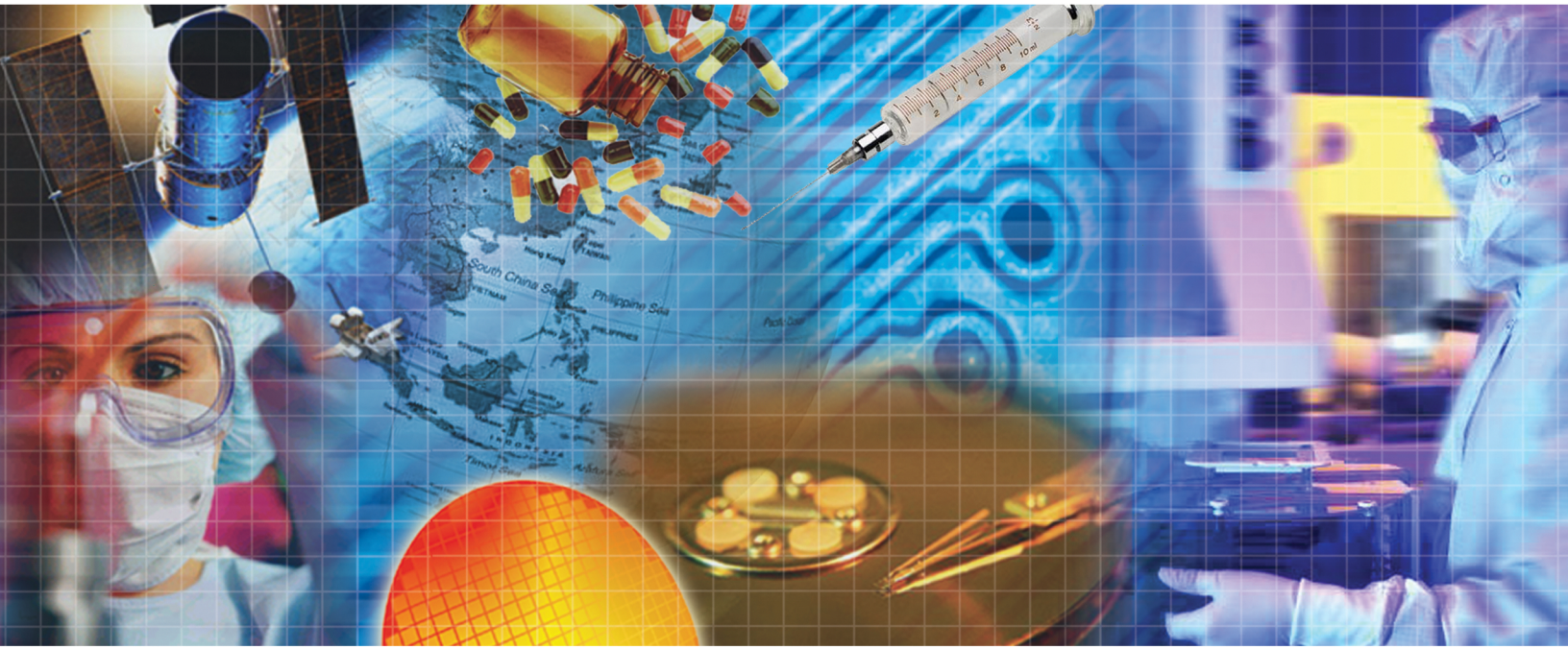

LIGHTHOUSE
WORLDWIDE SOLUTIONS
Technology That Counts!

HPC 1100

High Pressure Controller

Operating Manual

Lighthouse Worldwide Solutions

Lighthouse High Pressure Controller

Operating Manual

LWS Part Number 248083328-2 Rev 2

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About this Manual

This manual describes the installation and use of the Lighthouse Isokinetic High Pressure Controller.

