

# ***HeliTest Rack***

**Model 969-3580**

**Model 969-3581**

**Model 969-3582**

**Model 969-3583**

*MANUALE ISTRUZIONI*

*BEDIENUNGSHANDBUCH*

*NOTICE DE MODE D'EMPLOI*

*INSTRUCTION MANUAL*

# HeliTest Rack



**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.

Gli operatori ed il personale di manutenzione devono essere consapevoli di ogni rischio associato all'utilizzo di questo strumento. Devono riconoscere rischi e potenziali condizioni di pericolo e sapere come evitarli. Le conseguenze di un improprio e negligente uso dello strumento possono seriamente comprometterne l'efficienza. Questo prodotto deve essere utilizzato quindi solo da personale qualificato.

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. L'HeliTest Rack è un rilevatore di fughe, controllato da un microprocessore, realizzato con componenti a stato solido e con capacità di autodiagnostica e autoprotezione. Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante l'utilizzo dell'apparecchiatura.

**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.

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**ATTENZIONE!**

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

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### **NOTA**

*Le note contengono informazioni importanti estrapolate dal testo.*

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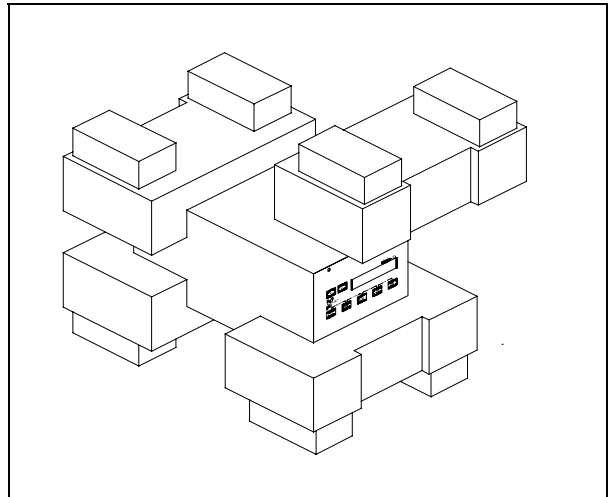
## **IMMAGAZZINAMENTO**

Durante il trasporto e l'immagazzinamento dei dispositivi devono essere soddisfatte le seguenti condizioni ambientali:

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

## **PREPARAZIONE PER L'INSTALLAZIONE**

Il dispositivo viene fornito in un imballo protettivo speciale; se si presentano segni di 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 il dispositivo e a non sottoporlo 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.



*Imballo dell'HeliTest Rack*

Ogni dispositivo è fornito dalla Varian predisposto per una certa tensione di alimentazione:

- il modello 969-3581 e 969-3583 per 220 Vac
- il modello 969-3580 e 969-3582 per 120 Vac

## INSTALLAZIONE



**PERICOLO!**

L'HeliTest Rack è fornito di un cavo di alimentazione a tre fili con una spina di tipo approvato a livello internazionale. Utilizzare sempre questo cavo di alimentazione ed inserire la spina in una presa con un adeguato collegamento di massa onde evitare scariche elettriche. All'interno del dispositivo si sviluppano alte tensioni che possono recare gravi danni o la morte. Prima di eseguire qualsiasi operazione di installazione o manutenzione dell'HeliTest Rack, scollegarlo dalla presa di alimentazione.

### NOTA

L'HeliTest Rack può essere installato su di un tavolo o all'interno di un apposito rack. In ogni caso occorre che l'aria di raffreddamento possa circolare liberamente intorno all'apparato. Non installare né utilizzare il dispositivo in ambienti esposti ad agenti atmosferici (pioggia, gelo, neve), polveri, gas aggressivi, in ambienti esplosivi o con elevato rischio di incendio.

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

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

Per gli altri collegamenti e l'installazione degli accessori opzionali, consultare le varie sezioni presenti in questo documento.



**ATTENZIONE!**

L'HeliTest Rack appartiene alla seconda categoria di installazione (o sovratensione) prevista dalla normativa EN 61010-1. Connettere quindi il dispositivo ad una linea di alimentazione che soddisfi tale categoria.



**ATTENZIONE!**

Il dispositivo di sezionamento dell'HeliTest Rack è la presa di rete. Installare l'unità in modo che il dispositivo di sezionamento sia facilmente accessibile.

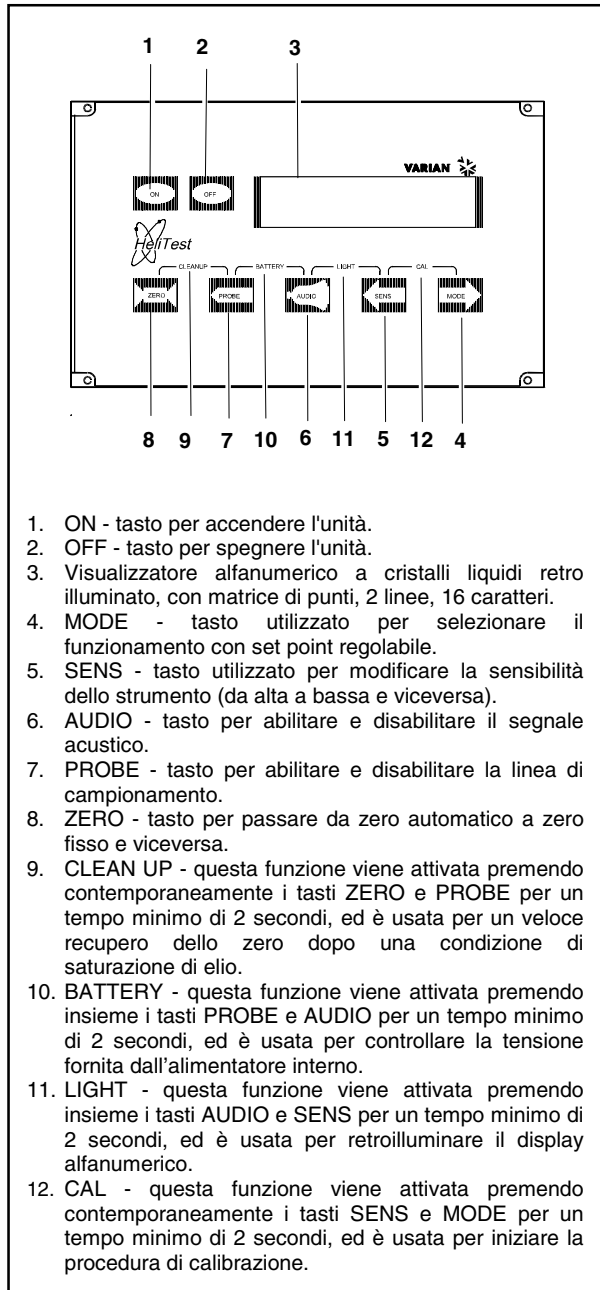


**ATTENZIONE!**

L'HeliTest Rack ha un connettore per l'uscita Analog o RS232 che deve essere connesso ai circuiti esterni in modo che nessuna parte sotto tensione sia accessibile. Assicurarsi che l'isolamento del dispositivo connesso all'HeliTest Rack abbia un'isolamento adeguato anche in condizione di guasto singolo come previsto dalla normativa EN 61010-1.

## Comandi, Indicatori e Connettori dell'HeliTest Rack

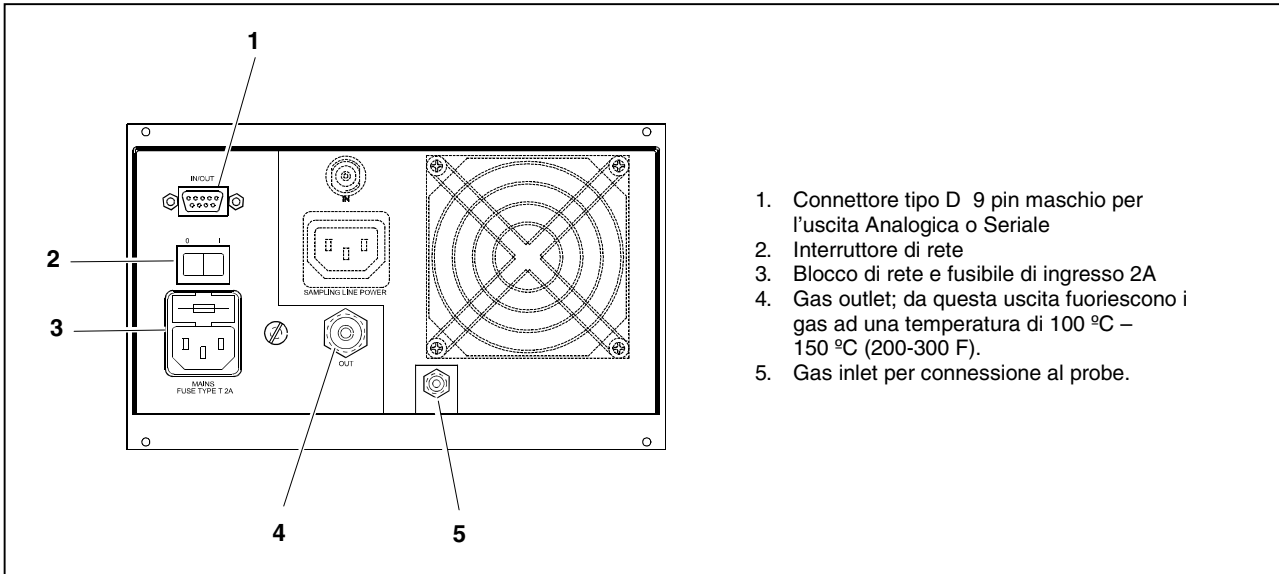
Di seguito sono illustrati il pannello di comando dell'HeliTest Rack ed i pannelli di interconnessione. Per maggiori dettagli fare riferimento al resto del manuale.



1. ON - tasto per accendere l'unità.
2. OFF - tasto per spegnere l'unità.
3. Visualizzatore alfanumerico a cristalli liquidi retro illuminato, con matrice di punti, 2 linee, 16 caratteri.
4. MODE - tasto utilizzato per selezionare il funzionamento con set point regolabile.
5. SENS - tasto utilizzato per modificare la sensibilità dello strumento (da alta a bassa e viceversa).
6. AUDIO - tasto per abilitare e disabilitare il segnale acustico.
7. PROBE - tasto per abilitare e disabilitare la linea di campionamento.
8. ZERO - tasto per passare da zero automatico a zero fisso e viceversa.
9. CLEAN UP - questa funzione viene attivata premendo contemporaneamente i tasti ZERO e PROBE per un tempo minimo di 2 secondi, ed è usata per un veloce recupero dello zero dopo una condizione di saturazione di elio.
10. BATTERY - questa funzione viene attivata premendo insieme i tasti PROBE e AUDIO per un tempo minimo di 2 secondi, ed è usata per controllare la tensione fornita dall'alimentatore interno.
11. LIGHT - questa funzione viene attivata premendo insieme i tasti AUDIO e SENS per un tempo minimo di 2 secondi, ed è usata per retroilluminare il display alfanumerico.
12. CAL - questa funzione viene attivata premendo contemporaneamente i tasti SENS e MODE per un tempo minimo di 2 secondi, ed è usata per iniziare la procedura di calibrazione.

