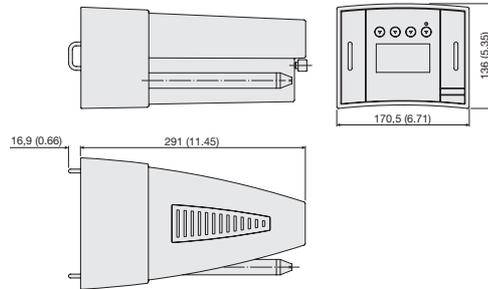


AGILENT LEAK DETECTION INSTRUMENTS

► Agilent PHD-4



Dimensions: millimeters (inches)

The PHD-4 is a portable, compact leak detector that runs on its own battery for up to four hours. Weighing only 2.6 kg (5.7 lbs) including the battery, it can be taken anywhere. The PHD-4 detects very small leaks in objects that have a slight helium/air pressure inside. It is sensitive to helium concentrations as small as 2 parts per million which equivalent to a leak rate of 5×10^{-6} atm-cc/sec. This level of sensitivity is far superior to the performance of other means of detecting leaks such as bubble testing. To accomplish this it relies on Agilent's proprietary and patented Selective Ion Pump Detection (SIPD) technology.

Controlled by a microprocessor, the PHD-4 is easy to use with no training required. All tuning and zeroing are handled automatically. The display can be set to use any of four languages – English, French, German, and Italian.

The basic PHD-4 package includes:

- PHD-4 basic module
- Transformer/battery charger (115 V-240 V)
- Carrying strap
- 15-pin I/O connector
- Instruction manual on CD-ROM

The complete PHD-4 package includes everything in the basic package plus:

- Spare battery
- Travel case
- Probe set

The PHD-4 replacement kit includes:

- Sampling pump with fittings
- Probe with sampling line
- Probe tip filter
- Internal filter kit (5 units)

Technical Specifications

Lowest detectable helium concentration	2 ppm (parts per million)		
Lowest detectable helium leak	5×10^{-6} mbar l/s	5×10^{-6} atm cc/s	5×10^{-7} Pa m ³ /s
Response time	< 2 sec		
Recovery time	<10 sec (from 50 ppm to 0 ppm)		
Start up time, including self check-up	3 min approx.		
Electrical supply	<ul style="list-style-type: none"> • Rechargeable battery included • Power supply included 110-240 V 50-60 Hz 		
Battery operation time	4 hours		
Maximum signal drift	10 ppm/10 min		
Operating conditions	Temperature: +5 °C to +35 °C Humidity: 90% maximum relative humidity		
Storage conditions	Temperature: -20 °C to +60 °C Weight: 2,6 kg (5.7 lbs)		
Compliance to norms	CE, CSA/US approved		

LEAK DETECTION

Ordering Information

PHD-4 Complete Package	Part Number
Travel Case includes	9694640
• PHD-4 basic unit	
• Spare battery	
• Transformer/Battery charger (110-240 V)	
• Carrying strap	
• Probe set	
• 15-pin I/O connector	
• CD Instruction manual	
PHD-4 Basic Package	Part Number
Includes	9694600
• PHD-4 basic unit	
• Transformer/Battery charger (110-240 V)	
• Carrying strap	
• 15-pin I/O connector	
• CD Instruction manual	
PHD-4 Replacement Part Kit	Part Number
Includes	9694660
• Sampling pump with fittings	
• Probe with sampling line	
• Tip probe filter	
• Internal filter (kit of 5 units)	

Accessories	Part Number
• Probe set	9693515
• Capillary leak with refillable reservoir and gauge	9693540
• Probe with 10 meter (30') maximum sampling line	9693525
• Telescoping extension probe	9693520
Individual Replacement Parts	Part Number
• Spare battery	SR03702609
• Power supply (110-240 V)	SR03702888
• Sampling pump with fittings	SR03702513
• Probe with sampling line	SR03702538
• Tip probe filter	SR2890001201
• Internal filter (kit of 5 units)	SR03702959
• Carrying strap	SR03702791
• 15-pin I/O connector	SR03702894
• Travel Case (metal)	SR03702890
• Protective Bag (canvas)	VSPHD4BAG

Contact Agilent for Rack mounting or specific application requirements.