Text Conventions

The following typefaces have the following meanings:

Note: *A note appears in the sidebar to give extra information regarding a feature or suggestion*

WARNING: ***A warning appears in a paragraph like this and warns that doing something incorrectly could result in personal injury, damage to the instrument or loss of data.***

italics	Represents information not to be typed or interpreted literally. For example, *file* represents a file name. Manual titles are also displayed in italics.
boldface	Introduces or emphasizes a term.
`Courier font`	Indicates command syntax or text displayed by the diagnostic terminal.
`Bold Courier`	Indicates commands and information that you type. You can use uppercase or lowercase letters; in this manual, commands are shown in uppercase.
Helvetica Italics	Indicates a comment on a command or text output.

Additional Help

For more information about the Lighthouse Isokinetic High Pressure Controller, contact Lighthouse Worldwide Solutions.

(800) 945-5905 Sales and Service
(541) 770-5905 Outside of USA

techsupport@golighthouse.com
www.golighthouse.com

1 Safety

Cautions

Certain cautions and good practices must be followed to insure safety of personnel and equipment. For example, Figure 1-1 illustrates the optional high-pressure purge filter required when the sample gas pressure is greater than 60 psi.

Figure 1-1 HPC1100 with High-Pressure Purge Filter

The Lighthouse High Pressure Controller is designed to provide safe and reliable operation. The following good practices will ensure the safety of personnel and instrumentation:

WARNING: ***Removal of the inlet gas supply line from the HPC while in use can result in personal injury. Use of a "standard" purge filter with inlet pressures greater than 60psi may result in rupture of the filter and personal injury or damage to equipment.***

1. Turn off the high pressure gas source before connecting or disconnecting the High Pressure Controller.
2. Make sure the high pressure gas is connected only to the **GAS INLET** port.
3. Ensure that all fittings, connectors and adapters are tight (finger tight + 45°) before applying high pressure gas to the inlet of the Controller.
4. Do NOT exceed pressures of 150 psi on the **INLET**.

2 *Introduction*

Overview

The High Pressure Controller 1100 was designed for use with Lighthouse Airborne Particle Counters in applications where the sample is under pressure. Standard applications include sampling of CDA, Nitrogen and other inert gases.

This operating manual describes how to set up, use and maintain the Lighthouse High Pressure Controller 1100.

Unlike previous diffusers, the Lighthouse High Pressure Controller 1100 is designed to be isokinetic at all input pressures between 30 and 150 psi. By adjusting the Flow Control of the Controller, the output stream to be sampled can be set to 1.0 CFM to provide accurate measurement regardless of the pressure at the input.

The High Pressure Controller 1100 is compatible with the entire line of Lighthouse 1 CFM SOLAIR and REMOTE laser particle counters.

The HPC1100

The Lighthouse HPC 1100 uses a precision valve and flow meter for adjusting the sample flow to the particle counter, illustrated below.

Figure 2-1 High Pressure Controller front view

Table 2-1 High Pressure Controller Specifications

Material	Stainless Steel
Inlet Pressure Range	30-150 PSI
Outlet Flow Rate	1.0 CFM
Flow Control	Adjustable
Gauge Range	0-5 Lpm
Sample Fluid	Inert Gases
Inlet and Outlet Port Seals	1/4" Metal Gasket, High Purity VCR Fittings
Dimensions	5.61” (w) x 7.57” (h) x 10.32” (d) [14.22 x 19.30 x 26.21 cm]
Weight	6 lbs [2.7 kg]
Options	High-pressure Purge filter (to sample gasses exceeding 60 psi)

3 Getting Started

Unpacking

The HPC1100 High Pressure Controller has been thoroughly inspected and tested at the factory. When the Controller is received, inspect the shipping container for damage. If the carton is damaged, notify the carrier and save the carton for inspection. Inspect the Controller for broken parts, scratches, dents or other damage.

Verify the contents of the package against the shipping list. If anything is missing, please contact your sales representative or Lighthouse Worldwide Solutions immediately at (800) 945-5905.