Pannello frontale dell'HeliTest Rack  
969-3581, 969-3582, 969-3580 e 969-3582





1. Connettore tipo D 9 pin maschio per l'uscita Analogica o Seriale
2. Interruttore di rete
3. Blocco di rete e fusibile di ingresso 2A
4. Gas outlet; da questa uscita fuoriescono i gas ad una temperatura di 100 °C – 150 °C (200-300 F).
5. Gas inlet per connessione al probe.

*Pannello posteriore dell'HeliTest Rack*

**PROCEDURE DI USO**

**Accensione dell'HeliTest Rack**

Per accendere il dispositivo è sufficiente inserire il cavo di alimentazione nella presa di rete e portare l'interruttore di linea in posizione 1.

**Avvio dell'HeliTest Rack**

Per avviare il dispositivo occorre premere il pulsante ON sul pannello frontale.

**Arresto dell'HeliTest Rack**

Per arrestare il dispositivo occorre premere il pulsante OFF sul pannello frontale.

**MANUTENZIONE**

Il modulo HeliTest Rack, richiede solo la pulizia della linea d'aspirazione, per ulteriori informazioni si rimanda al capitolo "Technical Information". Qualsiasi intervento deve essere eseguito da personale autorizzato. In caso di guasto è possibile usufruire del servizio di riparazione Varian o del "Varian advanced exchange service", che permette di ottenere un HeliTest Rack rigenerato in sostituzione di quello guasto.



**PERICOLO!**

Prima di effettuare qualsiasi intervento sul dispositivo scollegare il cavo di alimentazione.

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

**ALLGEMEINES**

Dieser Apparat ist für Fachbetriebe bestimmt. Die Bediener und das Wartungspersonal müssen alle mit dem Gebrauch dieses Instruments verbundenen Gefahren kennen. Sie müssen Risiken und eventuelle Gefahrensituationen erkennen und wissen, wie sie zu vermeiden sind. Die Folgen falschen oder nachlässigen Gebrauchs des Instruments können die Effizienz stark gefährden. Daher darf dies Produkt nur von qualifiziertem Personal benutzt werden.

Vor Gebrauch sollte der Benutzer diese Gebrauchsanleitung sowie alle weiteren mitgelieferten Zusatzdokumentationen genau lesen. Bei Nichtbeachtung - auch teilweise - der enthaltenen Hinweise, unsachgemäßem Gebrauch durch ungeschultes Personal, nicht autorisierten Eingriffen und Mißachtung der einheimischen, hier zur Geltung kommenden Bestimmungen übernimmt die Firma Varian keinerlei Haftung.

HeliTest Rack ist ein Lecksucher, der von einem Mikroprozessor gesteuert wird, mit Festkörperelementen realisiert ist und über Selbst-Diagnose und Eigenschutz-Funktionen verfügt. Die folgenden Absätze enthalten alle Informationen, die für die Bediener-sicherheit beim Gebrauch der Apparatur nötig sind.

**In dieser Gebrauchsanleitung werden Sicherheitshinweise folgendermaßen hervorgehoben:**



**GEFAHR!**

Die Gefahrenhinweise lenken die Aufmerksamkeit des Bedieners auf eine bestimmte Prozedur oder Praktik, die bei unkorrekter Ausführung schwere Verletzungen hervorrufen können.



**ACHTUNG!**

Die Warnhinweise vor bestimmten Prozeduren machen den Bediener darauf aufmerksam, daß bei Nichteinhaltung Schäden an der Anlage entstehen können.

**ANMERKUNG**

*Die Anmerkungen enthalten wichtige Informationen, die aus dem Text hervorgehoben werden.*

**LAGERUNG**

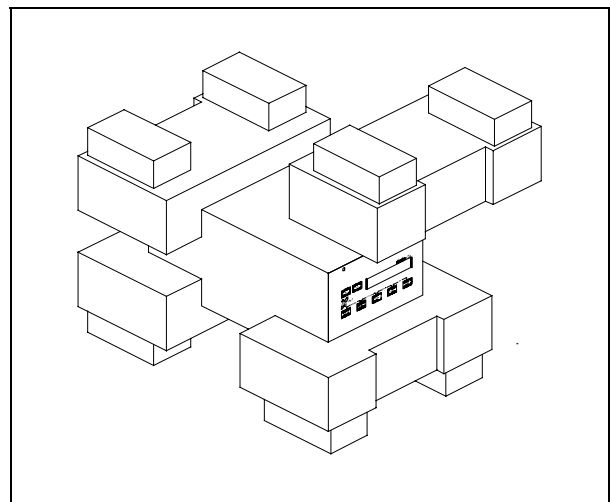
Beim Transport und bei der Lagerung der Controller müssen folgende klimatische Verhältnisse eingehalten werden:

- Temperatur: von -20 °C bis +70 °C
- Relative Luftfeuchtigkeit: 0-95 %  
(nicht kondensierend)

**VOR DER INSTALLATION**

Das HeliTest Rack wird mit einer speziellen Schutzverpackung geliefert. Eventuelle Transportschäden müssen der zuständigen örtlichen Verkaufsstelle gemeldet werden.

Beim Auspacken vorsichtig vorgehen, damit die Steuereinheit nicht fällt oder Stößen ausgesetzt wird. Das Verpackungsmaterial muß korrekt entsorgt werden. Es ist vollständig recyclebar und entspricht der EG-Richtlinie 85/399 für Umweltschutz.



*Verpackung des HeliTest Rack*

Jedes Gerät wird von Varian mit Einstellung für eine bestimmte Versorgungsspannung geliefert:

- das Modell 969-3581 und 969-3583 für 220 V~
- das Modell 969-3580 und 969-3582 für 120 V~

INSTALLATION



**GEFAHR!**

Das HeliTest Rack wird mit einem Netzkabel geliefert, das 3 Drähte enthält und mit einem den internationalen Normen entsprechenden Stecker ausgerüstet ist. Es sollte immer dieses Netzkabel benutzt werden, das an eine korrekt geerdete Steckdose anzuschließen ist, um Stromentladungen zu vermeiden. Im Inneren des HeliTest Rack entstehen hohe Spannungen, die schwere Schäden verursachen und zum Teil lebensgefährlich sein können. Vor jedem Montage- bzw. Wartungseingriff muß deshalb der Netzstecker gezogen werden.

**ANMERKUNG**

Das HeliTest Rack kann auf einen Tisch oder einem Gestell montiert werden. In beiden Fällen muß auf die ungehinderte Zirkulation der Kühlluft im Bereich des Geräts geachtet werden. Das HeliTest Rack darf nicht in Umgebungen installiert u/o benutzt werden, die Witterungseinflüssen (Regen, Frost, Schnee), Staub und aggressiven Gasen ausgesetzt sind und in denen Explosions- und erhöhte Brandgefahr besteht.

Beim Betrieb müssen folgende Umgebungsbedingungen eingehalten werden:

- Temperatur: von 0 °C bis +40 °C
- Relative Luftfeuchtigkeit: 0 - 95 % (nicht kondensierend).

Für die anderen Anschlüsse und die Installation des optionalen Zubehörs siehe die entsprechenden Abschnitte in dieser Gebrauchsanleitung.



**ACHTUNG!**

HeliTest Rack gehört zur zweiten Installations-(oder Überspannungs-)Kategorie wie von der Norm EN 61010-1 vorgesehen. Also muss das Gerät an eine Versorgungsleitung angeschlossen werden, die dieser Kategorie entspricht.



**ACHTUNG!**

Die Abtrennvorrichtung des HeliTest Rack ist der Netzstecker. Die Einheit so installieren, dass diese Abtrennvorrichtung leicht erreichbar ist.



**ACHTUNG!**

Das HeliTest Rack hat einen Ausgangsstecker für Analog oder RS232, der so an externe Kreise angeschlossen werden muss, dass kein unter Spannung stehendes Teil zugänglich ist. Sicherstellen, dass die Isolierung der an das HeliTest Rack angeschlossenen Einrichtung auch bei einer Einzeldefekt-Bedingung ausreichend ist wie von der Norm EN 61010-1 vorgesehen.

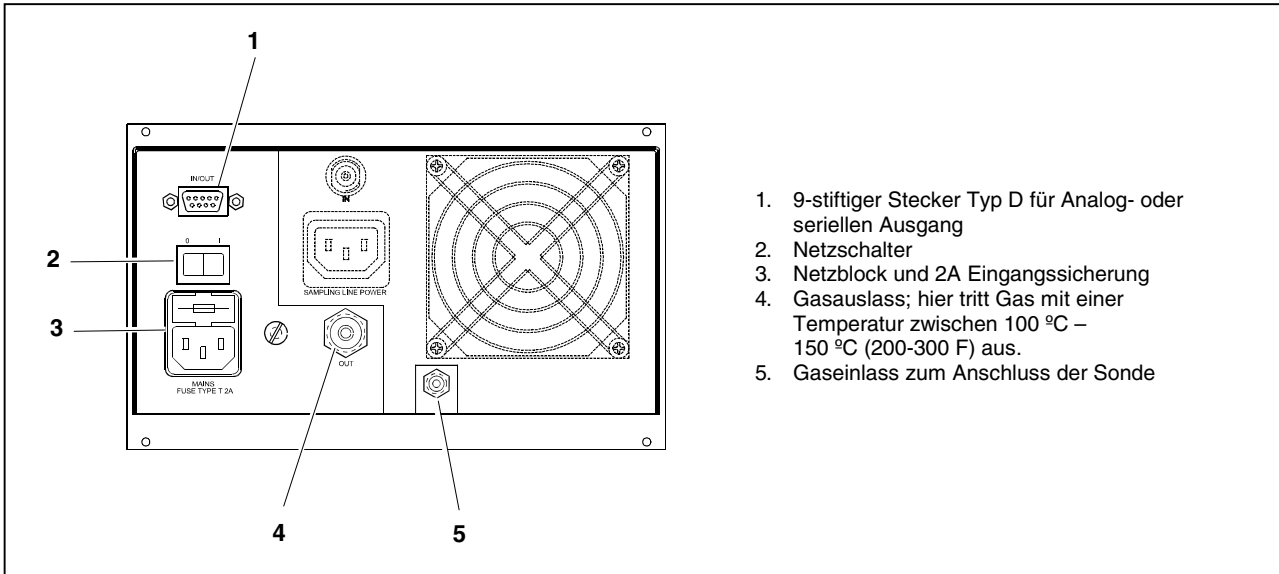
**Steuerungen, Anzeigen und Verbinder des HeliTest Rack**

Die folgenden Abbildungen zeigen das Bedienfeld und die Anschlussstafel des HeliTest Rack. Weitere Einzelheiten finden sich im Rest der Gebrauchsanleitung.



