims all other express and implied warranties, including, but not limited to, all implied warranties of merchantability and fitness for a particular purpose. No person or entity is authorized to bind Specpoint Systems, LLC to any other warranty, obligation, or liability for any Specpoint Systems, LLC product. Installation, operation or use of the Specpoint Systems, LLC product for which this warranty is issued shall constitute acceptance of the terms thereof.

This Agreement shall be governed by and construed in accordance with the laws of the State of Washington. Purchaser and Specpoint Systems, LLC agree that any action brought regarding the product, and liability related in any way to said product, shall be brought in a court of competent jurisdiction located in Yakima County, Washington. In the event an arbitration, 'suit or action is brought by any party related to the product, it is agreed that the prevailing party shall be entitled to reasonable attorneys' fees to be fixed by the arbitrator, trial court and/or appellate court.

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