

HeliTest Wing Kit

Complete package	969-4005
Base Unit	969-4006
Safety Probe	969-4007

MANUALE ISTRUZIONI

BEDIENUNGSHANDBUCH

NOTICE DE MODE D'EMPLOI

INSTRUCTION MANUAL

HeliTest Wing Kit



VARIAN



vacuum technologies

Dear Customer,

Thank you for purchasing a VARIAN vacuum product. At VARIAN Vacuum Technologies we make every effort to ensure that you will be satisfied with the product and/or service you have purchased.

As part of our Continuous Improvement effort, we ask that you report to us any problem you may have had with the purchase or operation of our product. On the back side you find a Corrective Action Request form that you may fill out in the first part and return to us.

This form is intended to supplement normal lines of communications and to resolve problems that existing systems are not addressing in an adequate or timely manner.

Upon receipt of your Corrective Action Request we will determine the Root Cause of the problem and take the necessary actions to eliminate it. You will be contacted by one of our employees who will review the problem with you and update you, with the second part of the same form, on our actions.

Your business is very important to us. Please, take the time and let us know how we can improve.

Sincerely,

Sergio PIRAS

*Vice President and General Manager
VARIAN Vacuum Technologies*

Note: Fax or mail the Customer Request for Action (see backside page) to VARIAN Vacuum Technologies (Torino) - Quality Assurance or to your nearest VARIAN representative for onward transmission to the same address.

CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO : VARIAN VACUUM TECHNOLOGIES TORINO - QUALITY ASSURANCE

FAX N° : XXXX - 011 - 9979350

ADDRESS: VARIAN S.p.A. - Via F.lli Varian, 54 - 10040 Leinì (Torino) - Italy

E-MAIL : marco.marzio@varianinc.com

NAME _____	COMPANY _____	FUNCTION _____
<p>ADDRESS : _____</p> <p>TEL. N° : _____ FAX N° : _____</p> <p>E-MAIL : _____</p>		
<p>PROBLEM / SUGGESTION :</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>		
<p>REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.) :</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">DATE _____</p>		

<p>CORRECTIVE ACTION PLAN / ACTUATION (by VARIAN VTT)</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>LOG N° _____</p>
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XXXX = Code for dialing Italy from your country (es. 01139 from USA; 00139 from Japan, etc.)



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INFORMAZIONI GENERALI

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Varian prima dell'utilizzo dell'apparecchiatura. La Varian si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche.

Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante L'utilizzo dell'apparecchiatura. Informazioni dettagliate sono fornite nell'appendice "Technical Information".

Questo manuale utilizza le seguenti convenzioni:



PERICOLO!

I messaggi di pericolo attirano l'attenzione dell'operatore su una procedura o una pratica specifica che, se non eseguita in modo corretto, potrebbe provocare gravi lesioni personali.



ATTENZIONE!

I messaggi di attenzione sono visualizzati prima di procedure che, se non osservate, potrebbero causare danni all'apparecchiatura.

NOTA

Le note contengono informazioni importanti estrapolate dal testo.

IMMAGAZZINAMENTO

Durante il trasporto e l'immagazzinamento degli strumenti, devono essere soddisfatte le seguenti condizioni ambientali:

- temperatura: da -20 °C a +70 °C
- umidità relativa: 0 - 95% (non condensante)

PREPARAZIONE PER L'INSTALLAZIONE

L'HeliTest WING trova posto in una valigia, se si nota la presenza di segni o danni, che potrebbero essersi verificati durante il trasporto, contattare l'ufficio vendite locale.

Durante l'operazione di disimballaggio, prestare particolare attenzione a non lasciar cedere gli strumenti e a non sottoporli ad urti.

Non disperdere l'imballo nell'ambiente. Il materiale è completamente riciclabile e risponde alla direttiva CEE 85/399 per la tutela dell'ambiente.

INSTALLAZIONE ED USO**PERICOLO!**

Il Kit è fornito di caricabatterie e cavi di alimentazione a tre fili con una spina di tipo approvato a livello internazionale. Utilizzare sempre questi cavi di alimentazione ed inserire la spina in una presa con un adeguato collegamento di massa onde evitare scariche elettriche. All'interno degli strumenti si sviluppano alte tensioni che possono recare gravi danni o la morte.

**PERICOLO!**

Il Safety Probe (969-4007) è certificato Intrinsically Safe in accordo con lo standard EEx ia IIA T4. È possibile utilizzare questo dispositivo in tutti gli ambienti a rischio di esplosione previsti da questo standard.

L'HeliTest Wing Base Unit (969-4006) deve tassativamente essere posizionato fuori da zone a rischio di esplosione.

È vietato l'uso del dispositivo in miniera od in impianti sotterranei. Un uso in ambienti non previsti dallo standard potrebbe recare gravi danni a persone o cose.

Durante il funzionamento è necessario che siano rispettate le seguenti condizioni ambientali:

- temperatura: da -5 °C a +40 °C;
- umidità relativa: 0 - 95% (non condensante).

**PERICOLO!**

L'HeliTest WING è provvisto di una batteria ricaricabile e del relativo caricabatterie. Eseguire l'operazione di ricarica in zona sicura. La procedura di ricarica in zona non sicura potrebbe recare gravi danni a persone o cose.

**PERICOLO!**

Se si utilizza l'HeliTest WING in ambienti non sicuri, è indispensabile l'utilizzo del Visual probe opportunamente connesso a massa e del posizionamento dell'unità di rilevamento in zona sicura.

MANUTENZIONE

L'HeliTest WING richiede solo la manutenzione di filtri del probe standard e del visual probe. Qualsiasi altro intervento deve essere eseguito da personale autorizzato.

**PERICOLO!**

Ogni intervento non autorizzato sul dispositivo potrebbe recare gravi danni a persone o cose.

In caso di guasto è possibile usufruire del servizio di riparazione Varian o del "Varian advanced exchange service", che permette di ottenere un dispositivo rigenerato in sostituzione di quello guasto.

Qualora un dispositivo, o parte di esso, dovesse essere rottamato, procedere alla sua eliminazione nel rispetto delle normative nazionali specifiche.

ALLGEMEINE INFORMATIONEN

Die Geräte sind für Verwendung durch Experten vorgesehen. Der Anwender ist gehalten, diese Anweisungen und alle sonstigen von Varian gelieferten Informationen zu lesen, bevor er die Apparatur in Betrieb nimmt. Varian übernimmt keine Verantwortung für irgendwelche Folgen, die sich aus - auch nur teilweiser - Mißachtung dieser Anweisungen, falscher Benutzung durch Personen ohne entsprechende Ausbildung, unerlaubtes Manipulieren an der Apparatur oder irgendwelcher anderer Verletzungen der besonderen nationalen Vorschriften ergeben.

Die folgenden Abschnitte enthalten alle Informationen, die für die Sicherheit des Anwenders beim Betrieb von Bedeutung sind. Die darauf folgenden Kapitel liefern detaillierte Informationen.

In diesem Handbuch werden die folgenden Konventionen verwendet:



GEFAHR!

Die Gefahr-Meldungen haben den Zweck, die Aufmerksamkeit des Anwenders auf Verfahren oder Prozeduren zu lenken, die bei falscher Ausführung zu schweren Verletzungen führen können.



WICHTIG!

Diese Meldungen werden den Prozeduren vorangestellt, die bei falscher Ausführung die Maschine beschädigen können.

HINWEIS

Die Hinweise enthalten wichtige aus dem Text hervorgehobene Informationen.

EINLAGERUNG

Bei dem Transport und der Einlagerung der Geräte müssen folgende Umgebungsbedingungen eingehalten werden:

- Temperatur: -20 °C und + 70 °C
- Rel. Luftfeuchtigkeit: 0 - 95% (nicht kond.)

INSTALLATIONSVORBEREITUNGEN

Die HeliTest Wing Produkte werden in einem oder mehreren Transportkästen aufgehoben, je nachdem welche Konfiguration und welche Optionen der Kunde bestellt hat. Falls Sie irgendwelche Schäden entdecken, die beim Transport entstanden sein könnten, benachrichtigen Sie sofort Ihr lokales Verkaufsbüro.

Beim Auspacken sorgfältig darauf achten, dass die Geräte nicht herunterfallen oder gegen irgendetwas stoßen.

Das Verpackungsmaterial entsprechend den Vorschriften entsorgen. Das Material kann zu 100% recycelt werden und entspricht den EWG Normen der Richtlinie 85/399.

INSTALLATION UND BENUTZUNG



GEFAHR!

Das Kit hat ein Batterieladegerät und ein dreiadriges Stromkabel mit international zugelassenem Sicherheitsstecker. Kabel und Stecker müssen an eine Steckdose mit richtiger Erdung angeschlossen werden, um elektrische Schläge zu verhindern. Die im Gerät erzeugte Hochspannung kann schwere Verletzungen verursachen oder zum Tode führen.



GEFAHR!

Safety Probe (969-4007) ist in Übereinstimmung mit der Norm EEx ia IIA T4 als eigengesichert zertifiziert. Es kann in allen nach dieser Norm als explosionsgefährdet definierten Umgebungen benutzt werden.

Die HeliTest Wing Base Unit (969-4006) muss unbedingt außerhalb explosionsgefährdeter Bereiche positioniert werden.

Dies Gerät darf nicht in Bergwerken oder unter der Erde benutzt werden. Die Verwendung dieses Geräts in Umgebungen, die nicht den Normen entsprechen kann schwere Verletzungen oder Schäden am Gerät verursachen.

Beim Betrieb müssen folgende Umgebungsbedingungen eingehalten werden:

- Temperatur: -5 °C und + 40 °C
- rel. Luftfeuchtigkeit: 0 - 95% (nicht kond.)



GEFAHR!

HeliTest WING wird mit einer wiederaufladbaren Batterie und entsprechendem Ladegerät geliefert. Die Batterie nur in sicheren Zonen wiederaufladen. Aufladen in unsicheren Zonen kann zu Verletzungen und Sachschäden führen.



GEFAHR!

Bei Benutzen des HeliTest WING in unsicheren Umgebungen muss der visuelle Sensor benutzt werden, der richtig geerdet sein muss. Die Aufnahmeeinheit muss auch in einem unsicheren Bereich plaziert sein.

WARTUNG

Die einzigen Wartungsarbeiten für HeliTest WING sind der Wechsel der Filter für den Standard- und den visuellen Filter. Alle anderen Eingriffe dürfen nur von autorisiertem Personal durchgeführt werden.



GEFAHR!

Jeder Eingriff durch nicht autorisierte Personen kann zu schweren Verletzungen und Sachschäden führen.

Bei Defekten kann man sich Varians Reparaturservice oder "Varian Advanced Exchange Service" bedienen, die das defekte Gerät gegen ein generalüberholtes austauschen.

Wenn ein Gerät oder ein Teil davon verschrottet werden soll, muß dies nach den nationalen Vorschriften geschehen.

INFORMATIONS GENERALES

L'utilisation de cet équipement est réservée aux professionnels. L'utilisateur doit lire ces instructions pour l'utilisation et toute autre information supplémentaire fournie par la société Varian avant d'utiliser cet équipement. La société Varian décline toute responsabilité pour des dommages provoqués par le non-respect même partiel de ces instructions, par l'utilisation impropre de la part de personnel non adéquatement formé, par des modifications non autorisées ou par toute action contraire aux dispositions des normes nationales en la matière.

Les paragraphes suivants contiennent toutes les informations nécessaires pour la sécurité de l'opérateur pendant l'utilisation de l'équipement. Des informations détaillées sont contenues dans l'annexe "Informations techniques".

Ce manuel utilise les symboles suivants:



DANGER!

Les messages de danger servent à attirer l'attention de l'opérateur sur une procédure ou une opération spécifique qui, si elle n'est pas exécutée correctement, pourrait provoquer des graves lésions.



ATTENTION!

Les messages d'attention sont placés avant les procédures dont le non-respect pourrait entraîner des dommages à l'équipement.

NOTE

Il s'agit d'informations importantes tirées du texte.

STOCKAGE

L'équipement peut être transporté et stocké dans les conditions ambiantes suivantes:

- Température: -20 °C à +70 °C
- Humidité relative: 0 à 95% (sans condensat)

PREPARATION A L'INSTALLATION

Le produit 'HeliTest Wing' est livré dans une ou dans plusieurs boîtes, en fonction de la configuration et des options choisies par l'utilisateur. Si vous détectez des dommages sur l'équipement, pouvant avoir été provoqués par le transport, adressez-vous immédiatement au distributeur le plus proche.

Lors du déballage prenez soin de ne pas le faire tomber ou de lui faire subir des chocs.

Ne pas laisser l'emballage dans la nature. L'emballage est recyclable à 100% et est conforme aux normes CEE de la directive 85/399 pour la protection de l'environnement.

INSTALLATION ET UTILISATION



DANGER!

Le kit est livré avec un chargeur de batterie et un cordon d'alimentation doté d'une fiche à trois fils, homologuée au niveau international. Utilisez toujours ce cordon et branchez-le sur une prise d'alimentation dotée de mise à la terre appropriée pour éviter toute décharge électrique. La haute tension générée à l'intérieur de l'équipement peut entraîner des graves lésions, voire la mort.



DANGER!

Le dispositif Safety Probe (969-4007) est certifié à prévention intrinsèque, conformément à la norme EEx ia IIA T4. Ce dispositif peut être utilisé dans tous les environnements où il y a un risque d'explosion comme défini dans cette norme. HeliTest Wing Base Unit (969-4006) doit être positionné hors des zones à risque d'explosion. Ce dispositif ne doit pas être utilisé dans les mines ou dans le sous-sol. L'utilisation de ce dispositif dans des environnements non conformes aux normes peut entraîner des graves atteintes à la santé ou des dommages à l'équipement.

L'équipement doit être utilisé dans les conditions ambiantes suivantes:

- Température: -5 °C à +40 °C;
- Humidité relative: 0 à 95% (sans condensats).



DANGER!

Le dispositif HeliTest WING est livré avec une batterie rechargeable et le chargeur de batterie correspondant. Recharger la batterie dans un endroit sûr. Le chargement de la batterie effectué dans un endroit dangereux peut provoquer des lésions ou des dommages à l'équipement.



DANGER!

En cas d'utilisation du dispositif HeliTest WING dans des endroits dangereux, la sonde visuelle doit être utilisée et elle doit être mise à la terre. Le détecteur doit être situé également dans une zone dangereuse.

ENTRETIEN

En ce qui concerne l'entretien le dispositif HeliTest WING ne requiert que le remplacement des filtres standard et de ceux de la sonde visuelle. Toute autre intervention doit être effectuée par du personnel autorisé.



DANGER!

Toute intervention non autorisée effectuée sur le dispositif peut provoquer des lésions graves et des dommages aux biens.

En cas de défaillance du dispositif, vous pouvez vous adresser au service après-vente de la société Varian ou au "Varian Advanced Exchange Service" qui vous fournira un dispositif remis à neuf à la place de celui défectueux.

Si vous devez éliminer le dispositif, ou un de ses éléments, procéder à l'élimination conformément aux normes nationales en vigueur en la matière.

GENERAL INFORMATION

The equipment described in this manual is intended for professional use. The user must carefully read this instruction manual and any additional information provided by Varian before using the equipment. Varian declines all responsibility for damage caused by the total or partial misuse of the instructions provided herein, by the improper use of the equipment by untrained personnel, by unauthorized interventions or by negligence in complying with any specific national rule or regulation.

The following sections provide you with all the information needed to guarantee the operator's safety when using the equipment. Detailed information is provided in the appendix entitled "Technical Information".

The following conventions are used in this manual:



DANGER!

Danger messages call the operator's attention to a specific procedure or operation that could cause serious injury if not performed correctly.



WARNING!

Warning messages are provided before procedures that could cause damage to the equipment if not complied with.

NOTE

Notes provide you with important information extracted from the text.

