TELEDYNE LEEMAN LABS
Everywhereyoulook™

# Hydra II$_{AA}$ Mercury Analyzer Pre-Installation Guide

Part Number: 150-00316

Rev: H, May - 2015

## Updated Information

The information contained in this document is subject to change without notice.

## Trademarks

**The companies indicated own the following trademarks:**

None

All other brands or product names are trademarks or registered trademarks of their respective owners.

**Teledyne Leeman Labs**

110 Lowell Road

Hudson, NH 03051 U.S.A

www.teledyneleemanlabs.com

**Sales Support:** 800-634-9942

**Technical Support:** 800-533-6267

**Main:** 603-886-8400

**Fax:** 603-886-4322

# Hydra $II_{AA}$ Mercury Analyzer Pre-Installation Guide

## 1.1 Introduction

Thank you, for purchasing a Teledyne Leeman Lab's Hydra $II_{AA}$ CVAA mercury analyzer. The purpose of this guide is to assist new users in the preparation of their laboratory prior to the installation of the Hydra $II_{AA}$ mercury analyzer. If there is any doubt about the information provided, please contact your local Service Representative or Teledyne Leeman Labs using information in Section 1.13 "Contact Information".

In preparation for the installation of your analyzer, please review this pre-installation guide to ensure that your laboratory is prepared. After the installation, please retain a copy of this guide for your records.

## 1.2 Receiving the Instrument

**If your analyzer will be installed by a Teledyne Leeman Lab's Service Engineer, please do not unpack any boxes without consulting the Teledyne Leeman Lab's Customer Support Department** (see Section 1.13 "Contact Information" if necessary).

The Service Engineer will be responsible for reviewing the shipment against the packing list. The Service Engineer cannot be responsible for this task, nor can Leeman Labs be responsible for any missing items, if boxes have been opened or removed before the arrival of the installation engineer.

The Service Engineer is a skilled professional who will install your equipment, verify that it is operating to specifications, and train your personnel in its basic operation. Your preparation enables you to use his/her visit to the best advantage.

**NOTE**

The connection of the Hydra $II_{AA}$ mercury analyzer to your company's internal communication network/server is not part of the normal installation process and is best left to a trained Information Technology (IT) professional.

## 1.3 Pre-Installation Requirements

This section summarizes the site requirements necessary for proper installation of the Hydra $II_{AA}$ mercury analyzer. Specific details of these requirements are included in the sections which follow.

**Table 1-1 Hydra $II_{AA}$ Site Requirements**

| | |
|---|---|
| **Dimensions** | |
| Width (Base) | 49.5 cm (19.5 in) |
| Depth (Base) | 49.5 cm (19.5 in) |
| Height[a] | 47 cm (19 in) |
| Weight | 18.4 Kg (40.6 lbs) |
| **Electrical Requirements** | |
| Four Grounded Electrical Outlets | 110V, 15A, 60Hz or<br>220V, 10A, 50Hz |
| **Gas Supply** | |
| Type | Argon or Nitrogen |
| Purity | 99.999% |
| Inert Gas Regulator | Two-Stage |
| Recommended Pressure Range | 0-345 kPa (0-50 psi) |
| Max Distance to Instrument | 3 m (10 ft) |
| Connection size | 6.35 mm (1/4 in) OD<br>3.18 mm (1/8 in) ID |

| | |
|---|---|
| **Ventilation** | |
| Rate | 11.8 L/sec (25 CFM) |
| Connection | 6.35 mm (1/4 in) OD<br>Urethane Tubing |
| **Waste/Drain** | |
| Waste Respectable | 2 L or more of acidic waste |
| **Environmental Conditions** | |
| Temperature | 15 - 30 °C (60 - 86 °F) |
| Max Temperature Variation | 2 °C/hr (3.6 °F/hr)<br>10 °C/day (18 °F/day) |
| Relative Humidity | 20 - 80% (non-condensing) |

a. Requires an additional 17 cm (6.5 in) to allow the door to sit in the open position.

## 1.4 Hardware/Software Requirements

**NOTE**

Skip this section if your Teledyne Leeman Lab's Hydra $II_{AA}$ mercury analysis system was purchased with a PC from Teledyne Leeman Labs.

**Table 1-2 Minimum PC Hardware/Software Requirements**

| | |
|---|---|
| **Operating System** | Microsoft® Windows® 7 (32 and 64 bit) and 8.1 (64 bit) |
| **Random Access Memory (RAM)** | 2 GB |
| **Processor** | Pentium Dual Core 2.3 GHz |
| **Networking Communication Ports** | One standard factory installed Ethernet connection, if a network connection is desired. |
| | One available USB port |
| **Additional Hardware** | CD-ROM drive |
| | Printer with Windows® compatible print driver |
| | PS/2 or Bus Mouse |
| **Internet Browser** | Microsoft® Internet Explorer® 4 or higher must be installed for the software Help to function |

## 1.5 Choosing a Location

**NOTE**

Always position the equipment so that it is easy to disconnect the power cord.