Accessories

You can order several optional accessories to tailor the unit to your needs. These accessories include connectors, reducers, adapters and tubing. Contact your Lighthouse sales representative for prices and availability.

Shipping Instructions

Should it become necessary to return the unit to the factory for any reason, contact Lighthouse Customer Service or visit our website, www.golighthouse.com/RMA and obtain a Return Merchandise Authorization (RMA) number. Reference this number on all shipping documentation and purchase orders. After receipt of the RMA number, follow the shipping instructions below:

WARNING:
If the instrument is damaged during shipment due to inadequate user packing, the warranty may be voided and all repairs required will be at cost.

1. Use the original container, nozzle caps and packing materials whenever possible. If your instrument contains a battery, remove it before packing the instrument. If the battery needs to be shipped, package it separately and refer to www.golighthouse.com/rma for detailed instructions.
2. If the original container and packing materials are not available, wrap the unit in "bubble pack", surround with shock-absorbent material and place in a double-wall carton - the instrument should not rattle around when the carton is vigorously shaken. If the instrument is damaged during shipment due to inadequate user packing, the warranty may be voided and all repairs required will be at cost. You may contact Lighthouse to purchase a replacement shipping container and nozzle caps.
3. Seal container or carton securely. Mark "FRAGILE" and enter the Return Merchandise Authorization (RMA) number in any unmarked corner.
4. Return to the address provided by your Lighthouse representative or the RMA website.

Installation

The installation of the High Pressure Controller is completed in two steps - plumbing the device into your facility and adjusting the output flow to the particle counter.

Plumbing the HPC to Source Gas

Attaching the HPC to the sample gas source may require the use of VCR gaskets, four of which are normally supplied with the unit. Connection to the supply plumbing may require adapters - a limited list is provided in Table 3-1. Contact Lighthouse Sales and Support or your sales representative for availability and costs.

Table 3-1 HPC1100 Plumbing Adapters

From Fitting	Use Adapter	LWS Part Number
1/4" O.D. Tubing	1/4" Tube to 1/4" VCR	021402612
6mm O.D. Tubing	6mm Tube to 1/4" VCR	021402613
1/8" FNPT	1/8" NPT to 1/4" VCR	021402614
1/4" FNPT	1/4" NPT to 1/4" VCR	021402615
1/4" NPT	1/4" FNPT to 1/4" VCR	021402616
1/4" VCR	1/4" FVCR to 1/4" FVCR	021402617
3/8" O.D. Tubing	3/8" Tube to 1/4" Tube	021401832

The HPC GAS INLET requires a VCR gasket, as shown in Figure 3-1. The gasket fits only one way and the fitting should be finger-tight +1/8-turn to prevent leaks.

Figure 3-1 VCR Gasket

Safety

1. For obvious safety reasons, make sure that the supply line has been closed and there is no pressure on the line before connecting it to the HPC.
2. The particle counter should not be used to sample reactive gasses, such as oxygen or hydrogren, as they present an explosion and fire hazard.
3. Connect the HPC1100 only to sample gas supplies that are between 30 and 150 psi. An explosion hazard could be present after connection to supply pressures exceeding 150 psi.
4. If the sample pressure is greater than 60 psi, do not use a "standard" see-through purge filter for verifying the system. Lighthouse has a high-pressure stainless steel 0.003µm 1 CFM purge filter available that is rated throughout the HPC's pressure range. Contact your Sales Representative or Lighthouse Sales and Support for more information on this accessory.
5. To prevent leaks and zero count failures, make sure that external connections are tight (finger-tight + 1/8-turn) before pressurizing the sample circuit.