1. ON - Taste zum Einschalten des Gerätes.
2. OFF - Taste zum Abschalten des Gerätes.
3. LCD Hintergrundbeleuchtung für alphanumerische Anzeige, zwei Zeilen, insgesamt 16 Zeichen.
4. MODE - Benutzung der Bedienungstasten zur Einstellung des Schwellwertes.
5. SENS - Taste zum Umschalten von hoher Empfindlichkeit auf niedrigere Empfindlichkeit und umgekehrt.
6. AUDIO - Taste zum Ein-bezw. Ausschalten der akustischen Leckanzeige.
7. PROBE - Taste zum Ein-bezw. Ausschalten der Schnüfflerpumpe (Membranpumpe).
8. ZERO - Taste zum Umschalten von automatischem Nullabgleich auf festen Nullpunkt.
9. CLEANUP - diese Funktion wird aktiviert, indem man die ZERO und die PROBE-Taste für mindestens 2 sec. gleichzeitig drückt. Sie wird benutzt um einen schnellen Null-abgleich nach erfolgter Helium Sättigung zu erreichen.
10. BATTERY - diese Funktion wird durch gleichzeitiges Drücken der Tasten PROBE und AUDIO für mindestens 2 Sekunden aktiviert. Sie dient zur Kontrolle der Spannung, die von der internen Stromversorgung geliefert wird.
11. LIGHT - diese Funktion wird aktiviert, indem man gleichzeitig die AUDIO- und die SENS-Taste für mindestens 2 sec. drückt. Sie schaltet die Hintergrund-beleuchtung der Leckanzeige ein oder aus.
12. CAL - diese Funktion wird aktiviert, indem man gleichzeitig für 2 sec. die SENS- und die MODE-Taste drückt. Mit ihr wird das Gerät in den Kalibriermodus geschaltet.

Vorderes Bedienfeld des HeliTest Rack  
969-3581, 969-3582, 969-3580 und 969-3582



1. 9-stiftiger Stecker Typ D für Analog- oder seriellen Ausgang
2. Netzschalter
3. Netzblock und 2A Eingangssicherung
4. Gasauslass; hier tritt Gas mit einer Temperatur zwischen 100 °C – 150 °C (200-300 F) aus.
5. Gaseinlass zum Anschluss der Sonde

Rückseitige Tafel des HeliTest Rack

## BEDIENUNG

### **Einschalten des HeliTest Rack**

Zum Einschalten des Geräts brauchen nur das Versorgungskabel in den Netzstecker gesteckt und der Netzschalter auf die Position 1 gesetzt werden.

### **Starten des HeliTest Rack**

Zum Starten des Geräts muss die Taste ON auf dem vorderen Feld gedrückt werden.

### **Stoppen des HeliTest Rack**

Zum Stoppen des Geräts muss die Taste OFF auf dem vorderen Feld gedrückt werden.

## WARTUNG

Das Modul HeliTest Rack erfordert nur Reinigung der Ansaugleitung. Weiteres findet sich im Kapitel "Technical Information". Alle Eingriffe dürfen nur von autorisiertem Personal durchgeführt werden.

Bei Defekten kann man sich des Varian Wartungsdienstes oder des "Varian Advanced Exchange Service" bedienen. Letzterer erlaubt den Ersatz des defekten HeliTest Rack durch ein generalüberholtes.



**GEFAHR!**

Vor jedem Eingriff am HeliTest Rack muß der Netzstecker gezogen werden.

Eine eventuelle Verschrottung muß unter Einhaltung der einschlägigen landesüblichen Vorschriften erfolgen.

**INDICATIONS GENERALES**

Cet appareillage a été conçu en vue d'une utilisation professionnelle.

Les opérateurs et le personnel chargé de l'entretien doivent connaître tous les risques découlant de l'utilisation de cet appareil. Ils doivent être capables de reconnaître toute situation dangereuse potentielle et savoir comment l'éviter. Une utilisation impropre et inattentive de l'instrument peut provoquer des graves dysfonctionnements de ce dernier. Par conséquent ce produit ne doit être utilisé que par du personnel qualifié.

Il est conseillé à l'utilisateur de lire attentivement cette notice d'instructions ainsi que toute autre indication supplémentaire fournie par Varian, avant d'utiliser l'appareil. Varian décline par conséquent toute responsabilité en cas de non-respect total ou partiel des instructions fournies, d'utilisation incorrecte par du personnel non formé, d'opérations non autorisées ou d'un emploi contraire aux réglementations nationales spécifiques. L'HeliTest Rack est un détecteur de fuite, commandé par un microprocesseur, fabriqué avec des composants à l'état solide et doté des caractéristiques d'autodiagnostic et d'autoprotection. Les paragraphes suivants donnent toutes les indications nécessaires à garantir la sécurité de l'opérateur pendant l'utilisation de l'appareillage.

**Cette notice utilise les signes conventionnels suivants:**



**DANGER!**

Les messages de danger attirent l'attention de l'opérateur sur une procédure ou une manoeuvre spéciale qui, si elle n'est pas effectuée correctement, risque de provoquer de graves lésions.



**ATTENTION!**

Les messages d'attention apparaissent avant certaines procédures qui, si elles ne sont pas observées, pourraient endommager sérieusement l'appareillage.

**NOTE**

*Les notes contiennent des renseignements importants, isolés du texte.*

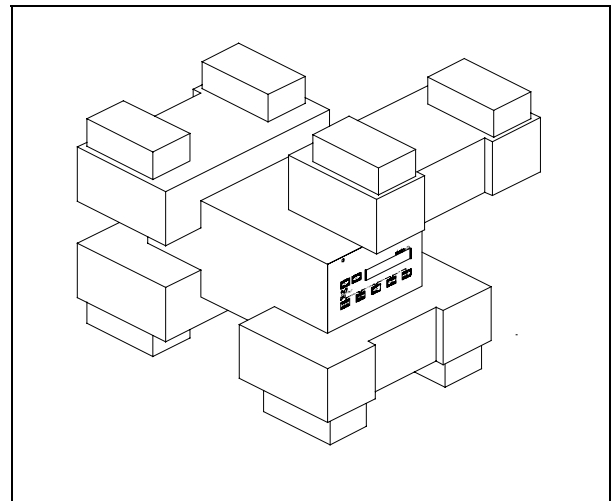
**EMMAGASINAGE**

Pendant le transport et l'emmagasinement des dispositifs, il faudra veiller à respecter les conditions environnementales suivantes:

- température: de - 20 °C à + 70 °C
- humidité relative: de 0% à 95 % (non condensante).

**PREPARATION POUR L'INSTALLATION**

Le dispositif est livré dans un emballage protectif spécial; si l'on constate des traces de dommages pouvant s'être produits pendant le transport, contacter aussitôt le bureau de vente local. Pendant l'opération d'ouverture de l'emballage, veiller tout particulièrement à ne pas laisser tomber le dispositif et à ne lui faire subir aucun choc. Ne pas jeter l'emballage dans la nature. Le matériel est entièrement recyclable et il est conforme aux directives CEE 83/399 en matière de protection de l'environnement.



*Emballage du HeliTest Rack*

Chaque dispositif est fourni par Varian pré-équipé pour une certaine tension d'alimentation:

- les modèles 969-3581 et 969-3583 pour 220 Vac
- les modèles 969-3580 et 969-3582 pour 120 Vac

## INSTALLATION



**DANGER!**

L'HeliTest Rack est doté d'un câble d'alimentation à trois fils avec une fiche du type approuvé au niveau international. Utiliser toujours ce câble d'alimentation et introduire la fiche dans une prise pourvue d'un branchement approprié à la masse, afin d'éviter toute décharge électrique. A l'intérieur du dispositif se développent de hautes tensions qui peuvent causer de graves dommages et même la mort. Avant d'effectuer toute opération d'installation ou d'entretien du dispositif HeliTest Rack, le débrancher de la prise d'alimentation.

### NOTE

Le dispositif HeliTest Rack peut être installé sur une table ou à l'intérieur d'un rack prévu à cet effet. Il est en tout cas nécessaire que l'air de refroidissement puisse circuler librement à l'intérieur de l'appareil. Ne pas installer et/ou utiliser le dispositif dans des milieux exposés à des agents atmosphériques (pluie, gel, neige), à des poussières, à des gaz de combat ainsi que dans des milieux explosifs ou à risque élevé d'incendie.

Pendant le fonctionnement, il est nécessaire de respecter les conditions environnementales suivantes:

- température: de 0 °C à + 40 °C
- humidité relative: de 0% à 95% (non condensante).

Pour les autres branchements et pour l'installation des accessoires en option, se reporter aux différents paragraphes de cette notice.



**ATTENTION!**

L'HeliTest Rack fait partie de la deuxième classe d'installation (ou surtension) prévue par la norme EN 61010-1. Par conséquent le dispositif doit être branché sur une ligne d'alimentation satisfaisant aux exigences prévues par cette classe.



**ATTENTION!**

Le dispositif de sectionnement de l'HeliTest Rack est la prise de secteur. Installer l'unité de façon à ce que le dispositif de sectionnement soit facilement accessible.



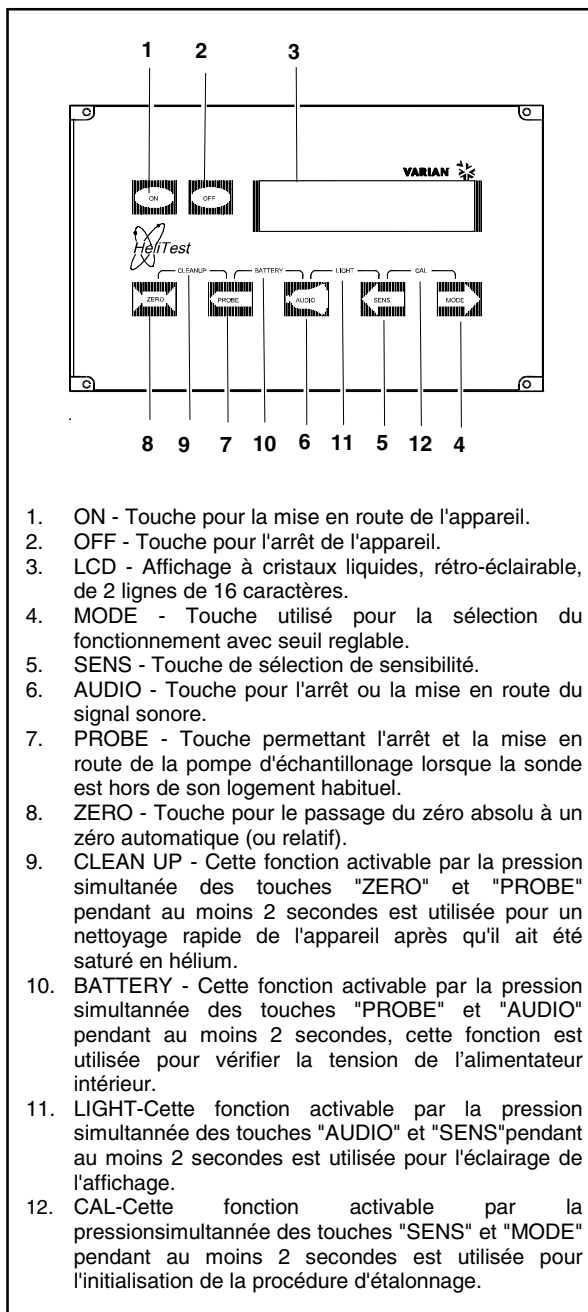
**ATTENTION!**

L'HeliTest Rack est pourvu d'un connecteur pour la sortie Analogique ou RS232 qui doit être branché sur les circuits extérieurs pour empêcher tout accès aux composants sous tension.