The typical Hydra $II_{AA}$ mercury analyzer system includes the mercury analyzer, autosampler, PC (standard desk top mini tower) with monitor, reagent and rinse bottles, and possibly a printer located next to the instrument. The system with a PC, monitor and reagent bottles requires a minimum linear bench space of 120 cm (48 in).

Approximate spacial requirements for each component/configuration are shown in Table 1-3 "Hydra $II_{AA}$ Spacial Requirements". Combine widths to estimate the total linear bench space required for your system configuration.

**NOTE**

Allow an additional 5 cm (2 in) behind the system for cable egress, ventilation, and access to power switches.

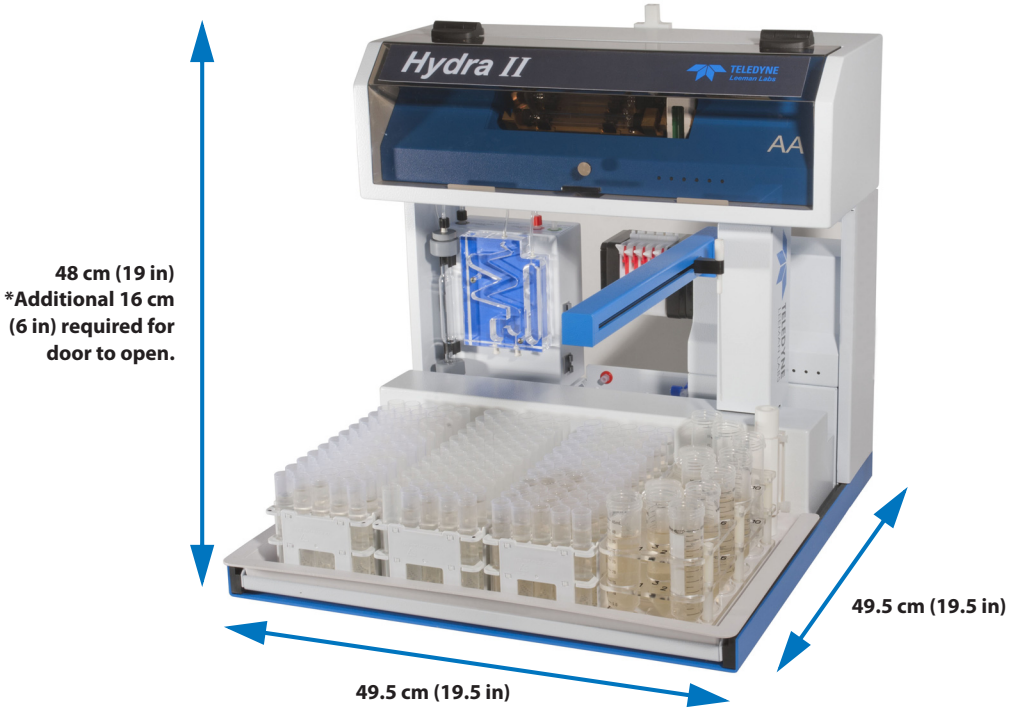
| Table 1-3 Hydra $II_{AA}$ Spacial Requirements[a] | | |
|---|---|---|
| **Configuration** | **Hydra $II_{AA}$** | **PC** |
| **Width** | 49.5 cm (19.5 in) | 92 cm (36 in)[b] |
| **Depth** | 49.5 cm (19.5 in) | 44 cm (17 in) |
| **Height (Unobstructed Space Above)** | 64 cm (25 in)[c] | 41 cm(16 in) |

a. 30 cm x 30 cm (1 $ft^2$) of floor space is required for the liquid waste receptacle. The waste receptacle can be located directly below the analyzer or directly in front of the lab bench (in line with the analyzer's peristaltic pump).

b. PC width requirement can be reduced to 51 cm (20 in) by placing the mini tower of the pc behind the monitor.

c. Includes an additional 16 cm (6 in) to allow the door to sit in the open position.

*Figure 1-1 Dimensions of the Hydra $II_{AA}$*




### 1.5.1 Work Surface Requirements

The analyzer must be placed on a sturdy countertop or table.

**NOTE**

Do not place the analyzer on a wheeled cart or folding table.

The work surface should be at least 61 cm (24 in) deep.

## 1.6 Electrical Requirements

**NOTE**

Do not apply power to the power supply until ready to operate the analyzer.

Four electrical outlets @110 VAC ±10%, 50/60Hz, 15A, or four electrical outlets @240 VAC ±10%, 50/60Hz are required, one each for the analyzer, computer, monitor, and printer.