Connecting the Device Into Your Facility

The GAS INLET and GAS OULTLET of the High Pressure Controller are shown below:

Figure 3-2 High Pressure Controller Typical Install

WARNING: ***Always use new VCR Gaskets to ensure a good pressure seal.***

1. Attach new VCR Gaskets to the 1/4" male VCR connectors on the GAS INLET and OUTLET connectors of the Controller.
2. Using the appropriate adapter, connect the supply line to GAS INLET. Make the connection finger tight, then use a wrench to tighten another 45°.
3. Connect the tubing kit to the supplied Controller OUTLET adapter. When connecting to the Lighthouse SOLAIR 1100, use the length of Bev-a-line XX tubing and nylon nut assembly provided. When connecting to other SOLAIR or REMOTE 1.0 CFM counters, the compression fitting is not required and the tubing may be inserted directly onto the counter's Inlet nozzle. Make the connection finger tight, then use a wrench to tighten another 45°.
4. When connecting to Lighthouse REMOTE counters, make sure adequate vacuum is available to the instrument before use.

Adjusting the Output Air Flow

WARNING: ***Be sure the flow specification of your particle counter and that of the Controller are the same - 1.0 CFM.***

The purpose of this section is to obtain the proper air flow for the particle counter connected to it.

Adjustment Procedure

WARNING: ***Sample gas pressure should not exceed 150 psi. Failure to heed this warning may result in personal injury or damage to the instrument.***

1. Make sure the Flow Control adjustment knob is turned fully clockwise (Close).
2. Turn on sample gas supply. Make sure the pressure to the HPC1100 does not exceed 150 psi.
3. Power on the particle counter or, for non-pump REMOTEs, turn on vacuum source and power. Make sure the vacuum source for non-pump REMOTEs is a minimum 18" Hg.
4. Turn the Flow Control adjustment knob counter-clockwise until the flow meter reads 2.8 on the scale when viewed at the center of the ball. Refer to Figure 3-3 for a detailed view.

Figure 3-3 Properly Adjusted HPC

5. Start particle counting and check results for accuracy.
6. Readjustment of the Flow Control may be required when the sample gas is changed to a different gas or as the supply tank loses pressure. Otherwise, the adjustment should not require continual "tweaking".

4 Cleaning

Overview

The HPC 1100 High Pressure Controller may become contaminated with particles, especially if it is used or stored in an uncontrolled environment. If you suspect the Controller is contributing to particle counts, clean it according to the procedure below.

Cleaning the Controller

1. Turn OFF the high pressure gas supply.
2. Disconnect the HPC from the supply at GAS INLET, remove and dispose of the 1/4" VCR gasket.
3. Install the High Pressure Purge filter with new VCR gaskets between the supply line and HPC and tighten the connections finger tight plus 1/8-turn.
4. Turn the gas supply ON and allow the particle counter to run for at least fifteen (15) minutes. The counter should count no particles within this time frame.
    - If zero particles are counted immediately, the problem exists outside of the HPC system. The gas supply and lines may be contaminated.
    - If it takes a few minutes to achieve a zero count, the HPC, particle counter or both may have been contaminated and are cleaned up.
5. If the system still fails at high counts, contact Lighthouse Technical Support.
6. If a successful zero count has been accomplished, turn OFF the supply, remove the purge filter and reattach the supply line using a new VCR gasket.
7. Tighten finger tight plus 1/8-turn.

A Limited Warranty

Limitation Of Warranties:

A. Lighthouse Worldwide Solutions (LWS) warrants that all equipment shall be free from defects in material and workmanship under normal use for a period of two years from date of shipment to Buyer except that LWS does not warrant that operation of the software will be completely uninterrupted or error free or that all program errors will be corrected. Buyer shall be responsible for determining that the equipment is suitable for Buyer's use and that such use complies with any applicable local, state, or federal law. Provided that Buyer notifies LWS in writing of any claimed defect in the equipment immediately upon discovery and any such equipment is returned to the original shipping point, transportation charges prepaid, within two years from date of shipment to Buyer and upon examination LWS determines to its satisfaction that such equipment is defective in material or workmanship, i.e. contains a defect arising out of the manufacture of the equipment and not a defect caused by other circumstances, including, but not limited to accident, misuse, unforeseeable use, neglect, alteration, improper installation, improper adjustment, improper repair, or improper testing, LWS shall, at its option, repair or replace the equipment, shipment to Buyer prepaid. LWS shall have reasonable time to make such repairs or to replace such equipment. Any repair or replacement of equipment shall not extend the period of warranty. If the Instrument is modified or in any way altered without the explicit written consent of LWS then the warranty is null and void. This warranty is limited to a period of two years, except as noted below, without regard to whether any claimed defects were discoverable or latent on the date of shipment. The length of warranty for pumps in hand held particle counters is one (1) year. Batteries and accessories with all products are warranted for one (1) year. Fuses and purge filters carry no warranty. If a third party battery is used in the product, the product warranty is null and void. If the battery is charged by a third party battery charger the battery warranty is null and void.

B. If Buyer shall fail to pay when due any portion of the purchase price or any other payment required from Buyer to LWS under this contract or otherwise, all warranties and remedies granted under this Section may, at LWS's option, be terminated.

C. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS, WARRANTIES AND COVENANTS, EXPRESS OR IMPLIED WITH RESPECT TO THE EQUIPMENT AND ANY DEFECTS THEREIN OF ANY NATURE WHATEVER, INCLUDING AND WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. LWS SHALL NOT BE LIABLE FOR and BUYER ASSUMES ALL RISK OF, ANY ADVICE OR FAILURE TO PROVIDE ADVICE BY LWS TO BUYER REGARDING THE EQUIPMENT OR BUYERS USE OF THE SAME. UNDER NO CIRCUMSTANCES SHALL LWS BE LIABLE TO BUYER UNDER ANY TORT, NEGLIGENCE, STRICT LIABILITY, OR PRODUCT LIABILITY CLAIM AND BUYER AGREES TO WAIVE SUCH CLAIMS. LWS's SOLE AND EXCLUSIVE LIABILITY AND BUYERS SOLE AND EXCLUSIVE REMEDY, FOR ANY NONCONFORMITY OR DEFECT IN THE PRODUCTS OR ANYTHING DONE IN CONNECTION WITH THIS CONTRACT, IN TORT, (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, SHALL BE AS SET FORTH IN THE SUBSECTION A HEREOF AS LIMITED BY SUBSECTION B HEREOF. THIS EXCLUSIVE REMEDY SHALL NOT HAVE FAILED OF ITS ESSENTIAL PURPOSE (AS THAT TERM IS USED IN THE UNIFORM COMMERCIAL CODE) PROVIDED THAT THE SELLER REMAINS WILLING TO REPAIR OR REPLACE DEFECTIVE EQUIPMENT (AS DEFINED IN SUBSECTION A) WITH A COMMERCIALLY REASONABLE TIME AFTER RECEIVING SUCH EQUIPMENT. BUYER SPECIFICALLY ACKNOWLEDGES THAT SELLER'S PRICE FOR THE EQUIPMENT IS BASED UPON THE LIMITATIONS OF LWS'S LIABILITY AS SET FORTH IN THIS CONTRACT.

Warranty Of Repairs After Initial Two (2) Year Warranty:

A. Upon expiration of the initial two-year warranty, all parts and repairs completed by an authorized Lighthouse repair technician are subject to a six (6) month warranty.

B. Other than the above, LWS makes no warranty of any kind, expressed or implied, except that the products manufactured and sold by LWS shall be free from defects in materials and workmanship and shall conform to LWS's specifications; Buyer assumes all risk and liability resulting from use of the products whether used singly or in combination with other products. If instrument is modified or in any way altered without the explicit written consent of LWS, then the warranty is null and void.