S'assurer que l'isolation du dispositif branché sur l'HeliTest Rack est adéquate même en condition de défaut individuel, comme il est prévu dans la norme EN 61010-1.

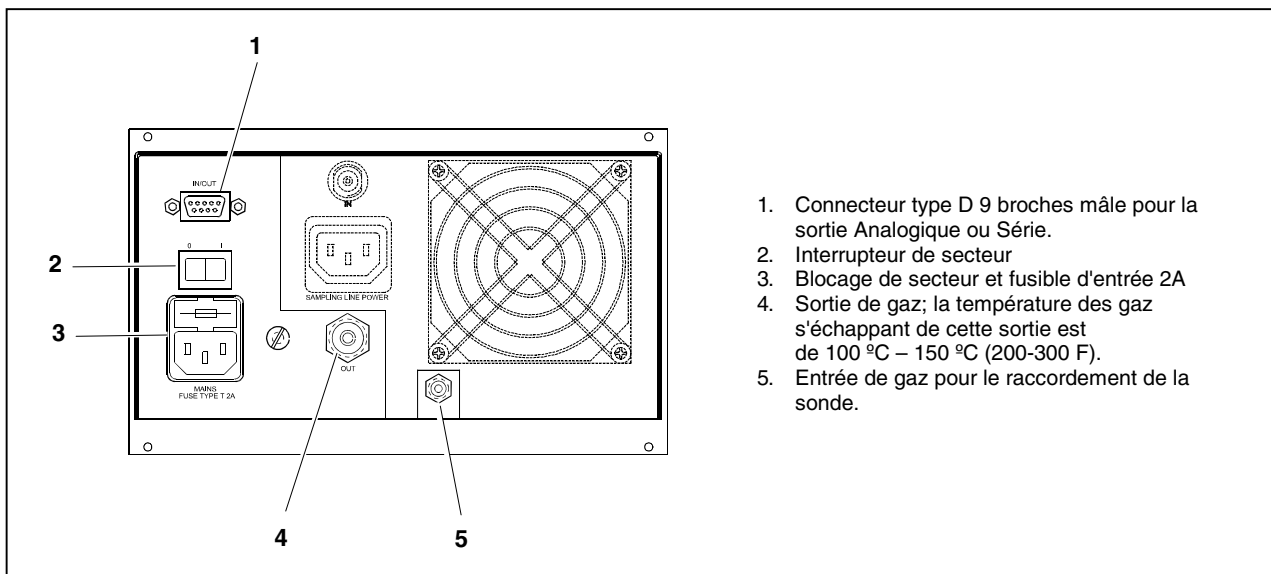
## Commandes, Indicateurs et Connecteurs du HeliTest Rack

On présente ci-dessous le tableau de commande du HeliTest Rack ainsi que les tableaux d'interconnexion. Pour les informations détaillées se reporter à la partie restante de la notice.



1. ON - Touche pour la mise en route de l'appareil.
2. OFF - Touche pour l'arrêt de l'appareil.
3. LCD - Affichage à cristaux liquides, rétro-éclairable, de 2 lignes de 16 caractères.
4. MODE - Touche utilisé pour la sélection du fonctionnement avec seuil réglable.
5. SENS - Touche de sélection de sensibilité.
6. AUDIO - Touche pour l'arrêt ou la mise en route du signal sonore.
7. PROBE - Touche permettant l'arrêt et la mise en route de la pompe d'échantillonnage lorsque la sonde est hors de son logement habituel.
8. ZERO - Touche pour le passage du zéro absolu à un zéro automatique (ou relatif).
9. CLEAN UP - Cette fonction activable par la pression simultanée des touches "ZERO" et "PROBE" pendant au moins 2 secondes est utilisée pour un nettoyage rapide de l'appareil après qu'il ait été saturé en hélium.
10. BATTERY - Cette fonction activable par la pression simultanée des touches "PROBE" et "AUDIO" pendant au moins 2 secondes, cette fonction est utilisée pour vérifier la tension de l'alimentateur intérieur.
11. LIGHT - Cette fonction activable par la pression simultanée des touches "AUDIO" et "SENS" pendant au moins 2 secondes est utilisée pour l'éclairage de l'affichage.
12. CAL - Cette fonction activable par la pression simultanée des touches "SENS" et "MODE" pendant au moins 2 secondes est utilisée pour l'initialisation de la procédure d'étalonnage.

Tableau avant du HeliTest Rack  
969-3581, 969-3582, 969-3580 et 969-3582



1. Connecteur type D 9 broches mâle pour la sortie Analogique ou Série.
2. Interrupteur de secteur
3. Blocage de secteur et fusible d'entrée 2A
4. Sortie de gaz; la température des gaz s'échappant de cette sortie est de 100 °C – 150 °C (200-300 F).
5. Entrée de gaz pour le raccordement de la sonde.

Tableau arrière du HeliTest Rack

## PROCEDURES D'UTILISATION

### Allumage du HeliTest Rack

Pour allumer le dispositif, il suffit d'introduire le câble d'alimentation dans la prise du réseau et placer l'interrupteur sur la position 1.

### Démarrage de l'HeliTest Rack

Pour démarrer le dispositif appuyer sur la touche ON située sur le tableau avant.

### Arrêt de l'HeliTest Rack

Pour arrêter le dispositif appuyer sur la touche OFF située sur le tableau avant.

## ENTRETIEN

Le module HeliTest Rack ne requiert que le nettoyage de la ligne d'aspiration; pour d'autre informations se reporter au chapitre "Informations Techniques". Toute intervention d'entretien doit être effectuée par du personnel autorisé.

En cas de défaut, s'adresser au service d'assistance technique Varian ou au "Varian advanced exchange service", qui pourra remplacer l'appareil défectueux par un HeliTest Rack remis en état.



**DANGER!**

Avant d'effectuer toute opération sur le dispositif, débrancher le câble d'alimentation.

En cas de mise au rebut d'un dispositif, procéder à son élimination conformément aux réglementations nationales en la matière.

**GENERAL INFORMATION**

This equipment is destined for professional use only.

The service operators and personnel must be aware of the risk involved in using this equipment. They must be aware of the potential risks and dangerous situations, and know how to avoid them. The consequences of improper or negligent usage of the equipment can seriously compromise its efficiency. Therefore this product must only be used by qualified personnel.

The user should read this instruction manual and any other additional information supplied by Varian before operating the equipment. Varian will not be held responsible for any events occurring due to non-compliance, even partial, with these instructions, improper use by untrained people, unauthorized interference with the equipment or any action contrary to that provided for by specific national standards. The HeliTest Rack is a microprocessor-controlled leak detector built using solid state components and incorporating self-test and self-protection features. The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment.

**This manual uses the following standard protocol:**



**WARNING!**

The warning messages are for attracting the attention of the operator to a particular procedure or practice which, if not followed correctly, could lead to serious injury.



**ATTENTION!**

The caution messages are displayed before procedures which, if not followed, could cause damage to the equipment.

**NOTE**

*The notes contain important information taken from the text.*

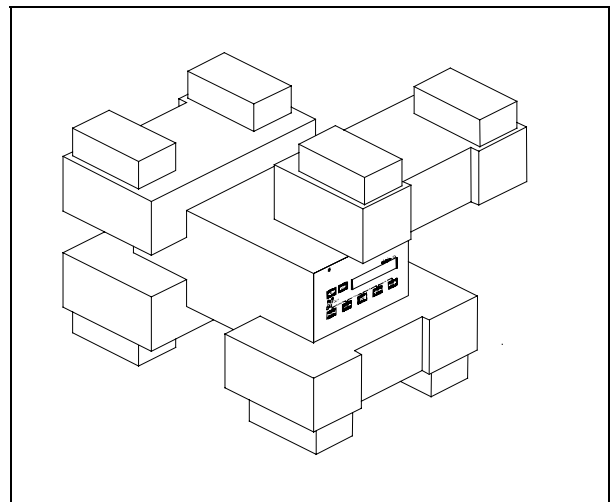
**STORAGE**

When transporting and storing the controllers, the following environmental requirements should be satisfied:

- temperature: from -20 °C to + 70 °C
- relative humidity: 0 - 95% (non-condensing)

**PREPARATION FOR INSTALLATION**

The HeliTest Rack is supplied in a special protective packing. If this shows signs of damage which may have occurred during transport, contact your local sales office. When unpacking the device make sure to avoid dropping it or subjecting it to any form of impact. Do not dispose of the packing materials in an unauthorized manner. The material is 100% recyclable and complies with EEC Directive 85/399.



*HeliTest Rack Packing*

Each device is factory set for a specific power supply:

- 220 Vac models 969-3581 and 969-3583
- 120 Vac models 969-3580 and 969-3582



**INSTALLATION**



**WARNING!**

The HeliTest Rack is equipped with a 3-wire power cord and plug (internationally approved) for user safety. Use this power cord and plug in conjunction with a properly grounded power socket to avoid electrical shock. High voltage developed in the device can cause severe injury or death. Before servicing the unit, disconnect the input power cable.

**NOTE**

The HeliTest Rack can be used as a bench unit or a rack module, but it must be positioned so that free air can flow through the holes. Do not install or use the device in an environment exposed to atmospheric agents (rain, snow, ice), dust, aggressive gases, or in explosive environments or those with a high fire risk.

During operation, the following environmental conditions must be respected:

- temperature: from 0 °C to +40 °C;
- relative humidity: 0 - 95% (non-condensing)

For information regarding other connections or on how to install the optional accessories, refer to the related sections in this document.



**CAUTION!**

The HeliTest Rack belongs to the second installation (or overvoltage) category as defined by the EN 61010-1 norm. Therefore connect the device to a line voltage electrical outlet that complies with the specifications of this category.



**CAUTION!**

The line voltage electrical outlet is the HeliTest Rack's sampling device. Install the unit so that the sampling device is easily accessible.