STORAGE

The equipment can be transported and stored under the following environmental conditions:

- Temperature: -20 °C to +70 °C
- Relative humidity: 0 to 95% (non-condensing)

PRIOR TO INSTALLATION

The HeliTest Wing products are stored in one travelling case, if you detect any damage to the equipment that could have been caused during transportation, contact your local sales office immediately.

When unpacking the equipment, be careful to avoid dropping it or knocking it against anything.

Do not dispose the packaging material in the environment. The packaging material is totally recyclable and complies with EEC directives 85/399 for the safeguard of the environment.

INSTALLATION AND USAGE



DANGER!

The kit comes with a battery charger and with three-wire power cords fitted with internationally approved plugs. Always use these power cords and insert the related plugs into appropriately grounded power outlets so as to avoid electrostatic discharges. High voltages that could cause serious injury or even death are generated inside the equipment.



DANGER!

The Safety Probe (969-4007) is certified to be intrinsically safe in compliance with the EEx ia IIA T4 standard. This device can be used in all environments where there is a risk of explosion as defined by this standard.

The HeliTest Wing Base Unit (969-4006) must be positioned outside zones with a risk of explosion.

This equipment must not be used in mines or underground environments. The use of this equipment in environments that do not comply with the standards could cause serious injury to persons or damage to the equipment.

The equipment must be used under the following environmental conditions:

- Temperature: -5 °C to +40 °C;
- Relative humidity: 0 to 95% (non-condensing).



DANGER!

The HeliTest WING comes with a rechargeable battery with related battery charger. Recharge the battery in a safe area; recharging the battery in an unsafe area could cause injury to persons or damage to objects.



DANGER!

When using the HeliTest WING in unsafe environments, the visual probe must be used and must be appropriately connected to ground. The detection unit must be placed in a safe area.

MAINTENANCE

As far as maintenance is concerned, the HeliTest WING requires only the replacement of the standard and visual probe filters. Any other intervention must be performed by authorized personnel.



DANGER!

Every unauthorized intervention on the device could cause serious injury to persons and damage to objects.

In the event of failure, it is possible to use the Varian repair service or the “Varian Advanced Exchange Service” through which you are assigned a refurbished device in replacement of the faulty one.

If a device, or a part of it, needs to be discarded, proceed to do so in compliance with the specific national standards.

OVERVIEW

HeliTest Wing is a line of sniffing leak detectors specifically designed for aeronautical applications.

The HeliTest Wing leak detectors use helium gas as a tracer gas for the detection of the source of leaks in the fuel tanks, housed principally in the wings of modern aircraft, and in the oxygen lines of commercial airliners.

Helium is a non-toxic inert gas which does not react chemically with any other element. Do to its small relative molecular mass, it has a high penetration capability allowing it to pass through the smallest gap. Helium is particularly suitable for leak detection tasks because of its low concentration in the atmosphere (five particles per million) which allows easy detection of any small increase in this proportion.

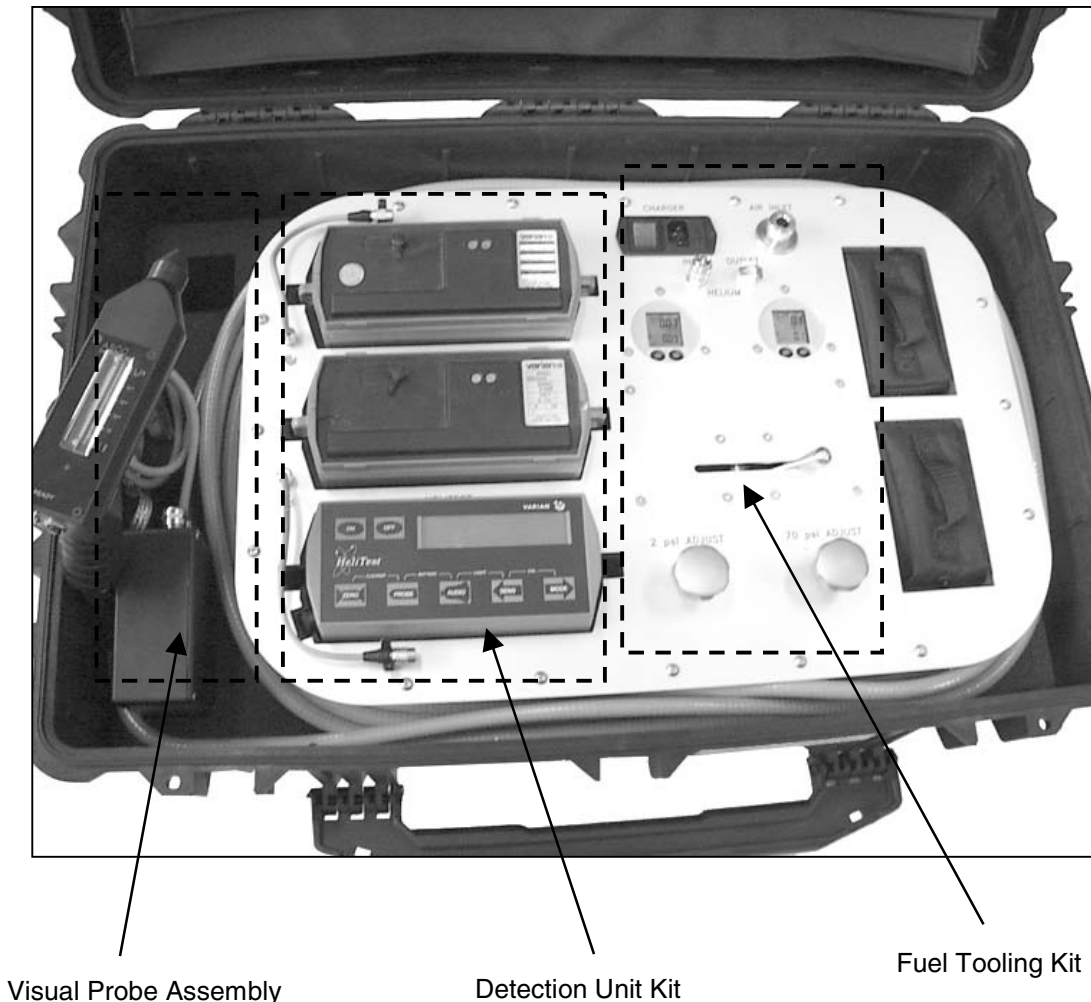
The HeliTest Wing line consists of a specifically programmed basic HeliTest detector and of a series of kits and accessories through which the HeliTest can be used for specific applications. This product line, integrated in a same travelling case, includes the following equipments :

- Detection Unit Kit
- Visual Probe Assembly
- Fuel Tooling Kit

The HeliTest Wing product line can be used to perform the following two tests:

- Fuel tank testing (internal and external)
- Leak repair checking

The following figure shows the location of the different equipments of the HeliTest Wing Detector in the travelling case.

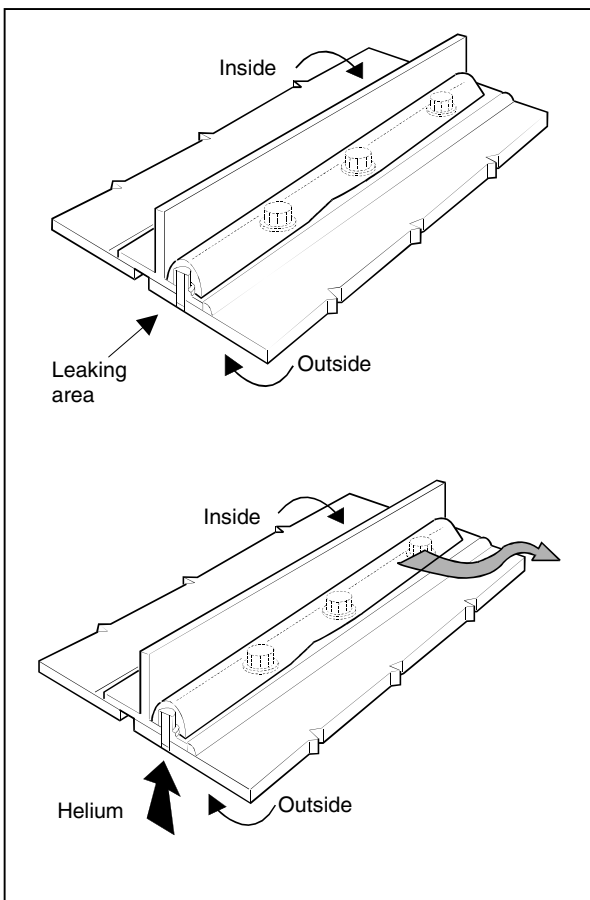


APPLICATIONS

Fuel Tank Testing

Fuel tanks in commercial airliners are housed principally in the wings. The wing structure is also the fuel tank structure, and there are no rubber tanks or other forms of inner walls within the wings. Wing structures are composed of large skin panels, dozens of ribs and stringers, and thousands of bolts and rivets covered with a sealant to prevent fuel leakage. Since this structure is flexible, eventually fuel leakage does occur and the leaks become evident on the outer surface of the skin.

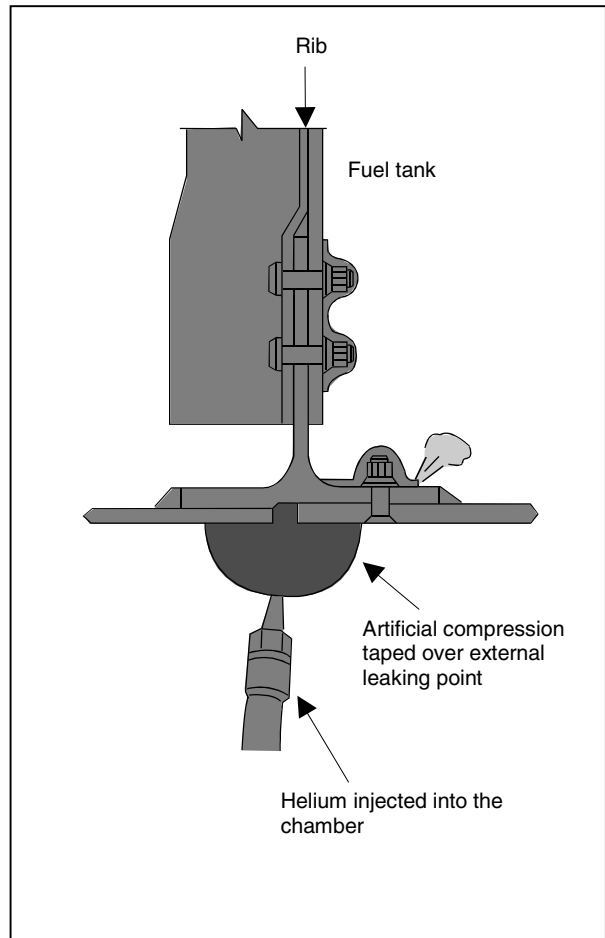
The visible point of leakage is at the end of the leak path. An efficient repair requires that the origin of the leak path (or paths) is identified and properly sealed. Helium is adopted as a tracer gas for the detection of the source of the leak.



Different Phases of the Detection Method

The leak is visually located externally while the source is identified internally by creating a compression chamber around the leak point and filling it with Helium under pressure. The procedure must start with a clear mapping of the fuel leak on the outer surface of the tank then the tank can be defuelled, drained and vented until it becomes completely dry. Before entering the tank, all the safety checks have to be performed to ensure adequate ventilation and acceptable fuel vapour concentration.

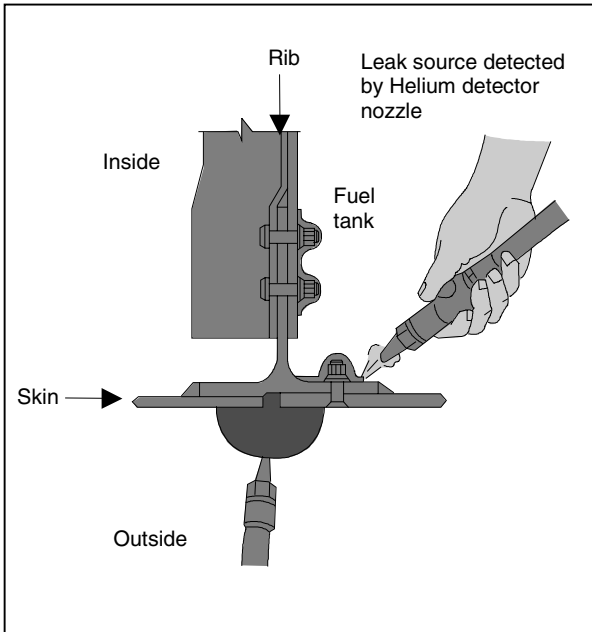
A compression chamber must be installed over the leaking area.



Compression Chamber and Helium Injection

At this point the jet of the Helium being forced into the tank has to be found. The helium which is pressurized by the compression chamber will flow through the leak path. By moving the visual detection probe, connected to the detection unit, inside the tank you must analyse all suspected surfaces until the helium flow is detected.

Bear in mind that more than one leak may exist in the same area and therefore it could be necessary to repeat this operation several times. In this case it is recommended to vent the area between two detection operations.



Leak Source Detection Using the Visual Probe

Leak Repair Checking

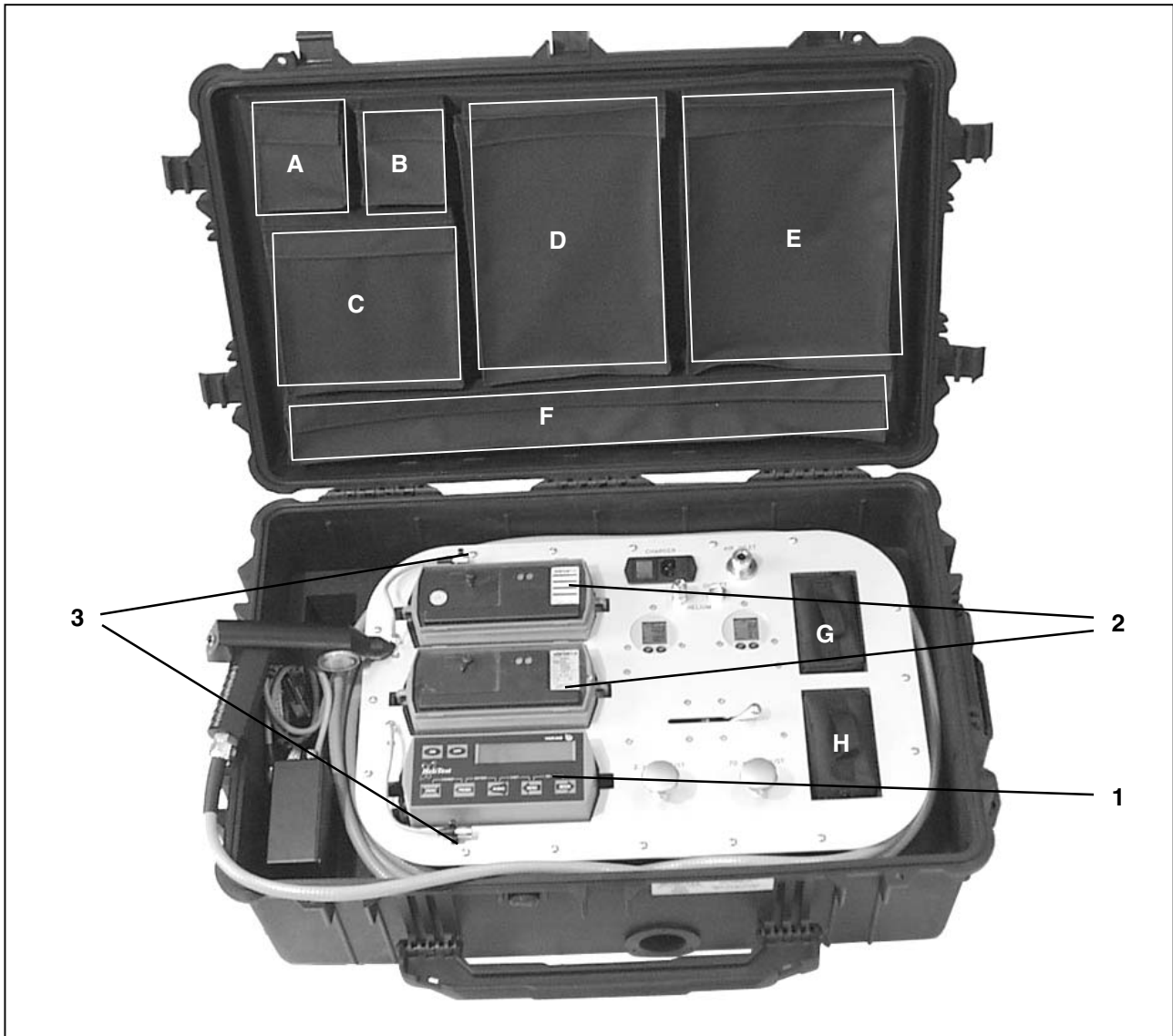
The HeliTest Wing can also be used to check for leaks after a repair. To perform this test, inject Helium into the fuel tank of an airliner, bleed the tank through the Drain Valve until measuring a Helium concentration of between 4000 and 5000 ppm.