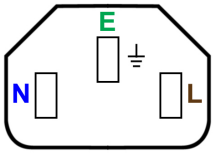
**NOTE**

An AC surge protected power strip with six outlets is strongly recommended.

The analyzer is provided with a 2.29 m (7.5 ft) power cord with a NEMA 5-15P male connector and an IEC 320 C13 female connector as shown in Figure 1-2 "NEMA 5-15P Plug and IEC 320 C13 Receptacle".

*Figure 1-2 NEMA 5-15P Plug and IEC 320 C13 Receptacle*

NEMA 5-15P




IEC 320 C13

For locations outside of North America where this NEMA 5-15P male connector is not common or desired, the power cord can be replaced or the plug (male connector) may be replaced with a suitable connector. Wiring connections should be made as denoted in Figure 1-2 and Table 1-4 "IEC 320 C13 Wiring Connections".

**Table 1-4 IEC 320 C13 Wiring Connections**

| | |
|---|---|
| **N** | Neutral - Blue wire |
| **E** | Earth Ground - Green wire with yellow strip |
| **L** | Line - Brown wire |

The Hydra $II_{AA}$ mercury analyzer uses a power brick that accepts AC input from 100-240 VAC ±10%, 50/60Hz. The specifications are shown in Table 1-5 "Voltage and Power Requirements".

**Table 1-5 Voltage and Power Requirements**

| | **Hydra $II_{AA}$ Mercury Analyzer** |
|---|---|
| **AC Input** | 1.4A @ 120 VAC ±10%<br>0.7A @ 240 VAC ±10%<br>50/60 Hz |
| **DC Output** | 15 VDC |

**WARNING**

**This equipment is designed for connection to a grounded (earthed) outlet. The grounding type plug is an important safety feature. For continued protection against electrical shock or damage to the instrument, do not disable this feature.**

The power requirements for the computer can be found on the label affixed to the bottom of the computer, or in the computer user's manual.

## 1.7 Gas Supply Requirements

A source of ultra-high purity, dry research-grade $N_2$ or 99.999% purity Argon.

The recommended gas regulator must be an inert two-stage design and provide 0-345 kPa (0-50 psi). Teledyne Leeman Labs recommends PN 115-00032. The cylinder or dewar must be capable of delivering 172 kPa (25 psi). The gas connection must be located within 3 m (10 feet) of the Hydra $II_{AA}$ and must accept 6.35 mm (1/4 in) OD, 3.18 mm(1/8 in) ID urethane tubing.

**NOTE**

An inert two-stage regulator is required to provide a stable input pressure.

## 1.8 Ventilation Requirements

**NOTE**

Ventilation is recommended but not required if the analyzer is equipped with an optional mercury trap to collect trace elemental mercury from system exhaust gases.

If connecting to a ventilation system, the system must provide at least 11.8 L/sec (25 CFM). Ventilation should allow for connection of 6.35 mm(1/4 in) OD urethane tubing. The exhaust line may be clipped into existing hood.

## 1.9 Environmental Conditions

### 1.9.1 Temperature

The recommended nominal or average laboratory temperature is 15-30° C (60-86° F).

### 1.9.2 Temperature Variation

The temperature rate of change in the laboratory should be limited to 2° C (3.6° F) per hour with a maximum daily change of 10° C (18° F). This temperature variation allows for the most stable operation of the instrument. Greater temperature variations will affect instrument stability.

Causes of temperature shifts including heat adjustments to the laboratory from morning to night, increase in room temperature due to direct sunlight, automatic air conditioner adjustments as well as positioning the analyzer near or beneath a heating/cooling vent should be avoided.

**NOTE**

Protection (such as blinds) from direct sunlight via windows is necessary due to optical heating from direct sunlight.

### 1.9.3 Relative Humidity

Humidity plus heat plays a major role in operating stability. Humidity may vary between 20 and 80%, but must be a non-condensing environment.

The laboratory humidity range should be monitored to determine if additional climate controls are needed to prevent conductivity changes on detector assemblies.

## 1.10 Necessary Supplies

- UHP Nitrogen or Argon (Cylinder or Dewar)

  Ultra-high purity, dry research-grade $N_2$ or 99.999% purity Argon

- Inert Gas Regulator

  Inert 2-stage, 0-345 kPa (recommended range 0-50 psi) secondary pressure gauge (PN 115-00032), with a coupling for either a cylinder or dewar capable of delivering 172 kPa (25 psi)

**NOTE**

The Hydra $II_{AA}$ should be located within 3 m (10 ft) of the gas source.