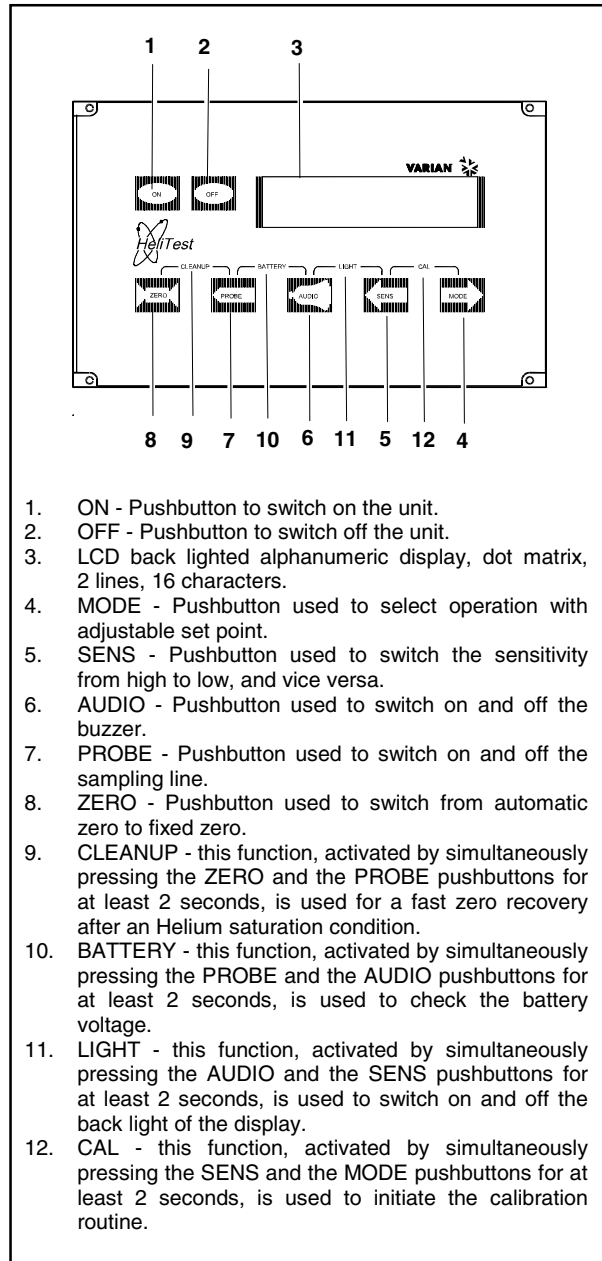
**CAUTION!**

The Helitest Rack has an analog output or RS232 connector that must be attached to the external circuits in a way as to prevent accessibility to any powered component. Make sure that the device connected to the HeliTest Rack be adequately insulated, even in the event of a single failure, as defined by the EN 61010-1 norm.

**HeliTest Rack Controls, Indicators and Connectors**

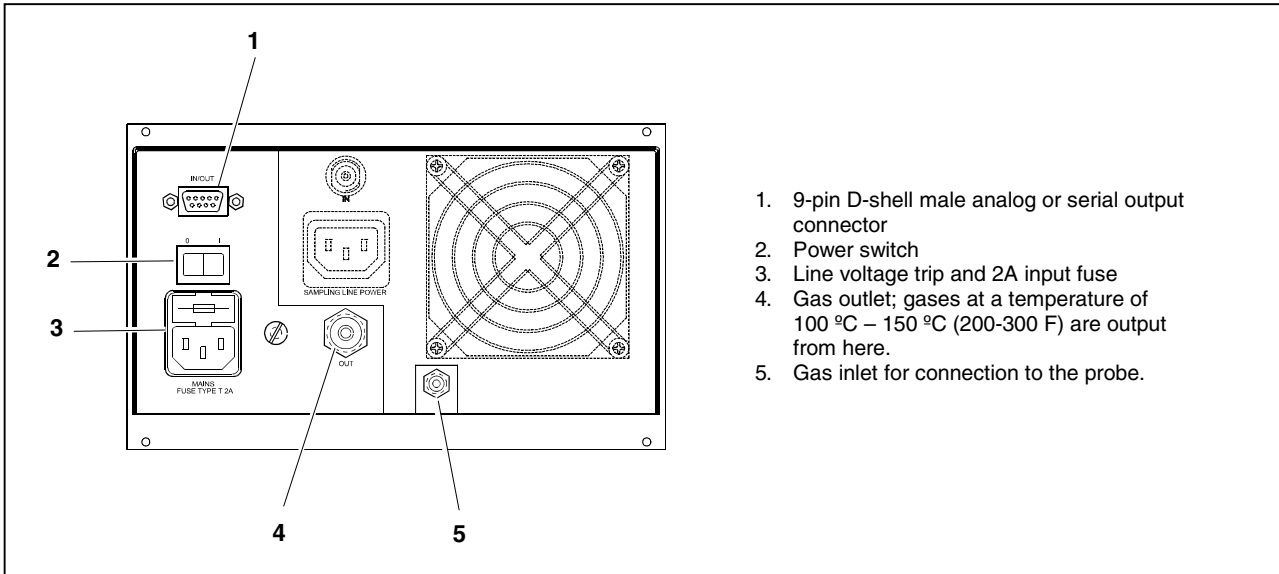
The following section shows the HeliTest Rack control panel and interconnection panel.

For more details, refer to the information provided throughout this manual.



1. ON - Pushbutton to switch on the unit.
2. OFF - Pushbutton to switch off the unit.
3. LCD back lighted alphanumeric display, dot matrix, 2 lines, 16 characters.
4. MODE - Pushbutton used to select operation with adjustable set point.
5. SENS - Pushbutton used to switch the sensitivity from high to low, and vice versa.
6. AUDIO - Pushbutton used to switch on and off the buzzer.
7. PROBE - Pushbutton used to switch on and off the sampling line.
8. ZERO - 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.

*HeliTest Rack Front Panel  
969-3581, 969-3582, 969-3580 and 969-3582*



1. 9-pin D-shell male analog or serial output connector
2. Power switch
3. Line voltage trip and 2A input fuse
4. Gas outlet; gases at a temperature of 100 °C – 150 °C (200-300 F) are output from here.
5. Gas inlet for connection to the probe.

*HeliTest Rack Front Panel*

**USE PROCEDURE**

***HeliTest Rack Startup***

To startup the device plug the power cable into a suitable power source and set the line switch to the position 1.

***Starting the HeliTest Rack***

To startup the device, press the ON pushbutton on the front panel.

***HeliTest Rack Shutdown***

To shutdown the device, press the OFF pushbutton on the front panel.

**MAINTENANCE**

The HeliTest Rack module only requires that the suction line be cleaned; refer to the section "Technical Information" for the related instructions. Any type of intervention must be performed by authorized personnel.

In case of device failure, it is possible to utilize the Varian repair service or the "Varian advanced exchange service"; the latter service consists of replacing the faulty HeliTest Rack with a refurbished one.



**WARNING!**

Before carrying out any work on the device disconnect it from the supply.

For a certain type of failure, the device will self-diagnose the error and the messages described in the following table are displayed.

**GENERAL**

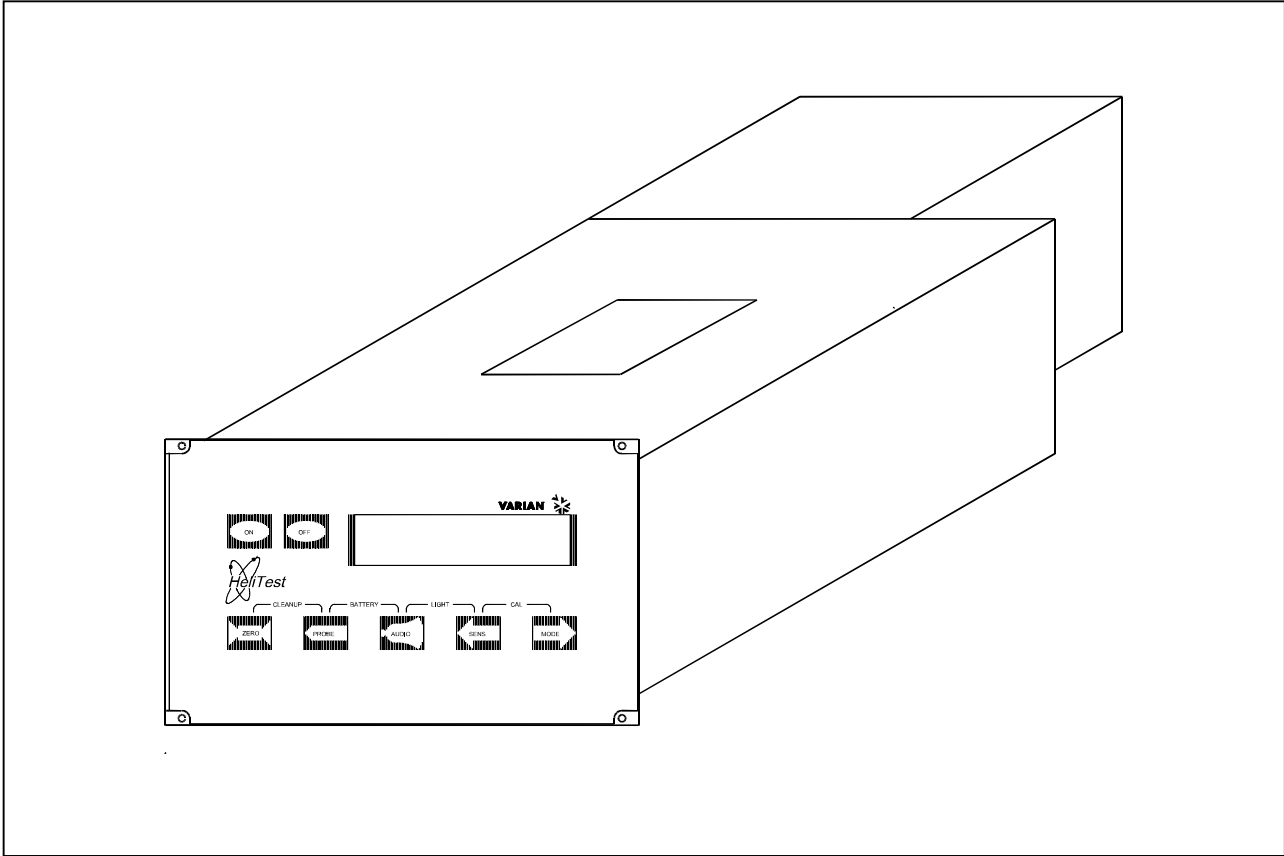
The HeliTest Rack is a self contained, ready to use leak detector able to detect, in fully automatic, autoranging mode, a helium concentration as small as 2 parts per million (ppm).

The leak value is displayed on an LCD alphanumeric display, and an audio signal proportional to Helium concentration is provided.

It incorporates all 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 will search for leaks using the extension probe.

The following figure shows the HeliTest Rack.



*HeliTest Rack*

**HELITEST RACK DESCRIPTION**

The HeliTest Rack set is available in four configurations.