Close the Drain Valve and then increase the internal pressure of the Helium by 200 mbar. At this point pass the visual probe over the leak area and ensure that there is no flow of Helium.

HELITEST WING DETECTION UNIT KIT

The HeliTest Wing Detection Unit Kit is used to detect, in fully automatic and auto ranging mode, a Helium concentration as small as 2 parts per million (ppm).

The following figure shows the location of the different items of the HeliTest Wing Detection Unit Kit in the travelling case.



HeliTest Wing Detection Unit Kit

This kit consists of the following items:

1. One HeliTest detection module
2. Two rechargeable batteries
3. Two connectors for battery charge.
- D. Case containing a set of three pin heads (more details in "III.5. Set of pin heads"), a 20 cm long tube with a PMC female connector.
- G. Case containing one power cord (battery to HeliTest), one power cable, two carrying straps

NOTE

Cases A, B, C, E, H contain Fuel Tooling Kit devices. Case F is dedicated to Fast Scan Probe (in option).

HeliTest Detection Module, Rechargeable Batteries, AC/DC Converter

The HeliTest detection module is a portable leak detector able to detect, in automatic and auto-ranging mode, a Helium concentration as small as 2 parts per million (ppm).

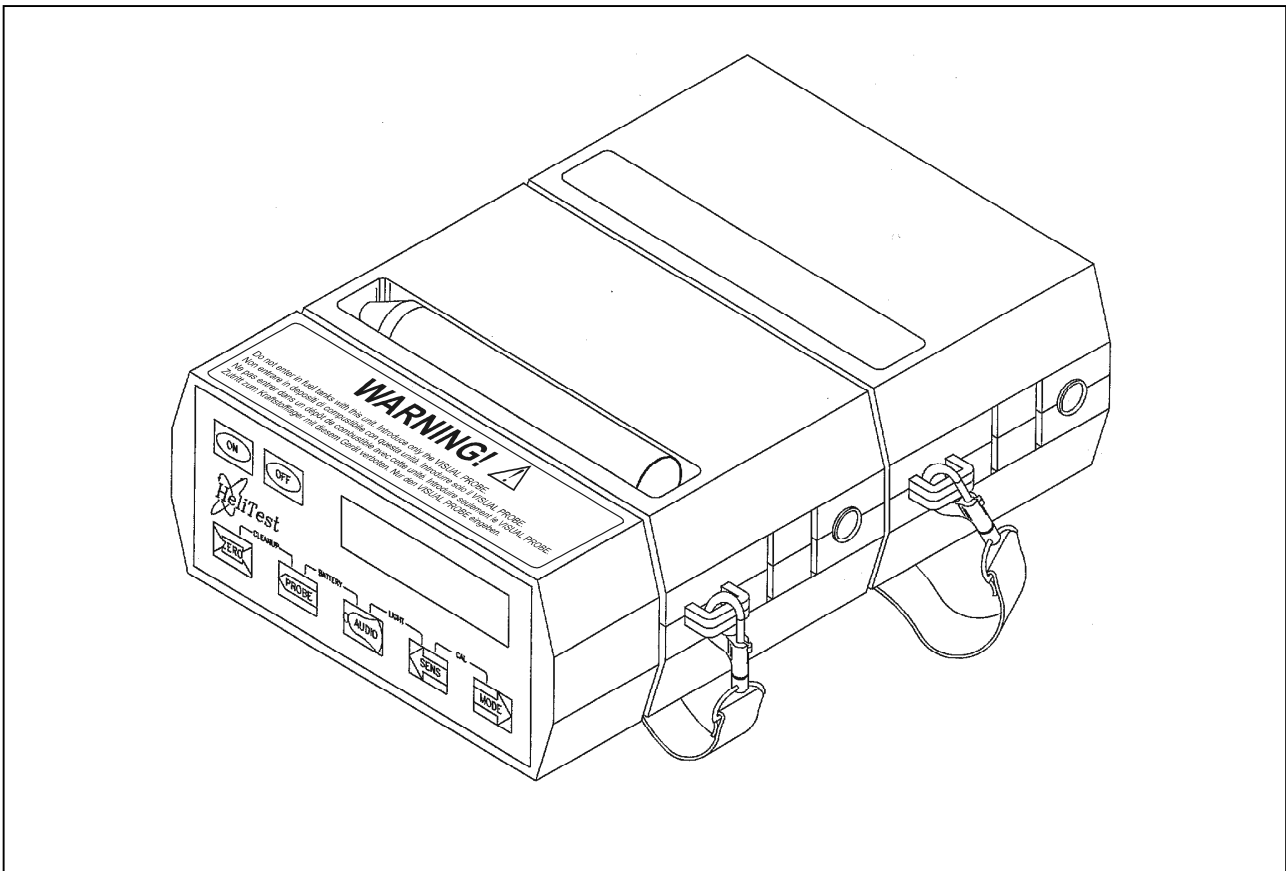
Once the aircraft's fuel tank line to be tested is filled with compressed Helium, the visual probe connected to the HeliTest module is passed over the suspected area and sucks the gases detected. When Helium molecules are detected, an electrical signal related to the Helium pressure is processed so as to display the detected leak value on the module's LCD and provide an audio signal proportional to the concentration of Helium.

This detection module comes with two maintenance free rechargeable batteries allowing the HeliTest to be used continuously for up to 5 hours. Two battery chargers are integrated in the travelling case to recharge the batteries.

It incorporates all the facilities required for self-diagnostic and protection features, and all controls are on the front panel.

The operator can hang the entire unit over the shoulder and can search for leaks using the extension probe.

The following figure is a picture of the HeliTest with battery.



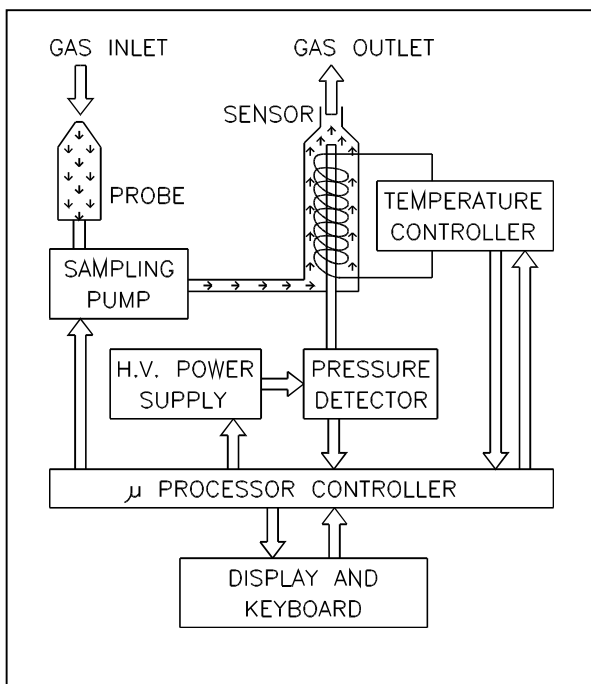
HeliTest with Battery

Theory of Operation

The piece to be tested is filled with a helium/air mixture.

The probe is passed over the suspected area, and a gas sample is continuously sucked through the flexible extension by the sampling line.

The pump blows the gas sample over a special heated silica capillary which stops atmospheric gases but allows Helium to pass through due to its small molecule. The atmospheric gas is exhausted at the top of the sensor, while Helium molecules reach the pressure detector. The electric signal related to Helium pressure is processed by a dedicated software and hardware combination allowing a direct read-out of Helium concentration on the display (refer to following figure).



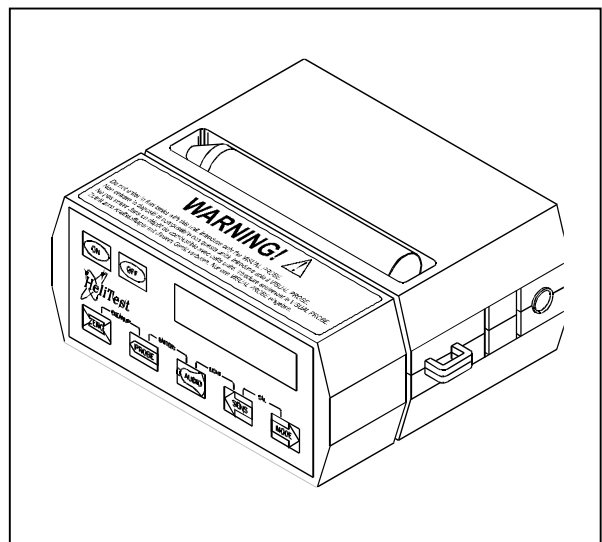
Operating Principle

Basic Unit

HeliTest is driven by a single chip microcomputer and consists of:

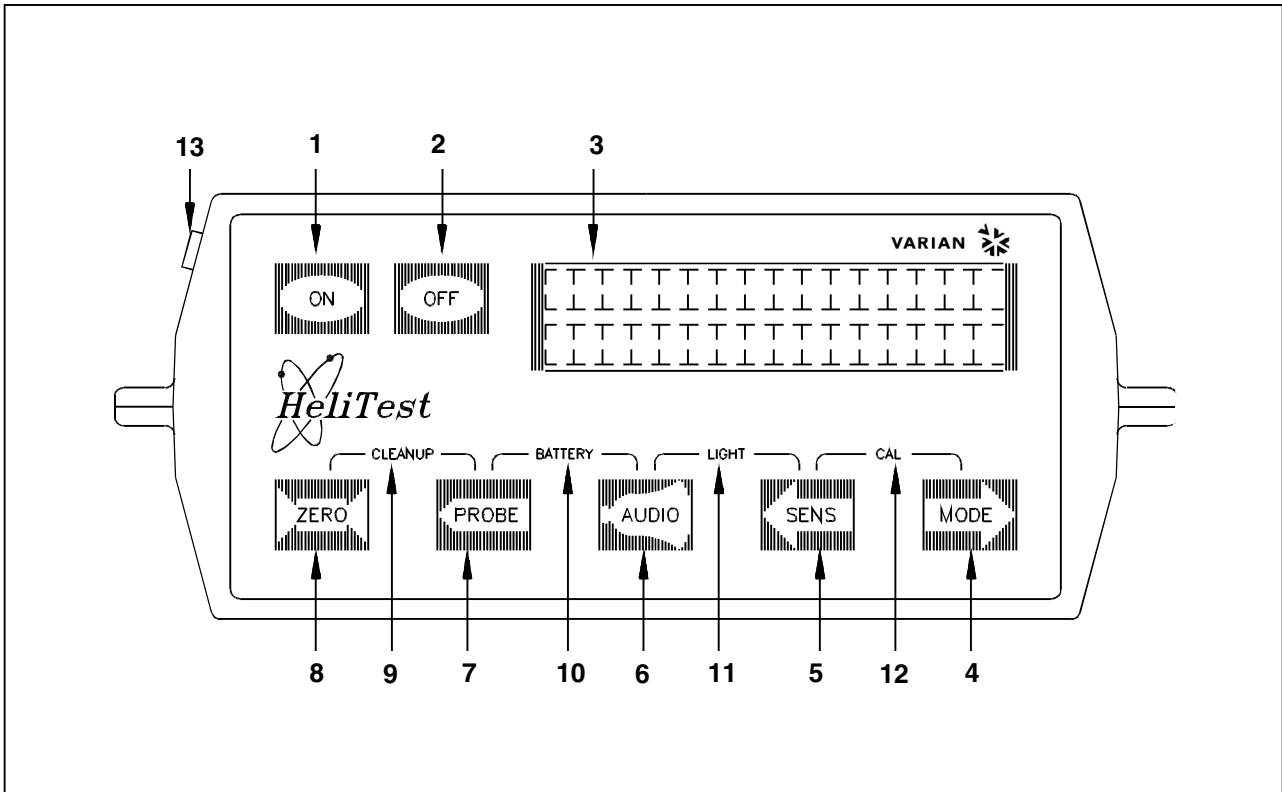
- front panel display and keypad;
- microprocessor PCB, where sensor temperature controller and pressure detector circuitries are located;
- high voltage PCB, which contains the high voltage power supply for pressure detection;
- Helium sensor (based on a silica capillary), with pressure detector;
- sampling line, where a membrane pump conveys the sampling gas into the detector;
- sniffing probe, connected to the module by a standard 1.5 meter long flexible extension.

A dedicated non-volatile RAM is used to store the operating parameters and information if power failure occurs for a period of 10 years accumulated off time.



Basic Unit

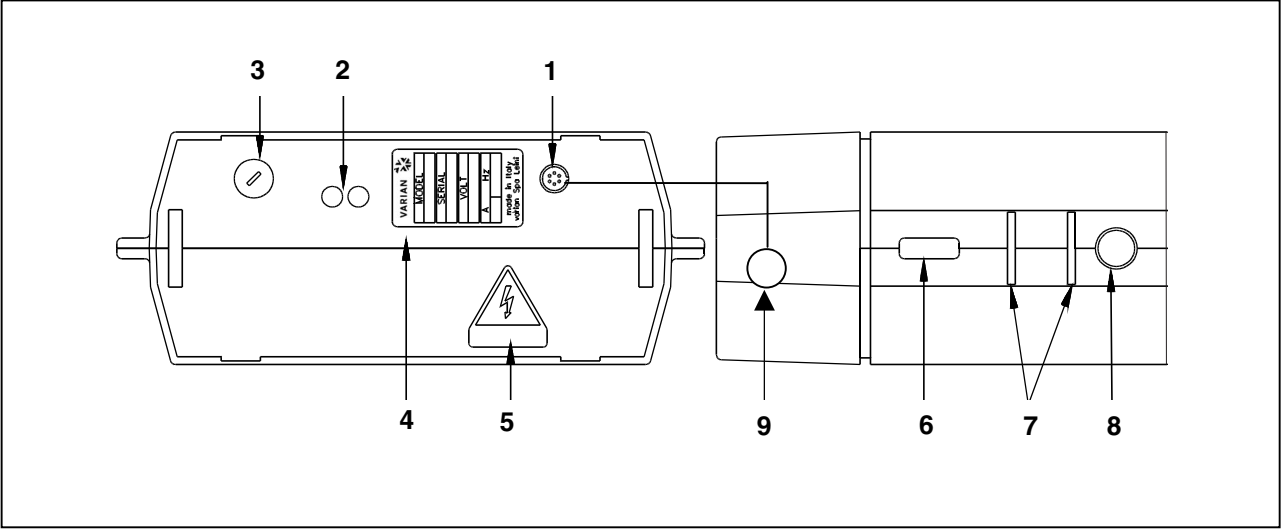
The HeliTest front panel controls are shown in the following figure:



HeliTest Front Panel

1. ON - keypad pushbutton to switch on the unit.
2. OFF - keypad pushbutton to switch off the unit.
3. Back lighted alphanumeric LCD, dot matrix, 2 lines, 16 characters.
4. MODE - keypad pushbutton used to select operation with adjustable set point.
5. SENS - keypad pushbutton used to switch the sensitivity from high to low, and vice versa.
6. AUDIO - keypad pushbutton used to switch the buzzer on and off.
7. PROBE - keypad pushbutton used to switch on and off the sampling line on and off when the probe is out of its housing.
8. ZERO - keypad pushbutton used to switch from automatic zero to fixed zero.
9. CLEANUP - this function, activated by simultaneously pressing the ZERO and the PROBE pushbuttons for at least 2 seconds, is used for a fast zero recovery after an Helium saturation condition.
10. BATTERY - this function, activated by simultaneously pressing the PROBE and the AUDIO pushbuttons for at least 2 seconds, is used to check the battery voltage.
11. LIGHT - this function, activated by simultaneously pressing the AUDIO and the SENS pushbuttons for at least 2 seconds, is used to switch on and off the back light of the display.
12. CAL - this function, activated by simultaneously pressing the SENS and the MODE pushbuttons for at least 2 seconds, is used to initiate the calibration routine.
13. Jack for remote earphone.