- AC Power Strip (surge protected) with six outlets (if sufficient wall outlets are not available)
- Certified Mercury Standard Solution

  100 or 1000 ppm

- Hydrochloric acid (Minimum grade: Trace Metal specification @ 37%)

  Recommended: Mallinckrodt/Macron, 6 each - 2.5 L, AR Select, Item # 5587-46

- Nitric acid, trace metal grade (68-70%)

  Recommended: Mallinckrodt/Macron, 2.5 L, AR (ACS), Item # 2704-46

- Stannous chloride (crystals, Di-hydrate)

  Recommended: Mallinckrodt/Macron, ACS 500 g, Item # 8176-04

- Potassium permanganate; solid, crystalline suitable for mercury analysis i.e., EPA 245.1

  Recommended: j.t baker 500 g bottle, Item # 3227-1

- Vapor Trap System (PN 125-00143-1)

  The vapor trap system is designed to capture mercury vapor from the instrument exhaust. The system includes activated charcoal, flow through bottle, quartz wool, and tubing assemblies to connect to the instrument and external exhaust.

- 2-Propanol. High-purity, “spectrophotometric” grade

  2-propanol will be used for cleaning the optical cells and cell windows

- Additional Chemical Compounds

**NOTE**

The sample preparation procedures of the intended analytical method may require additional chemical compounds. Refer to published method specifications.

## 1.11 Recommended Supplies

- Volumetric Flasks 100 mL class A (TC) 12 each
- Volumetric Flasks 1000 mL class A (TC) 2 each
- Volumetric Flasks 2000 mL class A (TC) 1 each
- Precision adjustable air displacement pipettes, 10 to 100 µl (TD), 200 to 1000 µl (TD), 400 to 2000 µl (TD), 1000 to 5000 µl (TD), 2000 to 10000 µl (TD)
- Replacement Tips for micropipettes
- Disposable Plastic Pipette Droppers
- Graduated Cylinders, 10 and 100 mL
- Kimwipes®
- Polypropylene or Polyethylene Bottle with Cap, 1 L
- Weighing Balance, top loading (0.1 g - readability or better, capacity > 200 g)
- Laboratory Scoopula and Large Spatula
- Stopwatch (for measuring liquid uptake rates)
- Stirring Rod
- Powder Funnel, wide-bore stem, small overall size
- Wrenches, adjustable 12 in, 6 in and 4 in
- Screw Drivers:
  - 1 Small Phillips-Head
  - 1 Medium Phillips-Head
  - 1 Long-Shank Medium Flat-Head
  - 1 Small Thin Flat-Head
- Flow Meter, 0-1500 mL/min calibrated to user's choice of carrier gas with 1 mL readability. Used to confirm gas flows for troubleshooting gas leaks after optical cell maintenance.
- Deionized Water

## 1.12 Preparedness Statement

Failure to meet one or more of the pre-installation requirements may prevent your instrument from operating properly. During installation, if an installation engineer determines that one or more of the pre-installation requirements have not been met, the company reserves the right to delay installation until all requirements are satisfactorily met. Any time lost during installation, caused by failure to meet the pre-installation requirements, will be billed to your account. If you have any questions regarding these requirements, please contact Teledyne Leeman Labs using Section 1.13 "Contact Information".

## 1.13 Contact Information

Teledyne Leeman Labs encourages you to contact us for any questions or concerns regarding your installation, or to order accessories and consumables. Please use the appropriate means of contact listed below for the most efficient service.

### 1.13.1 Teledyne Leeman Labs

**110 Lowell Road**

**Hudson, NH 03051 U.S.A**

**Main: 603-886-8400**

**Fax: 603-886-4322**

**www.teledyneleemanlabs.com**

### 1.13.2 Sales

US and International: +1 800-634-9942 or +1 603-886-8400

US and International Fax: +1 603-886-4322

E-mail: salesinfo@teledyne.com

**Visit our website at www.teledyneleemanlabs.com for a complete list of US and International Sales Representatives.**

### 1.13.3 Technical Support

US: +1 800-533-6267 (1-800-Leemans)

International: +1 603-886-8400

E-mail: service@teledyne.com

### 1.13.4 Replacement Parts and Consumables

US and International: +1 800-533-6267

E-mail: service@teledyne.com

## 1.14 Your Installation is Our Highest Priority

Streamlining the installation of your new Hydra $II_{AA}$ mercury analyzer system is our highest priority! Teledyne Leeman Labs would like to thank you in advance for the preparation of your laboratory. Your attention to detail will assist in the installation of your new instrument. If you have any questions or concerns we encourage you to contact us directly:

**Jeff Forsberg**
**Teledyne Leeman Labs**
**Mercury Product Manager**
**jeff.forsberg@teledyne.com**
**(402) 733-2829**

**Bob McCarthy**
**Teledyne Leeman Labs**
**Director Customer Support**
**bob.mccarthy@teledyne.com**
**(603) 521-3267**