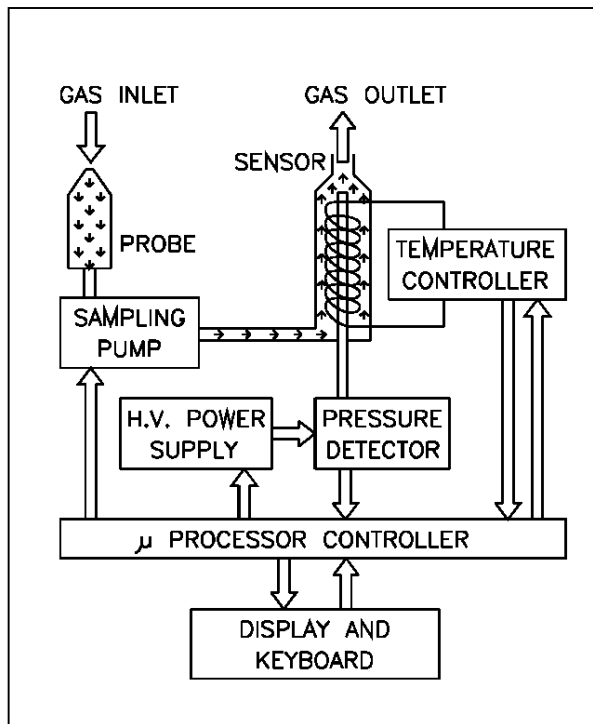
- 969-3580 HeliTest Rack 115 V Analog
- 969-3581 HeliTest Rack 230 V Analog
- 969-3582 HeliTest Rack 115 V RS232
- 969-3583 HeliTest Rack 230 V RS232

**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 the following figure).



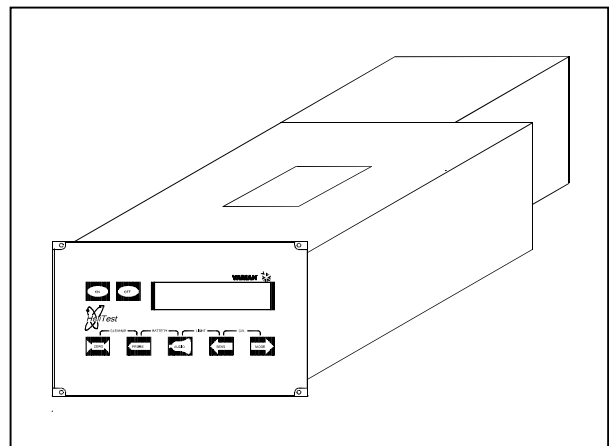
*Operating Principle*

**Basic Unit**

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

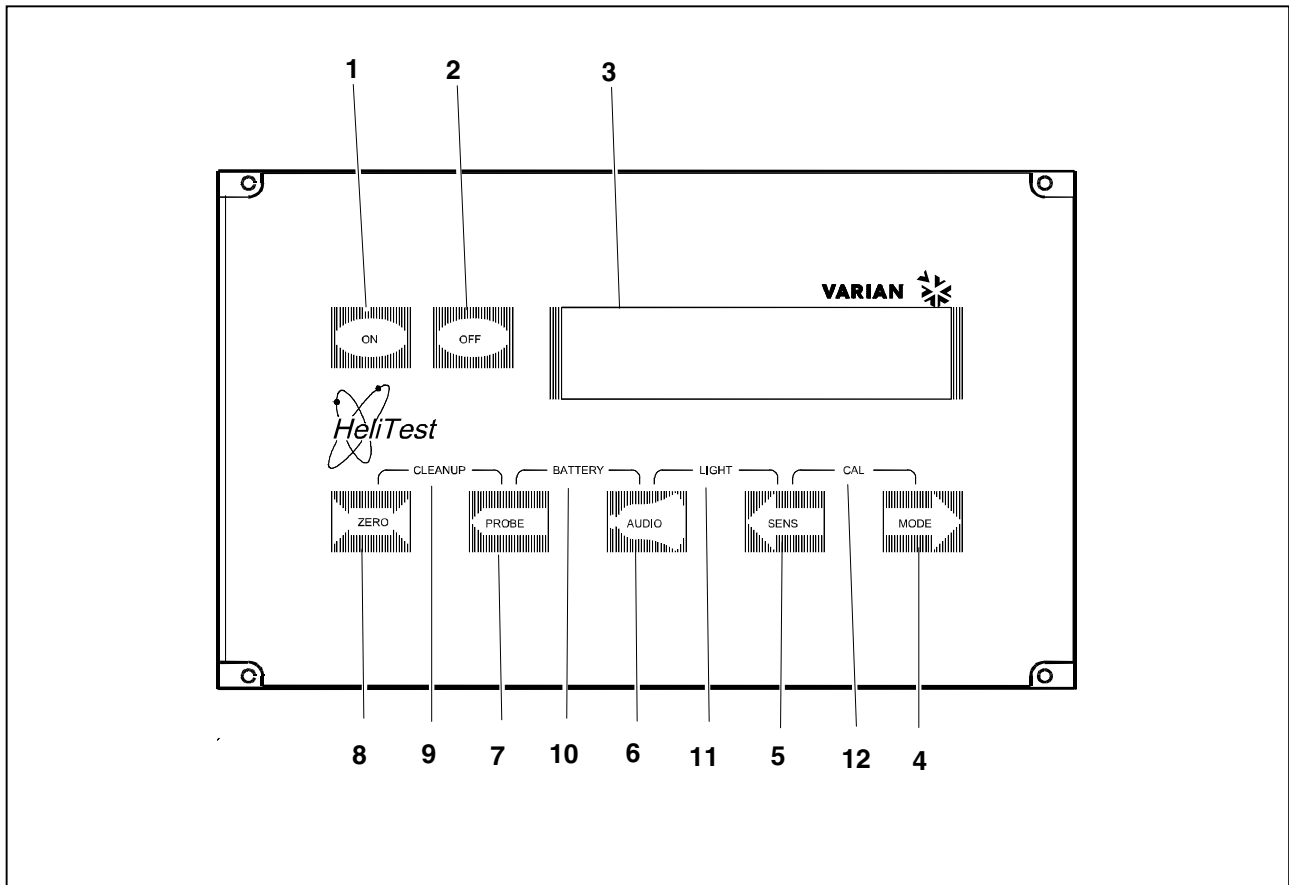
- front panel display and keyboard;
- microprocessor PCB, where sensor temperature controller and pressure detector circuitries are located;
- high voltage PCB, which contains the high voltage power supply for pressure detector;
- Helium sensor (based on a silica capillary), with pressure detector;
- 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*

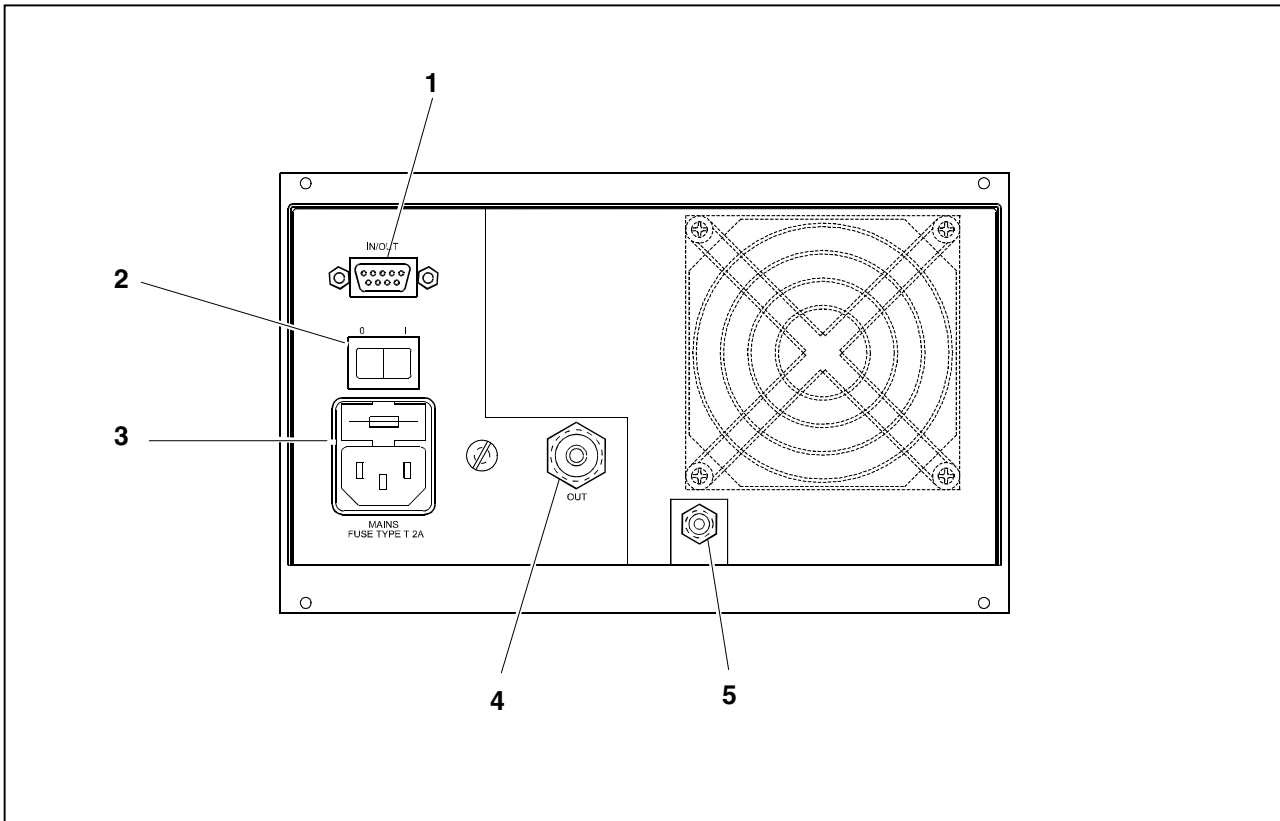
The HeliTest Rack front panel controls are shown in the following figure:



HeliTest Rack Front Panel

1. ON - pushbutton to switch on the unit.
2. OFF - pushbutton to switch off the unit.
3. LCD back lighted alphanumeric display, dot matrix, 2 lines, 16 characters.
4. MODE - pushbutton used to select operation with adjustable set point.
5. SENS - pushbutton used to switch the sensitivity from high to low, and vice versa.
6. AUDIO - pushbutton used to switch on and off the buzzer.
7. PROBE - pushbutton used to switch on and off the sampling line.
8. ZERO - 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 voltage provided by the internal power supply unit.
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.