The HeliTest side and rear panel controls are shown in the following figure.

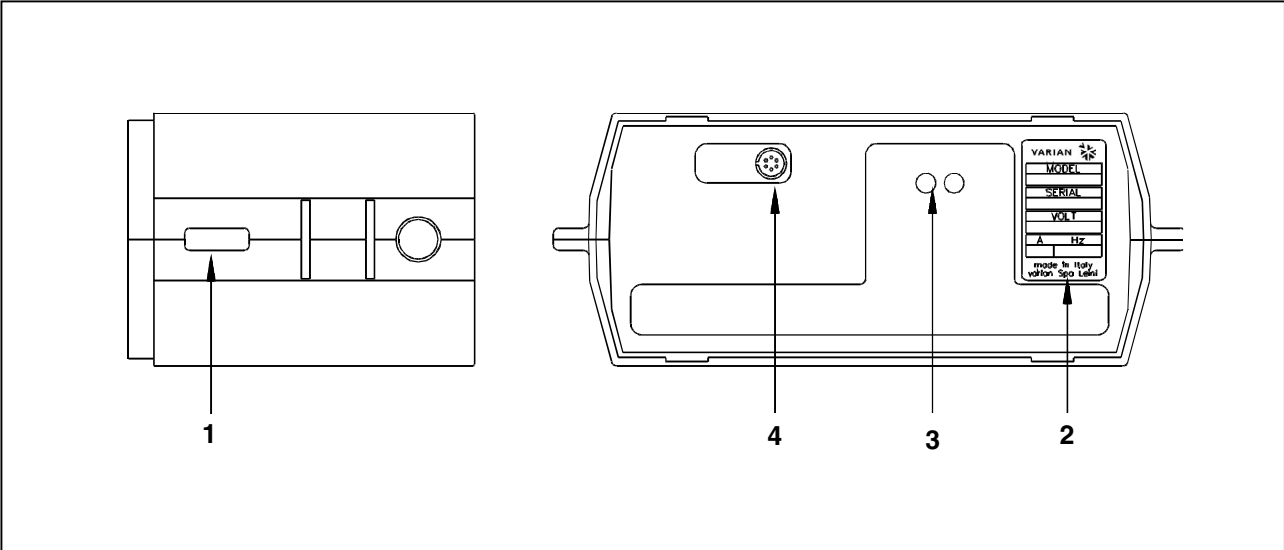


HeliTest Side and Rear Panel

- 1. Mains power cable connector
- 2. Mains quick spring connection
- 3. Mains fuse
- 4-5. Labels
- 6. Belt attachment point
- 7. Gas outlet (not to be covered)
- 8. Pushbutton (for battery release)
- 9. Transition box connector

Battery Unit

The battery unit consists of "maintenance free" sealed rechargeable batteries, with gelled electrolyte.



Battery Unit Side and Front Panel

- 1. Belt attachment point
- 2. Label
- 3. Mains quick connection
- 4. Mains power cable connector

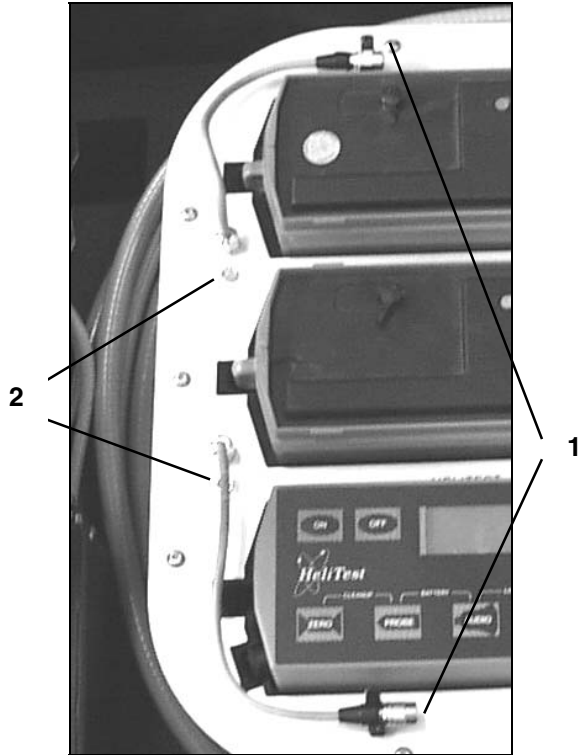
When the battery is fully charged, it allows 4 operating hours for HeliTest, with the display back light on, and 5 operating hours with the display back light off, prior to being discharged.

Ac/Dc Converter - Battery Charger

The Ac/Dc converter consists of a power supply 100/240 Vac, 50/60 Hz input; The output can be:

- 13.8 Vdc with no load
- 12.5 Vdc with a 1.8 A absorption.

It may be used instead of the battery unit and to recharge the battery.



Battery Charger

1. Battery charger cable (12 Vdc output)
2. Green/red LED

NOTE

The two battery chargers can be used simultaneously to recharge the batteries.



DANGER!

To charge the batteries, place the traveling case in a SAFE AREA (where there are no fuel vapors or explosive and flammable gases).

Specifications

HeliTest Module Specifications

Detectable concentration	2 to 9x10 ⁵ ppm (parts per million)
Response time	2 seconds for Helium, in accordance with AVS standard 2.1.
Reading drift	maximum 10 ppm every 10 minutes
Leak indicator	Alphanumeric display, 2 lines, 16 characters
Audio alarm	Variable frequency
Clean-up time	30 seconds typical, 5 minutes maximum after helium saturation
Self test and Warm-up time	3 minutes minimum
Turn-off time	Immediate
Operating conditions - temperature - humidity	-5 °C to +40 °C 90% maximum relative humidity (non condensing)
Jack for earphone	3.5 mm diameter earphone mono or stereo 32 ohm
Power requirement	12 Vdc, 1.4 A
Portability	Belt
Weight	2 kg - 4.4 lbs
Dimensions (inches)	Width 7.9 Height 3.5 Depth 6.7
(mm)	Width 200 Height 90 Depth 170

Battery Unit Specifications

Nominal voltage	12 Vdc
Nominal capacity	7.2 Ah (rated capacity at 20 hours discharge)
Self discharge	0.1% max. of the rated capacity per day at +20 °C of ambient temperature
Life	4-5 years (end of life being defined as when 60% of the rate capacity is reached, as per DIN 43534)
Operating - temperature - position	-5 °C to +40 °C any
Storage - temperature - position - recharge	-20 °C to +70 °C any at least every 6 months
Weight	2.7 Kg - 6 lbs
Dimensions (inches)	Width 7.9 Height 3.5 Depth 6.7
(mm)	Width 200 Height 90 Depth 170

Set of Pin Heads

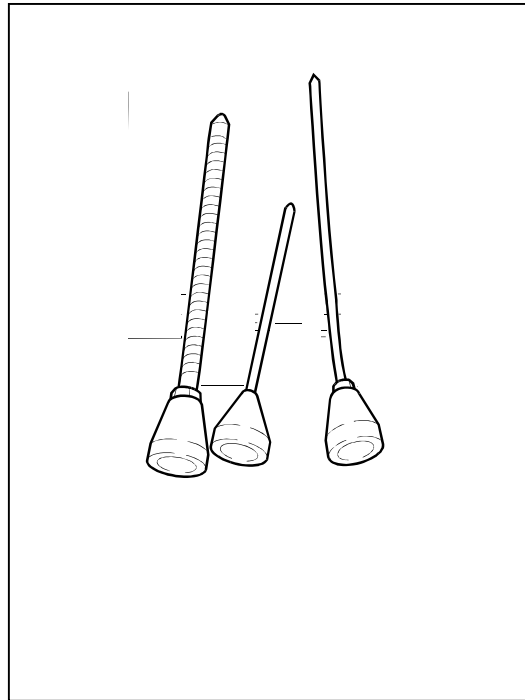
The HeliTest Wing detection unit kit also contains a set of three probe pin heads that can be used on either the standard probe or visual probe.

These pin heads are used so that you can access points that the probe cannot reach. When necessary, simply slide off the head of the probe and replace it with one of the pin heads as required.

The following items are provided in the pin head set:

- Straight, stainless steel 133 mm long tube
- Flexible Rilsan 175 mm long tube
- Semi-rigid 184 mm long tube
- 2 sintered bronze filters
- 2 O-rings for probe seal.

The following figure shows the set of pin heads.



Probe Pin Heads

VISUAL PROBE ASSEMBLY

The HeliTest Wing Visual Probe Assembly consists of the following parts:

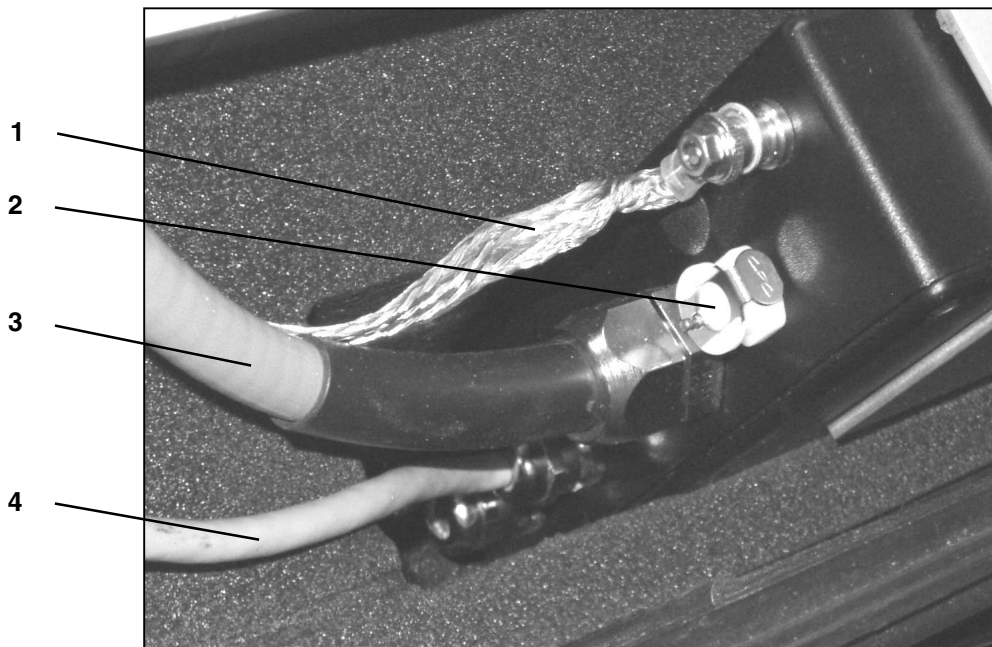
- Transition box, which includes a flame stopper, a power supply for the special probe and two ZENER barrier protection on electrical circuits
- Visual probe for the location of inside-tank leaks
- 10-meter connection line between transition box and probe.

 **WARNING!**

The transition box is a security device (flame stopper functionality) which must always be connected when the visual probe is used in the presence of flammable gases and vapours.

 **WARNING!**

Never use the Safety Probe 969-4007 with the Transition box not properly located into the Complete Package box. Complete Package and Transition box must be located in a safe area during operation.



Transition Box

With reference to the figure above, the following items are located on the front panel of the transition box:

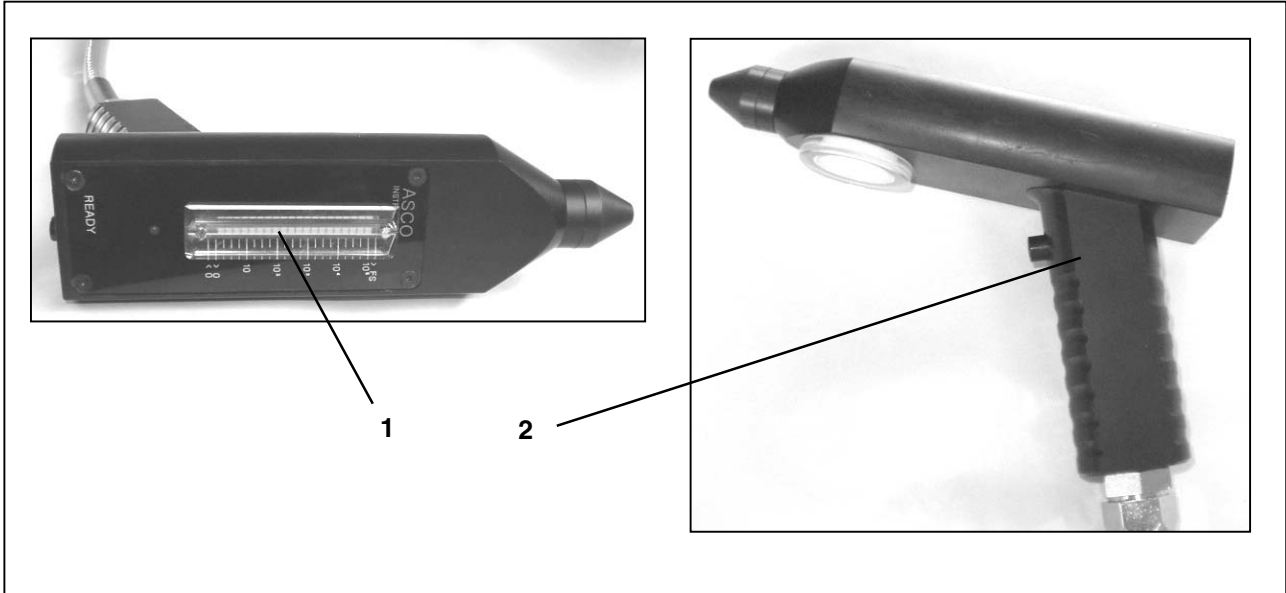
1. Ground cable connection (must be connected)
2. Outlet connector; used for the pneumatic connection to the HeliTest detection module.
3. Probe connector; used for the connection of the special visual probe.
4. Remote connector; used for the electrical connection to the HeliTest detection module.

 **WARNING!**

The transition box **MUST** be connected to ground. If it is not connected to ground, the probe could not work properly with consequent damage to the equipment and aircraft, and injury to the operator.

The special probe is equipped with a bar graph display (1) that indicates the concentration of Helium.

It allows the remote control of fixed zero/auto zero function and can accept the standard pin heads. The probe is intrinsically safe.



Visual Probe

During visual probe operation, the bar graph on the probe will repeat the same leak signal which is displayed on the front panel of the HeliTest detection module.