PHD-4 FEATURES AND BENEFITS



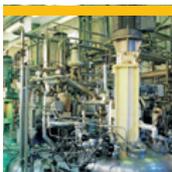
High Sensitivity to Helium – Can detect very small leaks

- High Sensitivity (2 ppm) to helium, three orders of magnitude better than industry standard, due to SIPD (proprietary and patented Selective Ion Pump Detection)
- Excellent selectivity for helium allows you to read helium leaks and ignore all other gases
- Helium sensitivity can be adjusted as required to minimize test costs and helium consumption
- Autozero function allows leak detection even in high helium background environment



Easy to Use – No training required

- State-of-the-art microprocessor control allows great simplicity of operation
- Fully automatic start-up
- Ready for test in less than 3 minutes
- Intuitive touch screen display
- Visual and audio indicators (standard headphone connection)
- No tuning required



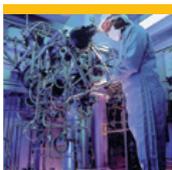
Truly Portable – Compact and light

- The PHD-4 weighs only 2.6 kg (5.7 lbs) including the battery
- Its compact size allows it to be easily carried anywhere
- Its ergonomic design allows comfortable use for extended periods



Versatile – Suitable for many different applications

- Wide range of uses: replaces or can be used with existing methods such as bubble test or pressure decay
- Able to detect both very small and large leaks
- Can operate either on battery power or connected to an outlet
- Displayed messages can be viewed in several languages (English, French, German, Italian).
- Standard Analog and RS232 Serial output.



Dependable – Long term operation

- Automatic backflow valve prevents helium saturation ensuring fast response times, as well as long life of sensing element.
- CE, CSA/US approved for global standardization.

PHD-4 APPLICATIONS

LEAK DETECTION



Large Vessels and Bioreactors

The PHD-4 offers unmatched accuracy and repeatability, presenting a unique solution that it is cost effective and very well suited for the leak range specifications of this application. Biotech and pharmaceutical industries used to rely on pressure decay and bubble test methods for finding leaks in their large bioreactors. The PHD-4 has established a new standard of quality, significantly increasing production yields.

- Fermenters
- Sterilizers
- Freeze Dryers



Underground Pipes and Storage Tanks

The portability and light weight of the PHD-4 plays a major role in this application. Underground pipes and storage tanks (UST) are slightly pressurized with helium which, due to its high mobility, can escape through small leaks and migrate to the surface, where it can be easily detected by the PHD-4.

The accuracy, portability and light weight of this unit greatly simplifies this process, particularly in difficult construction sites or rough terrain.

- Gas distribution lines
- Under and above ground containers and storage tanks
- Telecommunication and high voltage underground cables



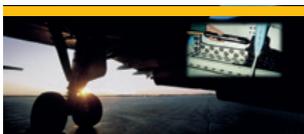
Courtesy of Fraunhofer UMSICHT, Germany

Water Heating and Cooling Pipes

The PHD-4 allows leak location without interruption of the normal operation, by mixing helium with the water in the circuit. Until recently, the precise and rapid location of leaks in buried pipes has been very difficult.

In the event of a leak, helium desorbs from the fluid and diffuses to the surface, where it is easily detected. Leaks in pipeline systems such as district heating systems, drinking or chilled water systems and steam pipe networks incur high costs due to losses and corrosion damage.

- Heater exchangers and steam condensation lines
- Water pipes
- Radiant heating systems

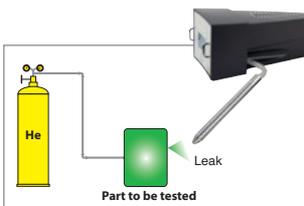


Airplane Fuel Tanks and Lines

PHD-4 technology is approved worldwide by airplane manufacturers and operators as the standard for the location of leaks in aircraft fuel tanks and in oxygen distribution lines.

Agilent works with an exclusive distributor for aircraft applications. Please contact your local Agilent office for more information.

- Fuel tanks
- Oxygen distribution lines



Other Applications

The PHD-4 is in daily use in many other applications. Its portability makes it ideal for factory and field maintenance. Here is a partial list of other applications:

- Components and systems for the Chemical and Petrochemical Industries
- Compressed air components and delivery systems
- Process gas delivery lines in Semiconductor fabrication industry