The HeliTest Rack rear panel is shown in the following figure:



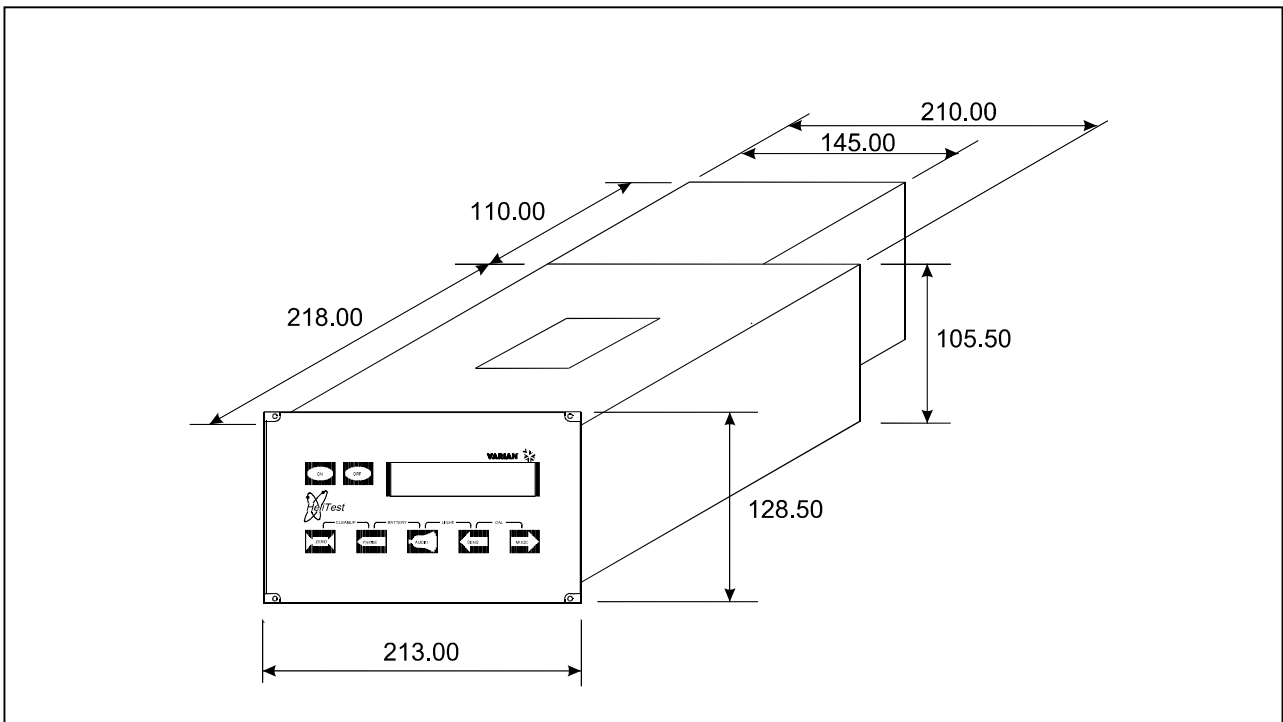
*HeliTest Rack Rear Panel*

1. 9-pin D-shell male connector for analog or serial output
2. Power switch
3. Mains trip and 2A input fuse
4. Gas outlet: gases at a temperature of 100 °C – 150 °C (200-300 F) are output from here.
5. Gas inlet for probe connection.

**Technical Specifications**

Detectable concentration	2 to $9 \times 10^5$ ppm (parts per million)
Response time	2 seconds for Helium, in accordance with AVS standard 2.1.
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	5 °C to 40 °C 90% maximum relative humidity without condensation
Power supply	115 Vac 70 VA 50/60Hz 230 Vac 70 VA 50/60Hz
Storage temperature	-20 °C to 70 °C
Weight	4.5 kg (10.1 lbs)
Dimensions (mm)	Width 213 Height 150 Depth 328
Minimum detectable loss	$5 \times 10^{-5}$ mbar l/s
Norm Compliance	EN 61010-1 EN55011 EN 61000-4-2 EN 61060-4-3 EN 61000-4-4



*HeliTest Rack Outline*

**GENERAL**



**WARNING!**

Never open the HeliTest Rack 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 ambient saturated with flammable gases.

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

The following measurement units may be selected: ppm, mbarL/s, cm<sup>3</sup>/s, cm<sup>3</sup>/min, TorrL/s, PaL/s, Pam<sup>3</sup>/s, Kg/h, g/y R12.  
The HeliTest Rack is fitted with an adjustable set point alarm level.

HeliTest Rack 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 Rack Start up".

If a change is desired, proceed as follows: switch on the HeliTest Rack 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 Rack 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 Rack will memorize the selected measurement unit. Subsequently, and also if no action is done, HeliTest Rack 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 Rack will memorize the selected set point level. Subsequently, and also if no action is done, HeliTest Rack will start the test routine (refer to section "Self test").

**NOTE**

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

In order to use the set point refer to section "SET POINT Mode"



**HELITEST RACK START UP**

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

-	-	-	-	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 section "General" to change it.

**Self Test**

After about 4 seconds from ON, HeliTest Rack automatically starts a self test routine procedure; the display will show:

		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 following message is shown:

		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 Rack is automatically switched off. Repeat the self test routine starting from section "HeliTest Rack Start up".

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

Subsequently, the internal power supply unit is and the following message is shown:

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

At the end of this test, if the power supply unit 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							*

If the battery voltage is between 11.2 Vdc and 10.2 Vdc, the following message is shown:

		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 following message is shown:

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

This test verifies the sensitivity of HeliTest Rack. To perform it, an amount of helium must be present inside the sampling line.

Within 1 minute, the test is finished and the following message is shown:

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 following message is shown:

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

This message is displayed for one minute, then the HeliTest Rack is automatically switched off. In this case, repeat the start-up procedure. If the same message appears, please contact the sales office.

If the result of the sensitivity test is O.K., the following message is shown:

			S	e	n	s	o	r		t	e	s	t		
															*

After 1 minute, the sensor is checked and if the sensor is O.K., the following message is shown:

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

Otherwise the following message is shown:

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

This message is displayed until the following action (see Note) has been taken or the HeliTest Rack is switched off.

**NOTE**

- Take HeliTest Rack away from helium sources.
- If available, spray Nitrogen (N2) or Argon (Ar) on the probe until OK is displayed (within 15 minutes maximum).
- Repeat the self test procedure by following the section "HeliTest Rack Start up".

If the sensor test still shows "SPRAY NITROGEN" contact the sales office.

Afterwards, the sampling line and pump efficiency is tested and the following message is shown:

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

If the test is successful, after about 10 seconds the following message is shown:

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

If the sampling line and pump test is negative, the following message is shown:

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

**NOTE**

This message is displayed for 1 minute, then the HeliTest Rack is automatically switched off.

The operator should:

- check and clean the dust filter at the top of the probe and/or extension
- repeat the self test procedure by following the section "HeliTest Rack Start up".

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 following message is shown:

			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 following message is shown:

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

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

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

After this phase, the following is displayed 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 following message is shown:

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

HeliTest Rack is now ready to operate in the measurement mode. The display gives a reading between 0 ppm and  $9 \times 10^5$  ppm, and the bar graph is a duplication of the mantissa number. Zero may blink if the HeliTest Rack zero becomes negative.

**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	*

**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 following message is shown: when switched HS to LS and when switched from LS to HS.

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

				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.

	.	.	.	.	.	.	.	.	.	.		X	X	<sub>10</sub>	X
L	S						p	p	m						*

**ZERO Operation**

By pressing the ZERO pushbutton, the mode of operation changes from "automatic zero" (default condition) to "fixed zero".

In the measurement mode, an FZ indication appears on the display when the fixed zero is selected.

	.	.	.	.	.	.	.	.	.	.		X	X	<sub>10</sub>	X
							p	p	m			F	Z		*

The zero value is calculated by integrating the Helium concentration value for about 10 seconds.

In the "fixed zero" mode of operation, the zero value is not updated, even if the Helium background concentration changes.

In the "automatic zero" mode of operation, the zero value is continuously updated. If the effective concentration is lower than the zero value, the display shows some "<" characters, each corresponding to about 2 ppm below zero (negative!!) and "0" flashes.

The "automatic zero" (AZ) mode of operation may be used to set the instrument to zero. If there is no Helium, switch the instrument to "automatic zero" and wait till the display shows no "<" characters and the "0" blinks no longer. In this condition, the instrument is cleared to less than 1 ppm and it is then possible to operate it in "fixed zero" by pressing the ZERO pushbutton again.

**SET POINT Mode**

This mode can be activated or deactivated by using the MODE pushbutton.

When the MODE pushbutton is pressed for the first time, the set point is activated and the selected set point level is displayed.

	.	.	.	.	.	.	.	.	.		0		
		S	P		Y	Y	Y	Y					*

Subsequently the selected measurement unit is shown the following message:

	.	.	.	.	.	.	.	.	.		0		
		S	P	X	X	X	X	X	X	X			*

When a leak lower than the set point selected level is sensed, its value is regularly displayed. When the set point level is overtaken, then the indicated leak value stops at the set point level and the LEAK signal appears.

	.	.	.	.	.	.	.	.	.		L	E	A	K
		S	P	X	X	X	X	X	X	X				*

If the leak value decreases below the set point, then the actual leak value is shown again and the leak signal disappears.

**NOTE**

*When the set point is activated the intermittent audio signal with frequency proportional to helium concentration is always disabled, and a continuous audio signal (which indicates the overtaking of the selected set point level) is enabled.*

**CLEANUP Operation**

**NOTE**

*Before starting the CLEANUP sequence, move the HeliTest Rack away from helium sources.*

If after exposing the probe at high Helium concentrations (higher than 10<sup>4</sup> ppm), the concentration inside the instrument remains high even after moving the probe away from the source of Helium. The instrument can be "cleaned" by activating the CLEANUP function.

By simultaneously pressing the ZERO and PROBE pushbuttons for 2 seconds, the function of quick zero setting is activated, and the display will be as shown as follows:

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

If the CLEANUP is successful (minimum 30 seconds), the display shows the following message:

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

and then, automatically, the HeliTest Rack returns to the operative mode of operation in which the CLEANUP was started.

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

-	-	-		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 Rack is automatically switched off after 1 minute. Repeat the self test procedure (section "Self Test") if the CLEANUP function is not successfully completed.*

**GENERAL**

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

**CALIBRATION (CAL)**

**NOTE**

*Before starting the calibration sequence, move the HeliTest Rack and the probe away from Helium sources.*

Whenever it is necessary to calibrate HeliTest Rack after the self test procedure, simultaneously press the SENS and MODE pushbuttons for 2 seconds.



It is possible to change the reading of the display until it corresponds to the concentration of sampling gas.