The button (2) on the probe allows you to select between Auto Zero and Fixed Zero operation. The LED on the probe will come on to indicate when Fixed Zero operation has been selected. In the Fixed Zero mode, the HeliTest sucks in air and then calculates the amount of Helium present; the resulting value is taken as its zero reference.

For a good zero reference, it is better that the sucked air be Helium-free. In the Auto Zero mode, the HeliTest updates the zero reference whenever Helium is detected. The Automatic Zero mode is used with high and unsteady Helium background.

The visual probe is equipped with an inlet hydrophobic filter which protects the instrument from any liquid fuel penetration. To change this filter, refer to the Storage and Maintenance Section (X.5).

FUEL TOOLING KIT

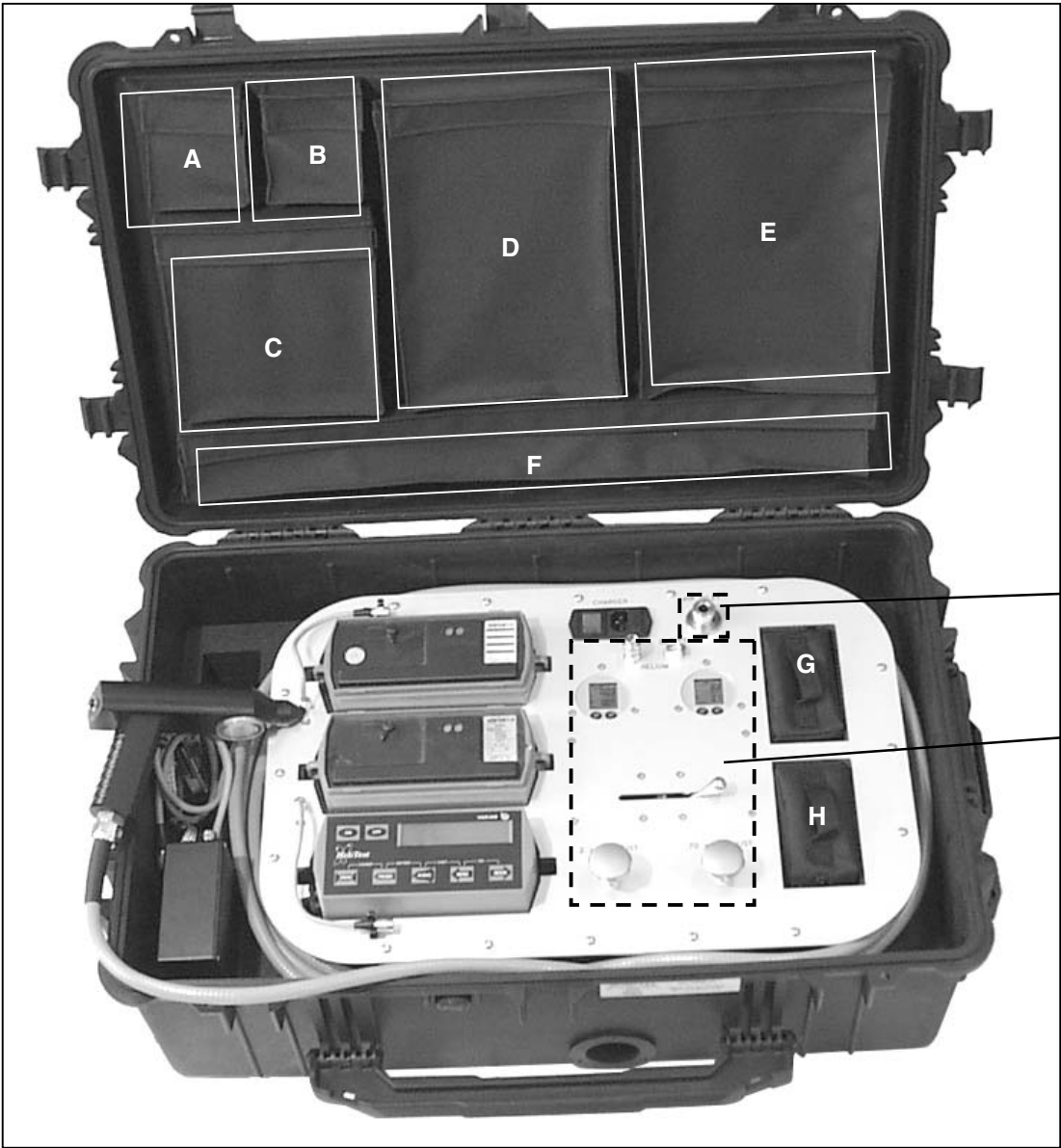
The Fuel Tooling Kit comes in a carrying case and is used to pressurize the compensation chambers with Helium and to vent any possible Helium background to a safe area.

This kit consists of the following items:

- Helium supply assembly (1)
- Venting supply assembly (2)

- Accessories and consumables; all quick connectors and hoses are supplied along with a set of compression chambers that will be helpful to create the external injection points. The consumables used for gasketing compression chambers or plastic bags on the aircraft structures are also supplied. Accessories and consumables are located in the cases A, B, C, D, E, H.

The following figure indicates the different components of the Fuel Tooling Kit.



Helium Supply Assembly

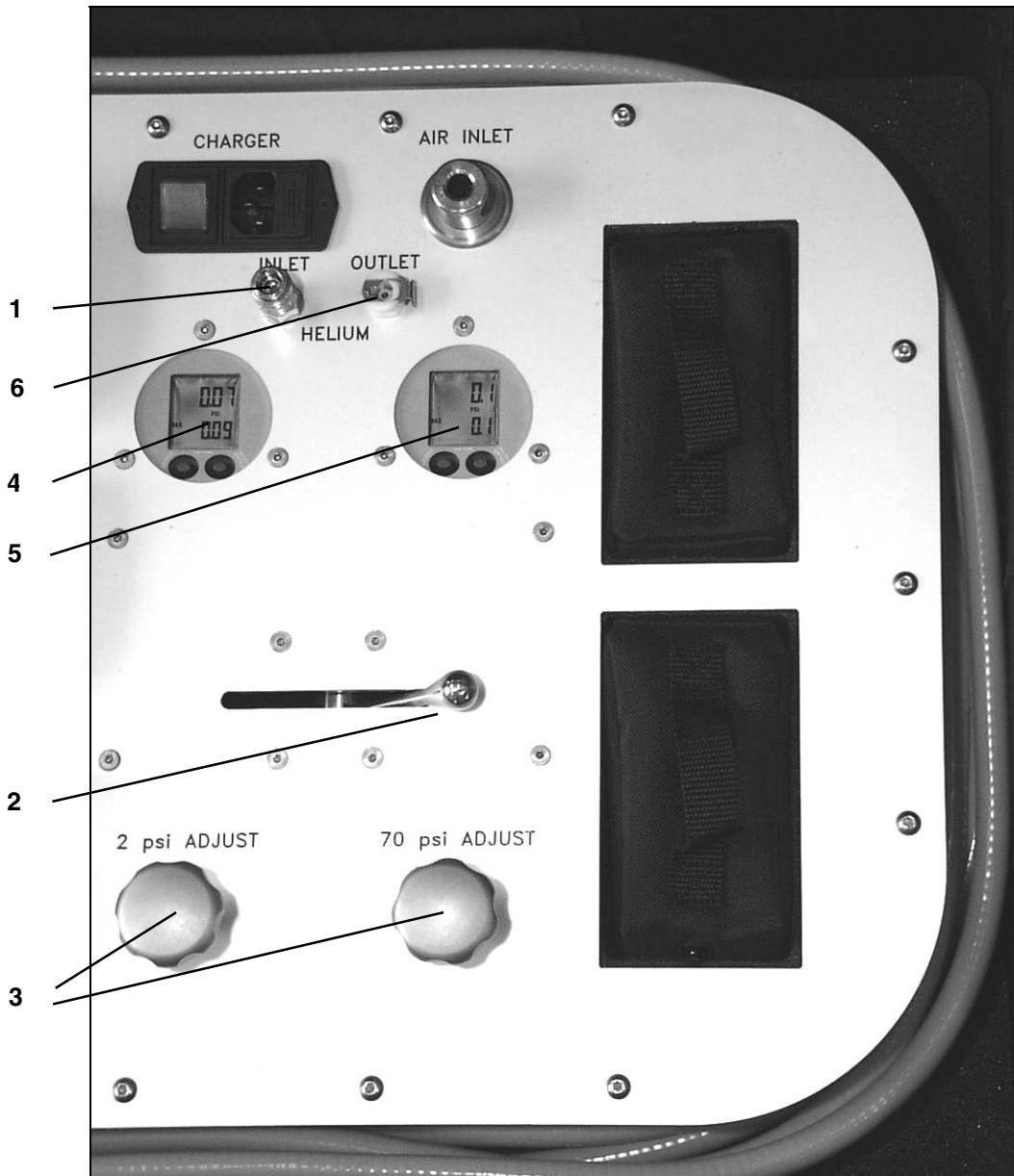
The Helium Supply Assembly includes a gas distribution network from a max. inlet (1) pressure of 10 bar (140 PSI) to the operating pressure.

With reference to the following figure, a selector switch (2) allows you to select between two different pressure ranges. Each range has a pressure adjustment valve (3) with a dedicated digital gauge (4) and (5) so that you can set the Helium injection pressure.

The following two ranges can be selected:

- Scale from 0 to 140 mbar (0 to 2 PSI), with an accuracy of 0.1% of measure range.
- Scale from 0 to 5000 mbar (0 to 70 PSI), with an accuracy of 0.1% of measure range.

The outlet (6) delivers helium from the Fuel Tooling Kit through special quick connectors.



Helium Supply Assembly

Venting Supply Assembly

The Fuel Tooling Kit includes a venting device based on a Venturi pump. This venting device lowers the Helium background in the tank and/or around the injection point and delivers a pumping speed of about 300 cubic meters per hour.

The Venturi pump is integrated in the case. Its inlet (1) is located on the back side of the case and its outlet (2) is on the front side.

The customer's compressed air line is connected to the Air Inlet connector (3) of the control panel; a maximum inlet pressure of 10 bar (140 PSI) is suggested.

The Venturi pump starts automatically when compressed air is supplied via Air Inlet connector.

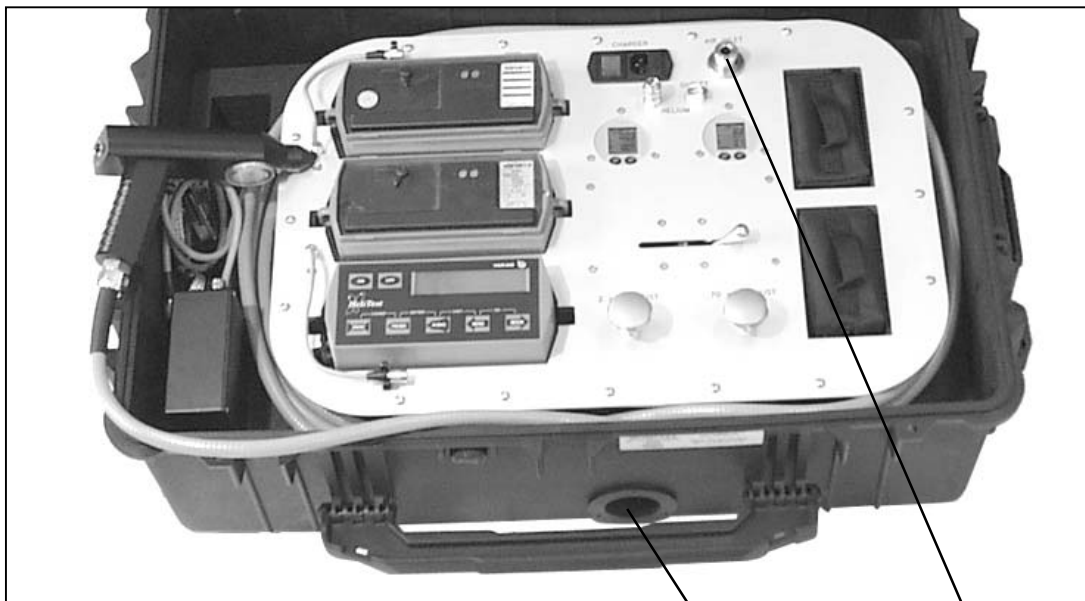
The Venturi pump is used to suck the helium overload inside the wing or around the injection point.

The Venturi pump can be connected to any type of customer pipe (such as a vacuum cleaner tube) with a supplied tube adaptor (located in case B) to suck air in the requested area.

 **WARNING!**

If the sucked air contains fuel vapours or any explosive (flammable) gas, the Venturi pump output must be displaced in a safe area.

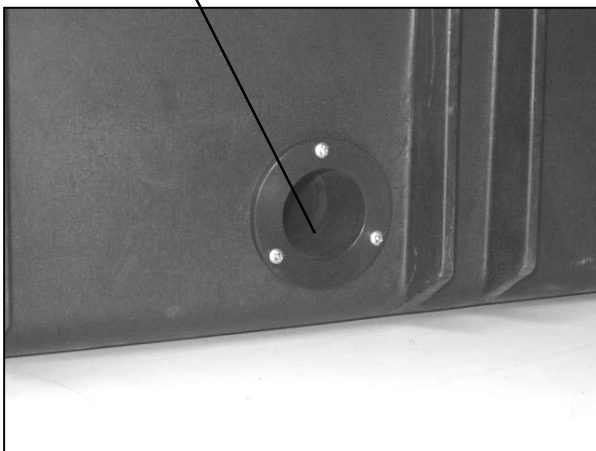
The following figure shows the venting supply assembly in the Fuel Tooling Kit carrying case.



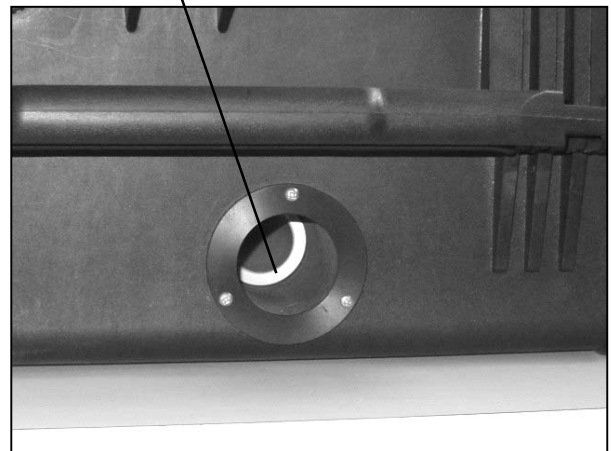
1

2

3



Venturi pump inlet on the back side of the case

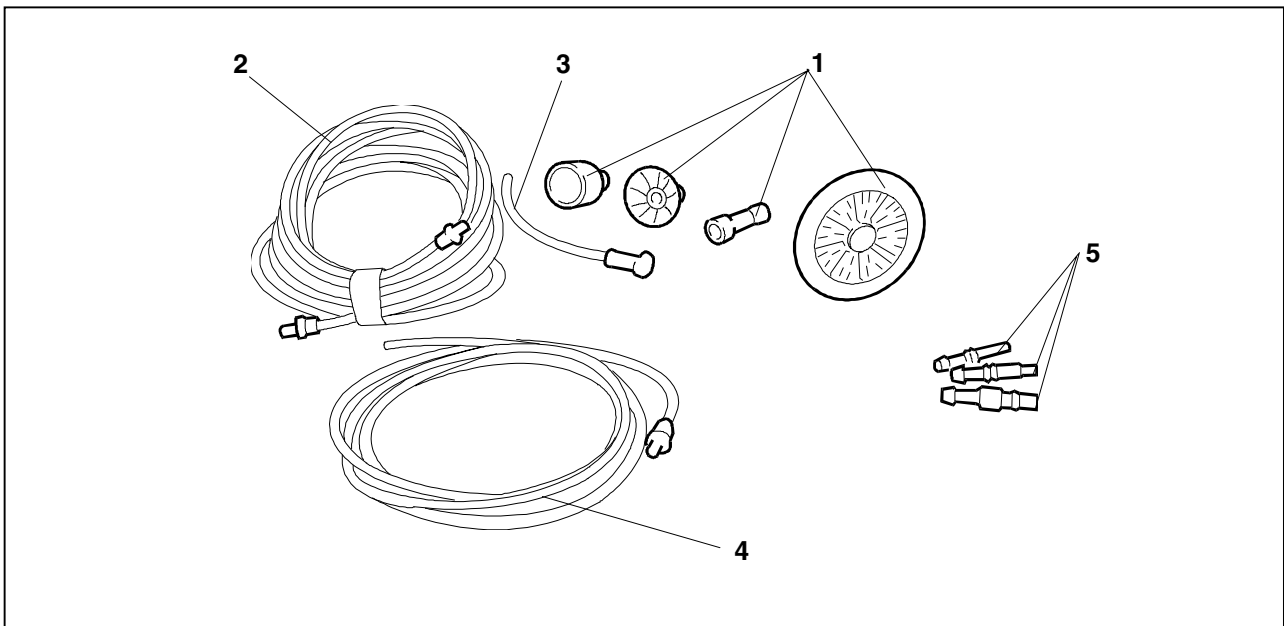


Venturi pump outlet on the front side of the case

Accessories and consumables

The following items are also provided with the Fuel Tooling Kit:

1. A set of four injection chambers (case H)
2. Tube for the connection between the Helium outlet and the injection chambers (case E)
3. Tube for connection to potential plastic bag compression chambers (case D)
4. Tube for the connection between the Helium bottle and Fuel Tooling Kit (case D)
5. Connectors for the different connections (case A)



Injection Chambers and Connection Tubes

Not represented in the previous figure, a roll of soft adhesive mastic (for gasket layer) is supplied in case C.