C. WARRANTY REPAIRS SHALL BE COMPLETED AT THE FACTORY, BY AN AUTHORIZED SERVICE LOCATION, BY AN AUTHORIZED SERVICE TECHNICIAN, OR ON SITE AT BUYER'S FACILITY BY A LIGHTHOUSE AUTHORIZED EMPLOYEE. BUYER PAYS FREIGHT TO FACTORY; SELLER WILL PAY STANDARD RETURN FREIGHT DURING THE WARRANTY PERIOD. BUYER MAY SELECT A FASTER METHOD OF SHIPMENT AT ITS OWN EXPENSE.

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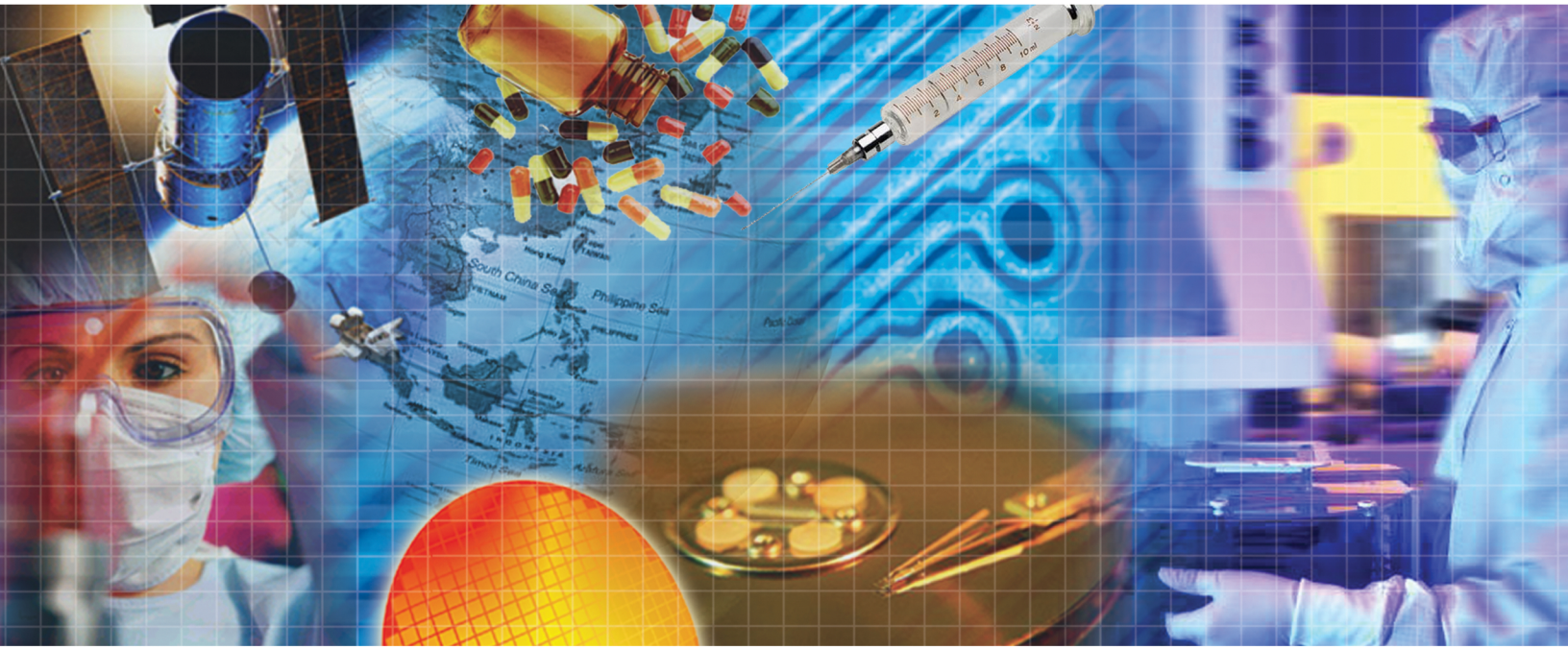

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