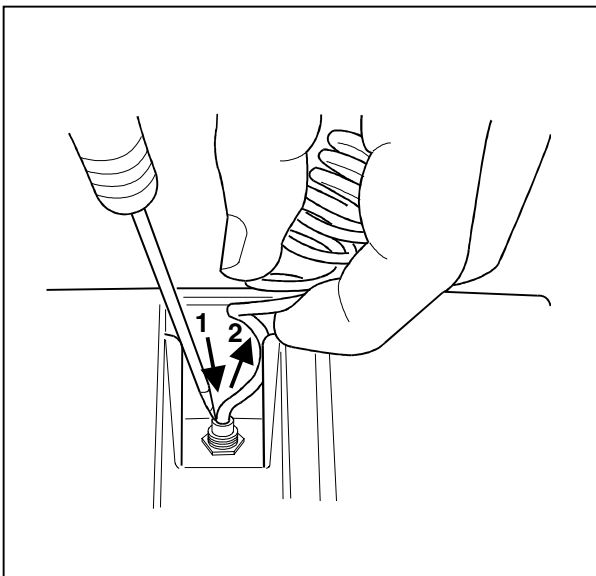
INSTALLATION

This chapter provides you the information needed to connect the different devices of the HeliTest Wing product line.

Connecting the HeliTest Detection Module and Visual Probe Assembly

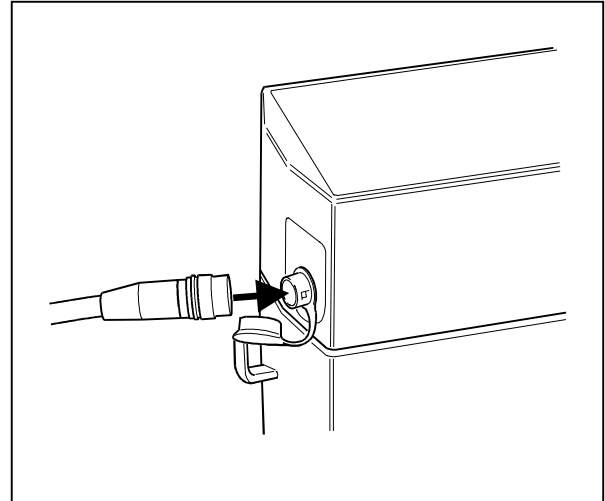
Proceed as follows to install the HeliTest detection module and the special visual probe assembly:

1. Remove the HeliTest module from the traveling case and attach it to one of the two rechargeable batteries provided.
2. Remove the HeliTest detection module's standard probe from its seat on the upper side of the module itself. To disconnect this probe's pneumatic connection, press the tube fitting ring with a small screwdriver and keep it pressed; pull out the tube and release the ring as shown in the following figure.



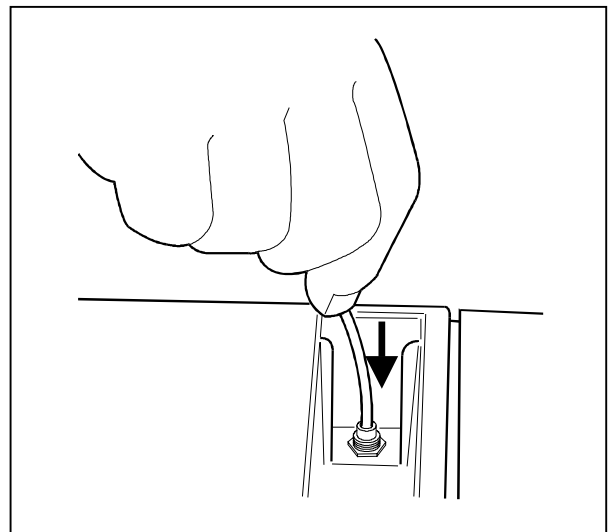
Disconnecting the Standard Probe from the HeliTest Detection Module

3. Remove the visual probe with their related tubes from the Fuel Tooling Kit traveling case.
4. Open the plug on the electronic cable connector on the side of the HeliTest Detection Module and plug one end of the electronic connection cable into it as shown in the following figure.



Connecting the Electronic Connection Cable to the HeliTest Detection Module

5. Attach one end of the pneumatic connection cable (supplied in case D) to the related connector on the HeliTest Detection Module. Refer to the following figure for the location of this connector (this connector was used by the HeliTest's standard probe cable previously removed).



Connecting the Pneumatic Connection Cable to the HeliTest Detection Module

6. Attach the free end of the transition box ground cable to a good plant ground.

⚠ WARNING!

The transition box **MUST** be connected to ground. If it is not connected to ground, the probe could not work properly with consequent damage to the equipment and aircraft, and injury to the operator.

Connecting the HeliTest to the Battery Unit

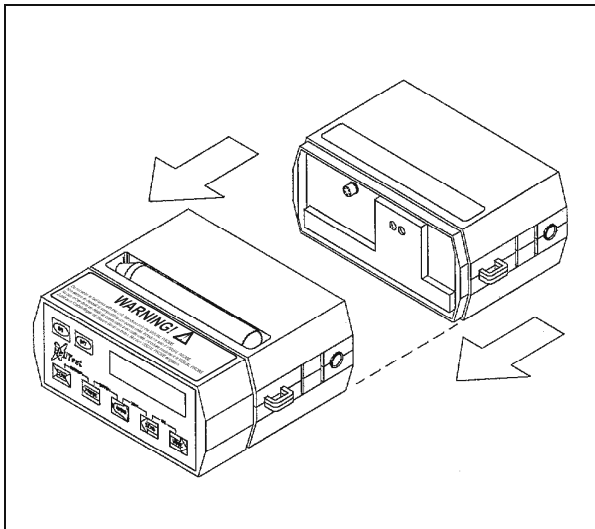
NOTE

The packaging of HeliTest is designed to minimize the possibility of shipping damage. However, HeliTest and related accessories must be carefully inspected and any damage should be reported to the carrier and to the sales office.

HeliTest can be connected to the battery via the quick spring connection or alternatively via the battery power cable. This feature will allow the user to select the most suitable configuration for his requirement. If the most compact configuration is required, the HeliTest should be connected directly to the battery unit (see the following figure), taking care to match exactly the battery unit power socket with the opposing pin socket on HeliTest. Proper connection is made when an audible "click" is heard after pressing both HeliTest and battery together.

CAUTION

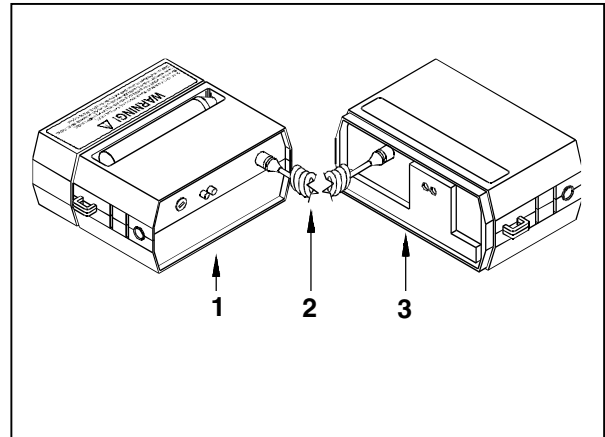
Ensure that the HeliTest and battery are securely connected to avoid accidental separation.



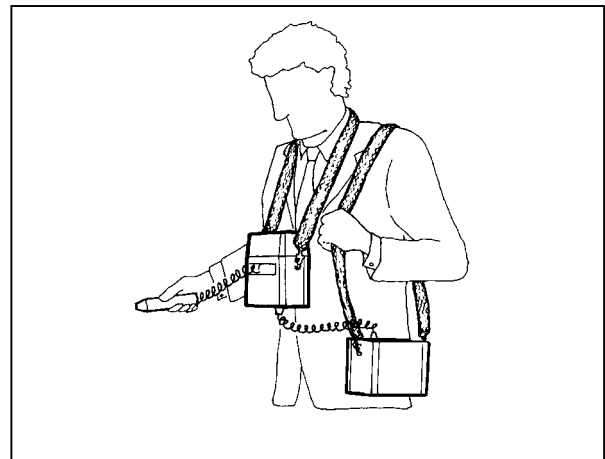
Connecting the Battery to the HeliTest Module

Connect and adjust the belt as necessary.

If a separate configuration is preferred, connect the battery (3) to the basic unit (1) using the power cable (2) (see the following figure). Connect and adjust the belt as necessary (see the following figure).



Battery Connection Using a Power Cable



Using the HeliTest Module with a Separate Battery

USING THE HELITEST MODULE

Helitest Set Up



WARNING!

Never open the HeliTest when connected to the mains, as the voltages and temperature developed in the unit are dangerous and may be fatal. Never use the unit in environments saturated with flammable gases.

HeliTest allows the following language selections: English, Italian, German, French.

The following measurement units may be selected: ppm, mbar.L/s, cm³/s, cm³/min, Torr.L/s, Pa.L/s, Pa.m³/s, Kg/h, g/y R12.

The HeliTest is fitted with an adjustable set point alarm level.

HeliTest is factory set as follows:

- Default language: English
- Default measurement unit: ppm
- Default set point alarm level: 10 ppm.

If the default configuration is appropriate, go to section "HeliTest Start up".

If a change is desired, proceed as follows: switch on the HeliTest by pressing the ZERO and then the ON pushbutton at the same time, and keep them pressed for at least 1 second. The display will show the language currently in use.

-	-	-	E	N	G	L	I	S	H	-	-	-
<	-	-								-	-	>

If a change in language is desired, within 5 seconds select the preferred language by pressing the SENS or MODE pushbutton.

After about 5 seconds HeliTest will memorize the selected language. Subsequently, and also if no action is done, the unit automatically switches to measurement unit selection mode.

The current measurement unit is shown on the display.

M	E	A	S	U	R	E	M	E	N	T	U	N	I	T
<	-	-					p	p	m		-	-	>	

If a change is desired, within 5 seconds select the preferred unit using the SENS or MODE pushbuttons until the desired unit is shown.

After about 5 seconds HeliTest will memorize the selected measurement unit. Subsequently, and also if no action is done, HeliTest automatically switches to the set point level setting mode.

NOTE

Whenever the measurement unit is changed, the previously selected set point level will be automatically set to minimum settable value, and therefore it will be necessary to update it.

The set point level (YYYY = value) is shown in the current measurement unit (XXXXXXXX).

		Y	Y	Y	Y			X	X	X	X	X	X	X
<	-	-	S	E	T		P	O	I	N	T	-	-	>

If a change is desired, adjust the set point level using the SENS or MODE pushbuttons until the desired value is reached.

After about 5 seconds HeliTest will memorize the selected set point level. Subsequently, and also if no action is done, HeliTest automatically switches to the FZ/AZ Setup function.

	F	Z	/	A	Z		C	O	N	T	R	O	L	
				L	O	C	A	L						

NOTE

REMOTE may be displayed if previously set.

Use SENS and MODE to select the required function.

NOTE

REMOTE must be selected if the zero is managed by the visual probe.

Subsequently, and also if no action is done, HeliTest will start the test routine (refer to the section "Self Test").

NOTE

In order to activate any of the above mentioned selections, HeliTest must be switched off and restarted by pressing simultaneously ZERO and ON pushbuttons.

In order to use the set point refer to the section "Set Point Mode".

Helitest Start Up

Switch on HeliTest by pressing the ON pushbutton; the following figure shows the display:

-	-	-	-	H	e	l	i	T	e	s	t	-	-	-	-
				W	e	l	c	o	m	e					*

NOTE

If the language is not the desired one, please refer to the section "Setting up the HeliTest Module" to change it.

Self Test

After about 4 seconds from ON, HeliTest automatically starts a self test routine procedure; the display will appear as shown in the following figure:

		S	e	l	f	t	e	s	t						
		p	r	o	c	e	d	u	r	e					*

NOTE

During test and operation, an asterisk, at the bottom right end of the display, will blink.

No action is required by the operator until the self test routine is finished or a fault occurs.

After about 4 seconds, the message shown in the following figure will appear:

		H	e	a	t	e	r	t	e	s	t				
															*

At the end of the heater test (about 4 seconds), if the test is successful, the following message is shown:

		H	e	a	t	e	r	t	e	s	t				
						O	K								*

or, if the test is negative and the heater is defective, the following message is shown:

				H	e	a	t	e	r						
		D	E	F	E	C	T	I	V	E					

NOTE

When this message is displayed, the self test routine is stopped. This message is displayed for 1 minute, then HeliTest is automatically switched off. Repeat the self test routine by following the information in section "HeliTest Start up".

If the heater is still reported "DEFECTIVE", contact the sales office.

Subsequently, the battery is tested and the display shown in the following figure will appear:

		B	a	t	t	e	r	y	t	e	s	t			
															*

At the end of this test, if the battery voltage is greater than 11.2 Vdc, the following message is shown:

		B	a	t	t	e	r	y	t	e	s	t			
						O	K								*

The display will be as shown in the following figure if the battery voltage is between 11.2 Vdc and 10.2 Vdc.

		B	a	t	t	e	r	y	t	e	s	t			
		B	A	T	T	E	R	Y	L	O	W			B	

When this message is displayed, the battery should be recharged.

After about 4 seconds, the display will be as shown in the following figure:

		S	e	n	s	i	t	i	v	i	t	y	t	e	s	t
															*	

This test checks the sensitivity of HeliTest.

Within 1 minute, the test is finished and the following figure will show the display:

		S	e	n	s	i	t	i	v	i	t	y	t	e	s	t
						O	K								*	

If the sensitivity test is not satisfactory, the display will be as shown in the following figure:

S	e	n	s	i	t	i	v	i	t	y	t	e	s	t
				F	A	U	L	T						*

This error means that the Ion Pump Detector does not issue an adequate signal. Proceed as follows to correct this problem:

1. Switch OFF and then ON again (if the problem persists go to step 2).
2. Spray a very small amount of helium in the sampling tube (it is better if the capillary leak is used). A large amount of helium can saturate the Ion Pump Detector (if the problem persists go to step 3).
3. Contact your local sales office.

If the result of the sensitivity test is O.K. the display will be as shown in the following figure:

		S	e	n	s	o	r	t	e	s	t			*

After 1 minute, the sensor is checked and the display will be as shown as in the following figure if the sensor is O.K.

		S	e	n	s	o	r	t	e	s	t			*
						O	K							

Otherwise the display will be as shown in the following figure:

		S	e	n	s	o	r	t	e	s	t			*
S	P	R	A	Y		N	I	T	R	O	G	E	N	

This problem means that the quality of helium inside the unit's detector is too HIGH and this condition doesn't allow the detector to turn on. This may result if the unit was exposed to 100% helium at any time.

Proceed as follows to correct this condition:

1. Switch ON the unit
2. During the self test, when the display shows:

			S	E	n	s	o	r	t	e	s	t		

3. Press ZERO and PROBE pushbuttons at the same time to activate the clean up function. The display will show:

-	-	-		C	L	E	A	N	U	P		-	-	-
			

4. During this procedure be sure that the HeliTest samples air without helium. This is very important to have a good result. The procedure can take between 1 minute to 1 hour.

5. At the end the display will show:

-	-	-		C	L	E	A	N	U	P		-	-	-
								O	K					

If the unit is fixed, it will go into the operating mode: leave the unit sampling air **without helium** for 1 hour minimum to completely clean up the sensor before turning unit off after this fault condition.

6. If the procedure fails, the display will show:

-	-	-		C	L	E	A	N	U	P		-	-	-		
				N	O	T		C	O	M	P	L	E	T	E	D

At this time you **can retry** the procedure. If after 2 or 3 tries the procedure fails again, it means that the HeliTest sensor is saturated and must be replaced. **Return the unit to Varian.**

Afterwards, the sampling line and pump efficiency is tested and the display will be as shown in the following figure:

S	a	m	p	l	i	n	g	l	i	n	e		
													*

If the test is successful, the display will be as shown in the following figure after about 10 seconds.

S	a	m	p	l	i	n	g	l	i	n	e		
								O	K				*

The display will be as shown in the following figure if the sampling line and pump test is negative.

S	a	m	p	l	i	n	g	l	i	n	e		
								F	A	U	L	T	

Proceed as follows to correct this condition:

1. Switch OFF the HeliTest
2. Unscrew the end part of the probe
3. Remove the metallic filter (light brown)
4. Clean and / or replace the filter

The same must be done also for the visual probe if connected.

If you have sampled a lot of dusty air the sampling line must also be cleaned:

1. Disconnect the sampling tube from the HeliTest
2. Introduce a compressed air flow in the sampling tube to remove any impurity from the line.
3. Re-install the probe and re-connect the sampling tube
4. Switch the HeliTest ON

The HeliTest must not sample any liquid! If you have sampled some liquid it may require that the sampling pump be replaced!

Only the visual probe is protected from liquids.

If the sampling line still shows a fault, contact the sales office.

If the test result is OK, after about 10 seconds the self test is finished and the display will be as shown in the following figure:

		S	e	l	f			t	e	s	t		
		C	O	M	P	L	E	T	E	D			*

Operative Mode

At the end of the self test (after about 10 seconds), the display will show the following figure:

				R	E	A	D	Y						
H	S		M	S		P	.	O	N			A	Z	*

and the HeliTest is ready to be used, with the default conditions:

- HS = high sensitivity
- MS = measurement mode
- P.ON = probe activated
- AZ = automatic zero

If, within about 1 minute, the probe has not been extracted from its socket, HeliTest reverts to stand-by mode in order to save energy and the display will be as shown in the following figure.

During the stand by mode, HeliTest is automatically switched off after 45 minutes if it is not put in operative condition.

				S	T	A	N	D	-	B	Y			
H	S		M	S		P	.	O	N			A	Z	*

In both conditions, when the probe is extracted from its socket the display will be as shown in the following figure (for 5 to 50 seconds).

		-	-	-	>	O	P	E	R	A	T	I	V	E
		P	L	E	A	S	E			W	A	I	T	*

and one more test is performed on the sampling line, pump and heater, then the display will show the following figure:

█	.	.	.	.	.	.	.	.	.	█	0			
							p	p	m					*

HeliTest is now ready to operate in the measurement mode. The display gives a reading between 0 ppm and 9×10^5 ppm, and the bar graph is a duplication of the mantissa number. Zero may blink if the HeliTest zero becomes negative (refer to the section entitled "Zero Operation").

PROBE Operation

The PROBE pushbutton enables or disables the sampling line and on the display we can read P.ON or P.OFF.

				R	E	A	D	Y						
H	S		M	S		P	.	O	F	F		A	Z	*

NOTE

The sampling line operates only when the probe is extracted from its socket.

LIGHT Operation

By pressing the AUDIO and SENS pushbuttons simultaneously for 1 second, the display lights up for 20 seconds. If they are kept pressed for 2 seconds, the display will remain lit until the two above pushbuttons will be pressed again.

AUDIO Operation

The AUDIO pushbutton enables or disables the audio signal, with a frequency proportional to the Helium concentration; it operates only in the measurement mode.

Sensitivity Changes

If a change in sensitivity is desired, press the pushbutton SENS: it switches between HS mode (high sensitivity 2 ppm) and LS mode (low sensitivity, 100 ppm).

During the transition (about 20 seconds), the display will appear as in the following figure when switched from HS to LS:

				H	S	-	-	>		L	S			
		P	L	E	A	S	E			W	A	I	T	*

and as in the following figure when switched from LS to HS.

				L	S	-	-	>		H	S			
		P	L	E	A	S	E			W	A	I	T	*

During operation in low sensitivity mode, the display will show LS in the bottom left corner (see the following figure).

█	.	.	.	.	.	.	.	.	.	█	X	X	₁₀	X
L	S						p	p	m					*

If the zero setting has not been reached 5 minutes after starting, the display will show the following figure:

-	-	-	C	L	E	A	N	U	P	-	-	-
	N	O	T	C	O	M	P	L	E	T	E	D

NOTE

When this message is displayed the HeliTest is automatically switched off after 1 minute. Repeat the self test procedure (section "Self Test") if the CLEANUP function is not successfully completed.

Battery Check

The battery voltage can be read during the operative mode. Simultaneously press the PROBE and AUDIO pushbuttons; the display shows the voltage value, e.g. in the following figure:

█	.	.	.	.	.	.	.	.	.	█	0		
					V	=	1	2	.	5			*

The indication will appear for about 5 seconds, unless the two pushbuttons are not pressed again.

The diagnostic also gives an indication of low battery (B on the right lower corner of the display) corresponding to a voltage of 11.2V. If the battery voltage is between 9.5V and 10.2V, the display will show as in the following figure for 1 minute, then the HeliTest automatically is switched off.

			B	a	t	t	e	r	y				
		O	U	T	O	F	O	R	D	E	R		

When this message is displayed, disconnect the battery unit and recharge it or change it.

Shut-down

To shut down HeliTest from any operating mode, or during start-up self test, press the OFF pushbutton.

NOTE

During configuration change operations the HeliTest cannot be switched-off.

USING THE VISUAL PROBE

To use the visual probe, simply turn on the HeliTest module and then pass the probe over the suspected area.

Bear the following information in mind when using the visual probe:

- Once the visual probe is connected to the HeliTest module, the concentration of Helium is displayed on the probe's logarithmic bar graph and on the HeliTest module's LCD.
- The Fixed Zero/Auto Zero function can be selected by using the pushbutton on the probe, as long as the HeliTest module's Setup parameter FZ/AZ is set to REMOTE (refer to the HeliTest Setup for more information).

To clean and replace the visual probe filter, refer to the Maintenance Section.

CONNECTING AND USING THE FUEL TOOLING KIT

The Fuel Tooling Kit must be connected to the compressed air distribution network of the facility (maximum inlet pressure of 10 bar/140 PSI), and to the industrial Helium supply bottle with related pressure reducer (maximum inlet pressure of 10 bar/140 PSI).

WARNING!

Remember that non-compliance with the pressure values indicated above could cause damage to the unit and could be dangerous for the operator.

Connection to a Helium Bottle

Proceed as follows to connect the Fuel Tooling Kit to a Helium bottle:

NOTE

Keep the Helium bottle and Fuel Tooling Kit far away from the injection point to avoid possible background resulting from a leaking bottle valve.

1. Install a pressure reducer on the bottle, following the standard safety instructions. This pressure reducer is not supplied with the kit.

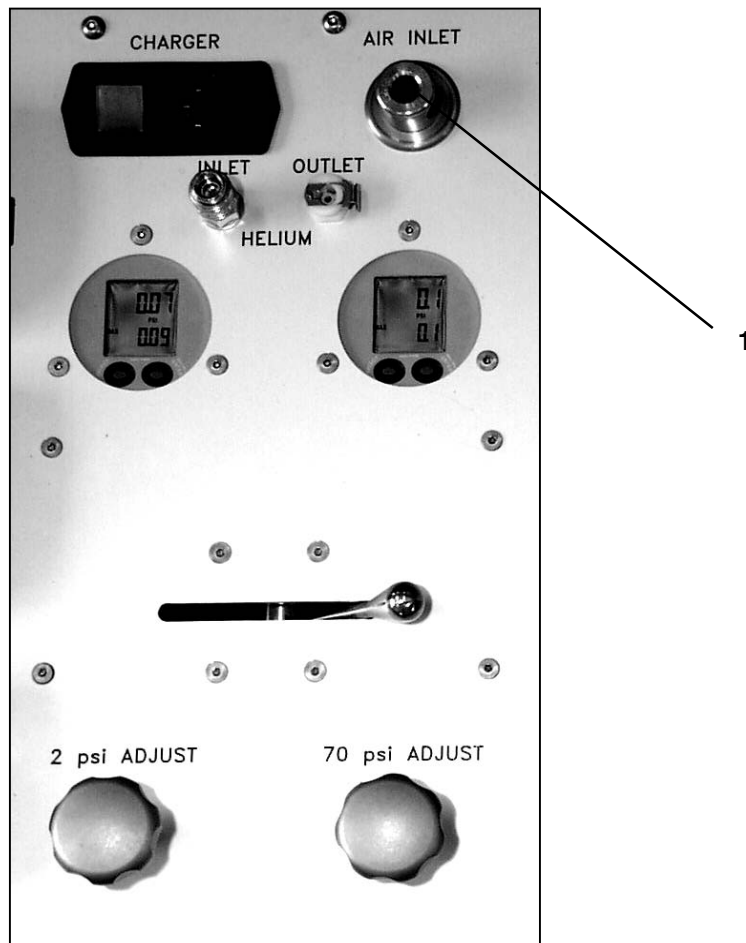
WARNING!

We strongly suggest the use of a pressure reducer with a last stage delivering a maximum pressure of 10 bar (140 PSI).

2. Connect the outlet of the last stage pressure reducer to the pipe and then connect the pipe to the Helium inlet (1) of the Fuel Tooling Kit indicated in the following figure.

NOTE

The customer needs to provide the adapter for connecting the outlet of the Helium bottle pressure reducer to the inlet pipe supplied.



Locating the Helium Inlet on the Fuel Tooling Kit

Venting Device Connection

The venting device supplies an air extraction of 35 l/sec. Its function is to remove potential Helium background that could result from the leakage of the compression chamber, or to remove Helium background from inside the aircraft wing (during a fuel leak check).

Proceed as follows to connect the venting device:

1. Orient the Fuel Tooling travelling case so that the vent device blows the pumping gases away from the check point.

 **WARNING!**

If the sucked air contains fuel vapours or any explosive (flammable) gas, the Venturi pump output must be displaced to a safe area.

2. Connect the vent device pipe, provided by the customer, to the Venturi pump inlet with the adaptor if necessary. The other end of the pipe must be positioned close to the area to be vented.

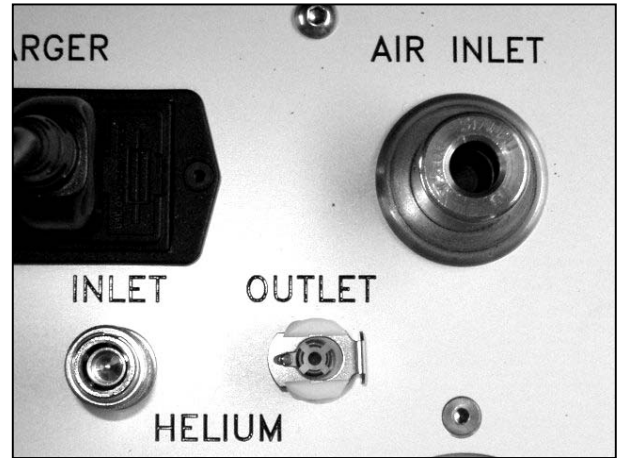


Venturi Pump Inlet on the backside of the case



Venturi inlet adaptor

3. Connect the compressed air supply to the Air inlet connector if the Fuel Tooling Kit (the related connector is supplied).



Locating the Compressed Air Inlet

4. To start and stop venting, simply inject or not compressed air in the Air Inlet connector..

Installing a Helium Compression Chamber

Proceed as follows to install the Helium compression chamber:

1. Locate the leak externally, possibly using talcum powder when the tank is filled with fuel.
2. Defuel, drain and vent the tanks as required so as to ensure a safe entrance inside the tank.
3. Perform all safety controls such as LEL (Lower Explosion Limit) check and oxygen level evaluation; throughout this test leave the venting device permanently in operation.
4. Carefully degrease the external area and blow dry the leak path with compressed air.
5. Apply the compression chamber on the leak detected in one of the following two ways:
 - using an injection chamber (provided with the kit) when the surface is flat.
 - using a plastic bag when the surface is not flat.

NOTE

The injection chamber can only be used on flat surfaces.

The injection chambers have been designed to inject Helium around a bolt or over flat areas.

- Install a soft adhesive gasket layer on the internal side of the wall of the injection chamber.
- Strongly apply the injection chamber against the area and then reinforce the injection point by applying the aluminium adhesive tape externally.

If the area is not flat, you need to create a plastic bag injection pocket using a thick-enough plastic sheet.

- Place a soft adhesive gasket layer on the aircraft.
- Stick the plastic sheet, avoiding leak paths along the gasketing.
- Cut the plastic sheet around the area and apply the aluminium adhesive tape over it so as to increase the resistance to the pressure of the bag.

Refer to the section Fuel Tank Testing for information on how the Helium compression chamber works.

Connecting the Helium Supply to the Compression Chamber

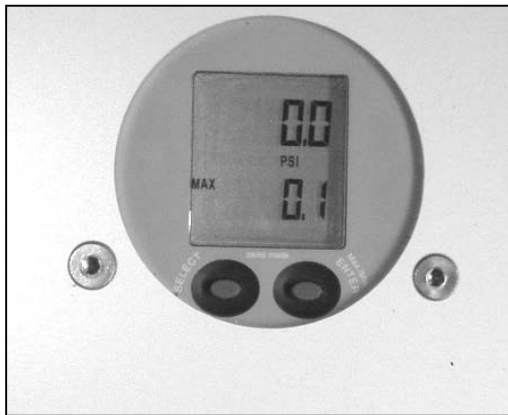
Proceed as follows to connect the Helium supply to the compression chamber:

1. Connect the 10 m long pipe with quick O-ring connectors to the connector on the Fuel Tooling kit after choosing the scale required for the test (0-2 PSI or 0-70 PSI).
2. Set the selector according to the outlet choice (0-2 PSI or 0-70 PSI).
3. Open the selected outlet valve to purge the tube.
4. Connect the tube to the pressurization chamber.
5. Switch on the dedicated gauge (0-2 PSI or 0-70 PSI) by pressing on SELECT button.
6. Adjust the pressure of the pressurization chamber as follows:

Start from a very low pressure (0.1 to 0.2 PSI) and then gradually increase, if necessary.
7. Start leak detection in the wing by using the HeliTest connected to the visual probe.

Setting the digital gauges

The two digital gauges have the same functions, the only difference is the range (0-2 PSI or 0-70 PSI).



Digital gauge

The gauge has two buttons:

- the left one (SELECT) is used to switch on the gauge, to select the functions and the pressure units and also to switch between maximum or minimum value display.
- the right one (ENTER) is used to validate the selection.

The following functions are available (with SELECT button) :

- **RESET**: the current value is saved as MIN/MAX value.
- **OFF** : Switch off the instrument.
- **MANO** : Give access to following functions:
 - **ZERO SET** : Save a new reference zero
 - **ZERO RES**: Restore the manufacturer calibrated zero
 - **CONT on** : Deactivate the automatic switch off
 - **CONT off** : Activate the automatic switch off. (15min after inactivity)

Ex : To select a new unit

- Switch on the gauge by pressing on **SELECT**.
- Wait 3 sec. for Measurement Mode.
- Press 3 times on **SELECT** to display **MANO**.
- Press on **ENTER** to display **ZERO SET**.
- Press on **SELECT** to display **ZERO RES**.
- Press on **SELECT** to display **CONT on** or **CONT off**.
- Press on **SELECT**, **BAR** is displayed.
- Press several times on **SELECT**, to display **mbar/hPa, kPa, Mpa, PSI**.
- Press on **ENTER** to validate the new value and to return in Measurement Mode.

Remarks:

- Press **ENTER** to display MIN value. It disappears after 5 sec.
- If the choice is not validate within 5 sec. by pressing **ENTER**, the gauge display the Measurement Mode.
- Switching on and switching off the gauge don't change the Setup.

- When **CONT on** is set, a flashing is displayed.
- If a pressure indication can't be displayed, **OFL** (overflow) or **UFL** (underflow) message appears.
- If the applied pressure is above the range, the last displayed pressure value flashes.
- When the battery sign appears in the top left corner, it means that the battery is low and need to be replace.
- To change a gauge battery, remove and turn the whole panel, unscrew the circular cover and then change the battery.

The battery life cycle is about 1400 hours in continuous use.

STORAGE AND MAINTENANCE

General Maintenance

As a general rule, all HeliTest Wing equipment should be stored in an area protected against shocks and humidity. The equipment must always travel in the related protective cases.

- It is recommended to apply the yearly "Helitest Wing Inspection Procedure".
- Only qualified personnel is authorized to change the safety pressure membrane of the case when necessary
- Never disassemble the gas lines, valves or connectors; such action must only be performed by qualified personnel.
- If a connector has to be replaced in the field, use the HeliTest Helium leak detector to check that it has been reinstalled leak-free before testing an aircraft. The same approach has to be performed on pipe connectors.
- Do not leave any dust or grease on the quick connectors so that they remain leak-free.
- If needed, clean the case or the accessories with a soft solvent (methyl alcohol, freon, etc.)
- Always check that the Helium pipes are not clogged. Clogged pipes could bring bad test results as the pressure would not be applied on the injection chamber.

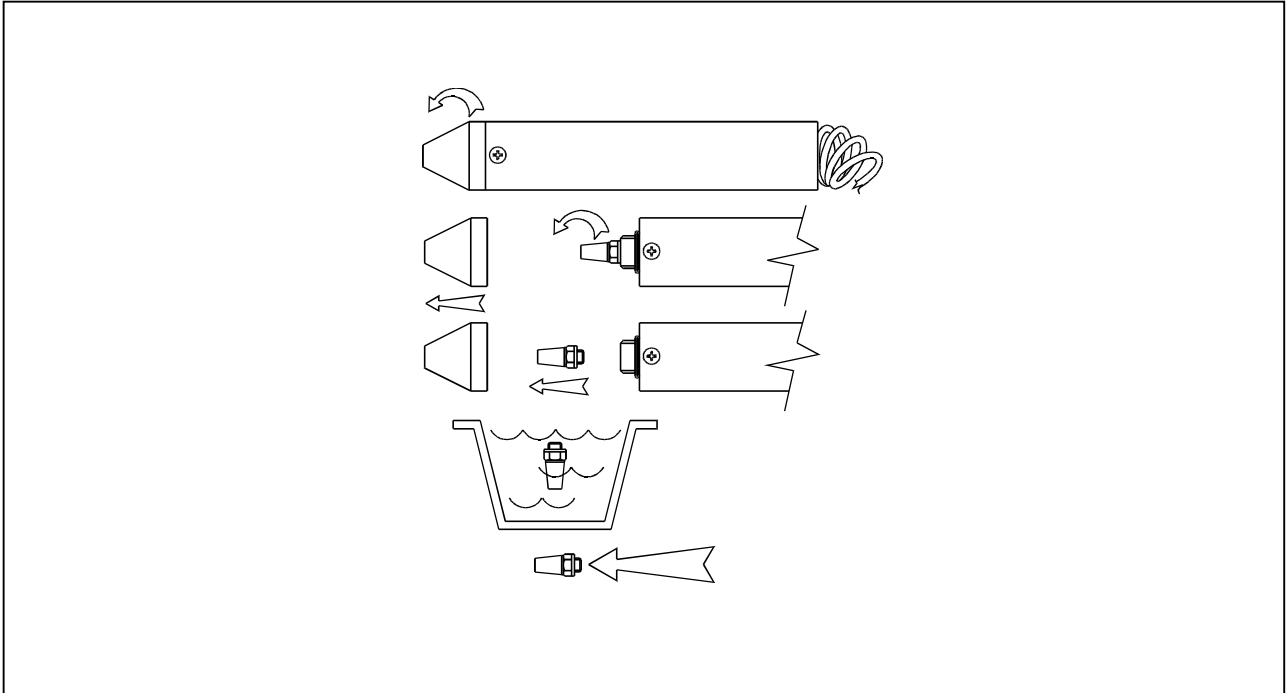
Helitest Module Maintenance

Replacement HeliTests are available on an advance exchange basis through sales offices.

Cleaning the Standard Probe Bronze Filter

Every two weeks, or whenever necessary, clean the sintered bronze filter as follows:

1. Unscrew and remove the head of the probe and then unscrew and remove the sintered bronze filter as shown in the following figure.
2. Clean the sintered bronze filter with a suitable degreasing solvent. Rinse and then dry with compressed air by following the indications given in the figure below.
3. Replace the filter if necessary.



Removing and Cleaning the Standard Probe Bronze Filter

Cleaning the Visual Probe Bronze Filter

To clean the visual probe's bronze filter, proceed as explained for the sintered bronze filter of the standard probe.

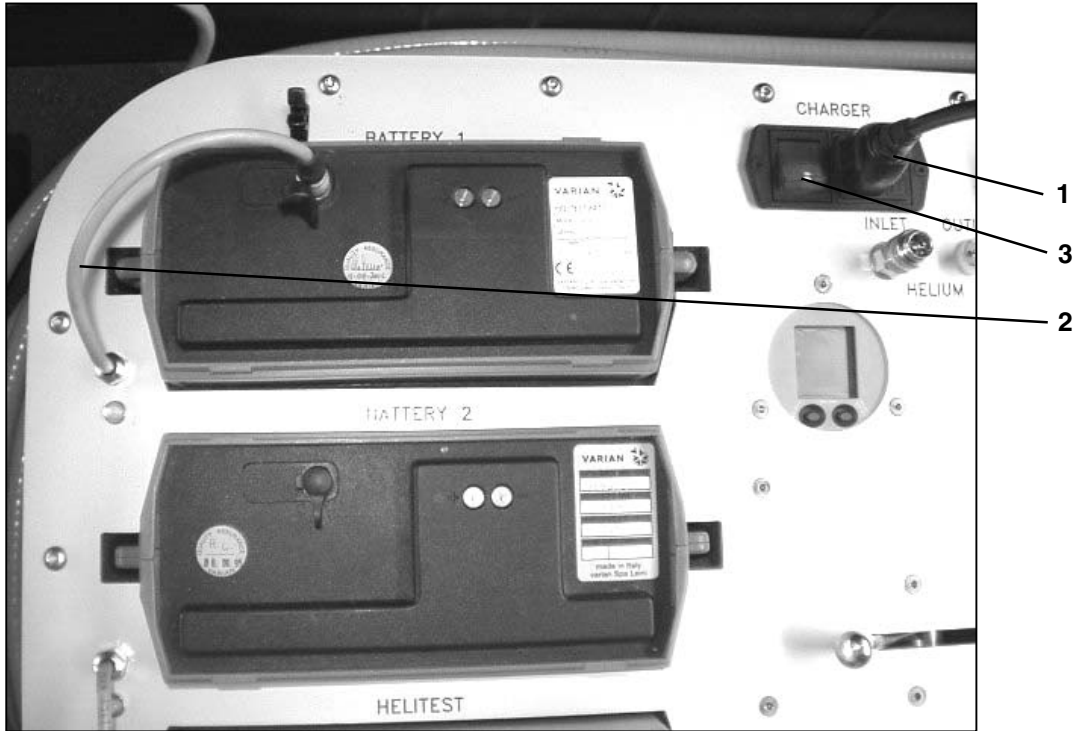
Replacing the Visual Probe Bronze Filter

Proceed as follows to replace the visual probe bronze filter:

1. Unscrew the head of the probe, unscrew the sintered bronze filter and then extract the filter from the body of the probe.
2. Insert a filter of the same type as the one removed and then screw the bronze filter and probe head back on again.

Battery Recharge

To recharge the battery, connect the power cable (1) to the travelling case, connect the battery charger cable (2) to the battery and turn the switch ON (3) (see the following figure).



During the charge phase, the battery charger LED is red and will change to green when the battery is fully charged.

When the battery is fully discharged, it is advisable to recharge it for at least 12 hours.

NOTE

The two batteries can be charge simultaneously. For each battery, the charge is controlled by green/red LED

NOTE

For optimum performance, recharge the battery every time usage. When HeliTest and battery are in store for long periods, it is advisable to recharge it at least every 6 months.



DANGER!

Use the HeliTest battery charger in a SAFE AREA ONLY (where there are no fuel vapors or explosive (flammable) gases).

SPARE PARTS AND CONSUMABLES

DESCRIPTION	PART NUMBER
Spare rechargeable battery	969-3530
Battery charger, AC/DC converter	969-3535
Probe pin heads set	969-3515
Maintenance kit (filters, O-Rings)	SR 03.702394
Fitting kit	SR 03.702395
Power cable (battery to HeliTest)	SR 03-647936
Belt	SR 03-647893
PTFE filters for Visual Probe	MILLIPORE: Millex – FH code SLFH 025 NS (box of 50 filters)



Request for Return



1. A Return Authorization Number (RA#) **WILL NOT** be issued until this Request for Return is completely filled out, signed and returned to Varian Customer Service.
2. Return shipments shall be made in compliance with local and international **Shipping Regulations** (IATA, DOT, UN).
3. The customer is expected to take the following actions to ensure the **Safety** of workers at Varian: (a) Drain any oils or other liquids, (b) Purge or flush all gasses, (c) Wipe off any excess residues in or on the equipment, (d) Package the equipment to prevent shipping damage, (for Advance Exchanges please use packing material from replacement unit).
4. Make sure the shipping documents clearly show the RA# and then return the package to the Varian location nearest you.

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Asia and ROW

Varian Vacuum Technologies
 Local Office

CUSTOMER INFORMATION

Company name:	
Contact person: Name:	Tel:
Fax:	E-Mail:
Ship Method:	Shipping Collect #: P.O.#:
<u>Europe only:</u> VAT reg. Number:	<u>USA only:</u> <input type="checkbox"/> Taxable <input type="checkbox"/> Non-taxable
Customer Ship To:	Customer Bill To:
.....
.....

PRODUCT IDENTIFICATION

Product Description	Varian P/N	Varian S/N	Purchase Reference

TYPE OF RETURN (check appropriate box)

<input type="checkbox"/> Paid Exchange	<input type="checkbox"/> Paid Repair	<input type="checkbox"/> Warranty Exchange	<input type="checkbox"/> Warranty Repair	<input type="checkbox"/> Loaner Return
<input type="checkbox"/> Credit	<input type="checkbox"/> Shipping Error	<input type="checkbox"/> Evaluation Return	<input type="checkbox"/> Calibration	<input type="checkbox"/> Other

HEALTH and SAFETY CERTIFICATION

Varian Vacuum Technologies **CAN NOT ACCEPT** any equipment which contains **BIOLOGICAL HAZARDS** or **RADIOACTIVITY**. Call Varian Customer Service to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

HAS NOT been exposed to any toxic or hazardous materials

OR

HAS been exposed to any toxic or hazardous materials. In case of this selection, check boxes for any materials that equipment was exposed to, check all categories that apply:

Toxic Corrosive Reactive Flammable Explosive Biological Radioactive

List all toxic or hazardous materials. Include product name, chemical name and chemical symbol or formula.

.....

Print Name: Customer Authorized Signature:

Print Title: Date:/...../.....

NOTE: If a product is received at Varian which is contaminated with a toxic or hazardous material that was not disclosed, **the customer will be held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Varian employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Do not write below this line

Notification (RA)#: Customer ID#: Equipment #:

FAILURE REPORT

TURBO PUMPS and TURBOCONTROLLERS

<input type="checkbox"/> Does not start <input type="checkbox"/> Does not spin freely <input type="checkbox"/> Does not reach full speed <input type="checkbox"/> Mechanical Contact <input type="checkbox"/> Cooling defective	<input type="checkbox"/> Noise <input type="checkbox"/> Vibrations <input type="checkbox"/> Leak <input type="checkbox"/> Overtemperature	POSITION <input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal <input type="checkbox"/> Upside-down <input type="checkbox"/> Other:	PARAMETERS Power: Rotational Speed: Current: Inlet Pressure: Temp 1: Foreline Pressure: Temp 2: Purge flow:
TURBOCONTROLLER ERROR MESSAGE:			OPERATION TIME:

ION PUMPS/CONTROLLERS

<input type="checkbox"/> Bad feedthrough <input type="checkbox"/> Vacuum leak <input type="checkbox"/> Error code on display	<input type="checkbox"/> Poor vacuum <input type="checkbox"/> High voltage problem <input type="checkbox"/> Other
Customer application:	

VALVES/COMPONENTS

<input type="checkbox"/> Main seal leak <input type="checkbox"/> Solenoid failure <input type="checkbox"/> Damaged sealing area	<input type="checkbox"/> Bellows leak <input type="checkbox"/> Damaged flange <input type="checkbox"/> Other
Customer application:	

LEAK DETECTORS

<input type="checkbox"/> Cannot calibrate <input type="checkbox"/> Vacuum system unstable <input type="checkbox"/> Failed to start	<input type="checkbox"/> No zero/high background <input type="checkbox"/> Cannot reach test mode <input type="checkbox"/> Other
Customer application:	

INSTRUMENTS

<input type="checkbox"/> Gauge tube not working <input type="checkbox"/> Communication failure <input type="checkbox"/> Error code on display	<input type="checkbox"/> Display problem <input type="checkbox"/> Degas not working <input type="checkbox"/> Other
Customer application:	

PRIMARY PUMPS

<input type="checkbox"/> Pump doesn't start <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Pump seized	<input type="checkbox"/> Noisy pump (describe) <input type="checkbox"/> Over temperature <input type="checkbox"/> Other
Customer application:	

DIFFUSION PUMPS

<input type="checkbox"/> Heater failure <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Vacuum leak	<input type="checkbox"/> Electrical problem <input type="checkbox"/> Cooling coil damage <input type="checkbox"/> Other
Customer application:	

FAILURE DESCRIPTION

(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

NOTA: Su richiesta questo documento è disponibile anche in Tedesco, Italiano e Francese.
REMARQUE : Sur demande ce document est également disponible en allemand, italien et français.
HINWEIS: Auf Aufrage ist diese Unterlage auch auf Deutsch, Italienisch und Französisch erhältlich.

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