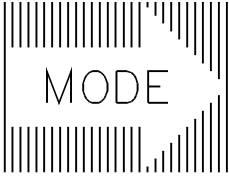
The display shows:

-	-	>		C	a	l	i	b	r	a	t	i	o	n	
				P	L	E	A	S	E		W	A	I	T	*

and after a few seconds, the following message is shown:

█	.	.	.	.	.	.	.	.	.	█	0				
				<	-		C	A	L		-	>			*

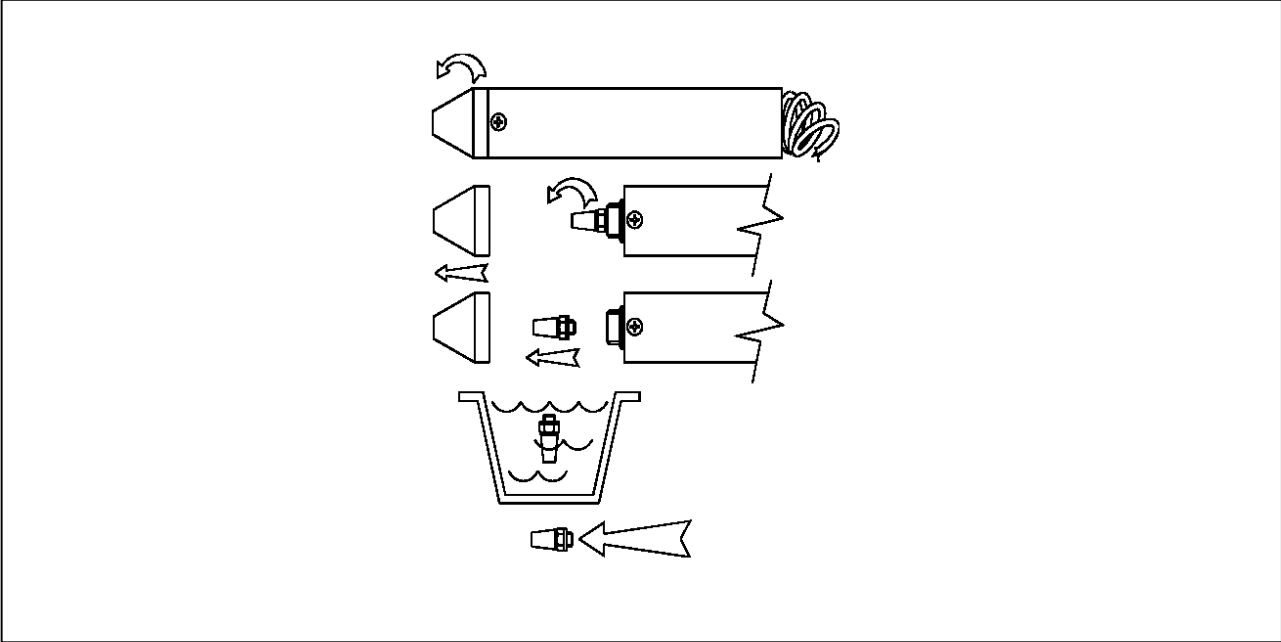
Inserting in the probe a mixture sample of He/N<sub>2</sub> (50 - 1000 ppm of helium) and pressing SENS or MODE (represented by two arrows).



Simultaneously pressing the SENS and MODE pushbuttons, the new calibration coefficient is memorized, and the HeliTest Rack returns to the mode of operation in which the calibration was started.

**PROBE FILTER CLEANING**

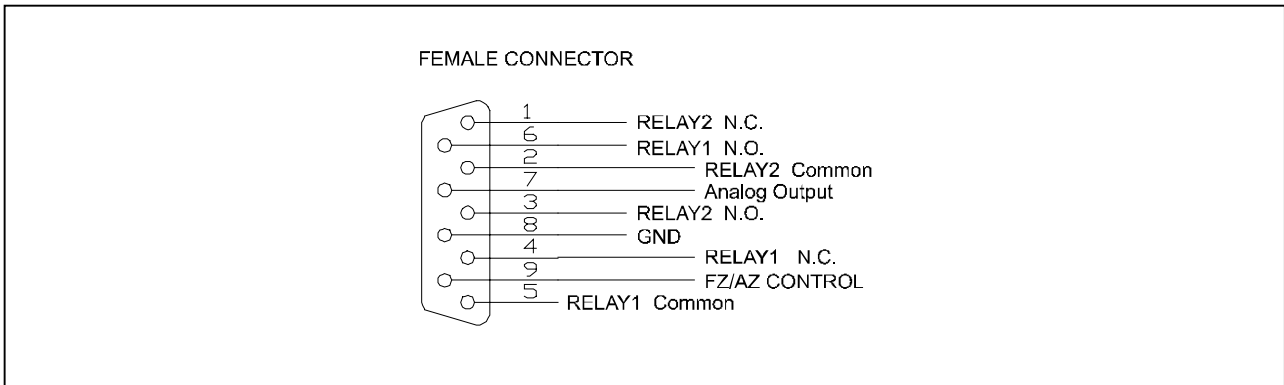
Every two weeks, or when necessary, clean the sintered bronze filter with a suitable degrease solvent, then rinse with dry compressed air following the directions given in the following figure and check the integrity and connections of the plastic flexible tube.



*Probe Filter Cleaning*

**Analog Version**

For the analog version the output connection and the meaning are shown in the following figure and table.

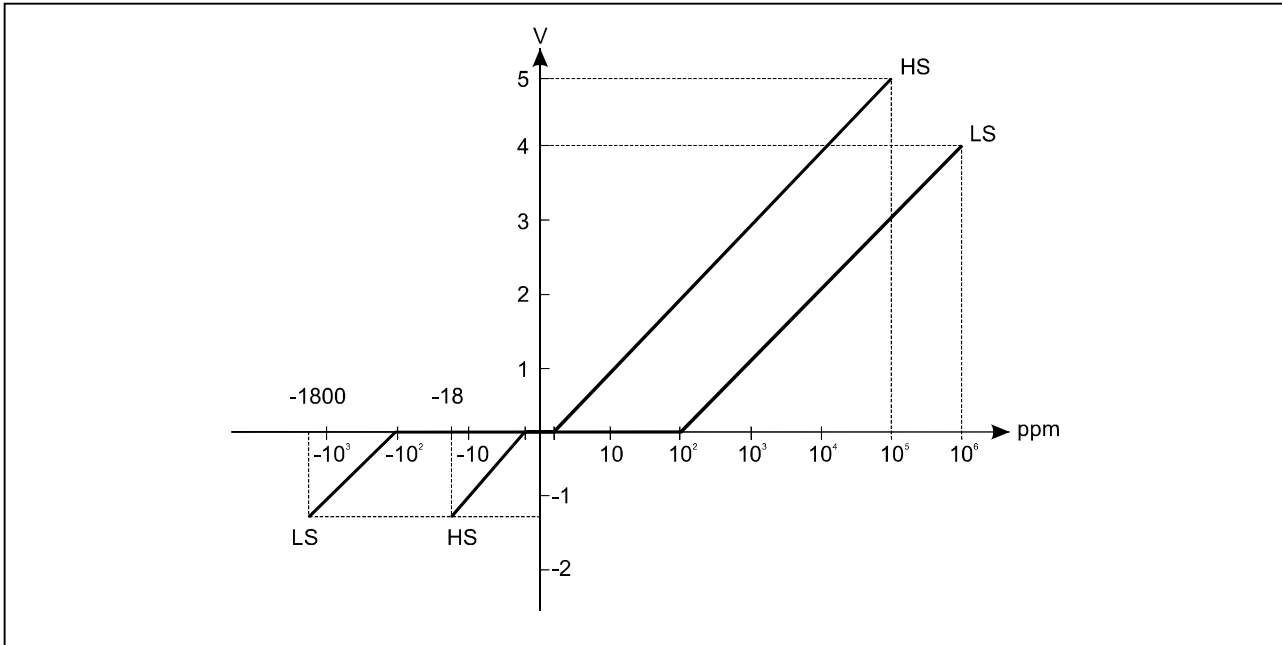


*Analog Connector*

PIN	SIGNAL	MAXIMUM RATINGS	DESCRIPTION
4 Normal Closed 5 Common 6 Normal Open	Relay 1 output	Voltage 24 Vac/Vdc Current 1A (Resistive load), 0.3A (Inductive load)	When the measurement value exceeds the SET POINT 1 threshold the relay 2 is activated.
1 Normal Closed 2 Common 3 Normal Open	Relay 2 output	Voltage 24 Vac/Vdc Current 1A (Resistive load), 0.3A (Inductive load)	The control of the relay 2 can be set by the front panel SET POINT 2 Setting:  When the measurement value exceeds the set point 2 the realy is activated.  <b>Ready Setting:</b> The relay 2 is activated when the HeliTest Rack is ready for the measurement.  <b>Setting Default:</b> Ready
8 Negative  9 Positive	AZ/fZ Input		<b>Contact Open:</b> Fixed zero  <b>Contact Closed:</b> Automatic zero  This function is acivated only if in the setting the remote mode is selected.
7 Positive  8 Negative	Analog output	Voltage -1.25 to 5 V Minimum Impedence 1 MΩ	Proportional to Helium concentration in HS (High Sensitivity)  -1.25 V = 18 ppm +5 V = 10 <sup>5</sup> ppm In LS (Low Sensitivity) -1.25 V = -1800 ppm -5 V = 10 <sup>6</sup> ppm

**NOTE**

The analog output voltage is always related to the measured concentration in ppm. The information does not change if a different measurement unit is selected from the front panel.



Analog Output Value Diagram

**HeliTest Rack Configuration Analog Version**

The HeliTest Rack configuration is activated as detailed in the general description section. Some additional functions and parameters can be selected in the HeliTest Rack version with analog output.

Here the complete sequence is summarized and additional information is supplied:

1. Press ZERO and ON buttons at the same time to start the configuration routine.
2. Language and measurement unit settings are possible as described in the general description section.
3. When the SET POINT indication appears, the selection of the display set point can be performed, as described in the general description section.

This set point is activated when the threshold value is overtaken, and if you are working in the Set Point Mode (is selected using the MODE Button), the LEAK indication will appear.

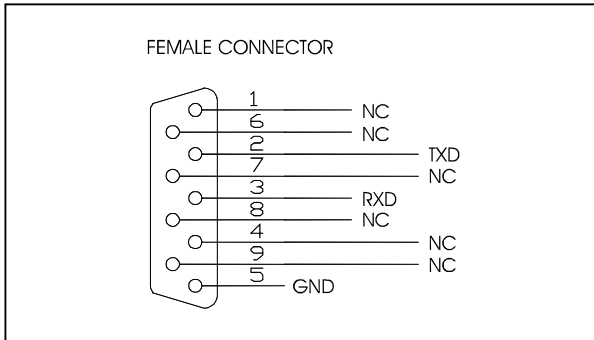
This Set point is related only on the display and to the audible alarm signals, and is not connected with the relays outputs, which are related to the SET POINT 1 and to SET POINT 2, as described as follows:

4. The next settings is for SET POINT 1: when the indication appears, please proceed with MODE and SENS buttons to set the desired value. When this value is overtaken, the corresponding changeover contact is activated
5. The next setting is REMOTE or LOCAL: when the remote mode is selected, the FZ/AZ selection can be done only through pins 9 and 8 on the connector (1).
6. After the REMOTE/LOCAL mode of operation is selected, the function of the RELAY 2 should be chosen:
  - if the READY selection is made, the changeover contact is activated when the HeliTest Rack is in READY condition
  - If the SET POINT 2 selection is made, the relay will be activated when the second set point is overtaken.
7. When the RELAY 2 selection is made, if SET POINT 2 is chosen, then the threshold value should be set with the same procedure used for setting the set point 1, using SENS and MODE pushbuttons.



**RS-232 VERSION**

The following figure shows the pin connection of the serial connection:



*RS232 Connector*

**COMMUNICATION DESCRIPTION**

**Communication Format**

- 8 data bit
- no parity
- 2 stop bit
- baud rate 1200

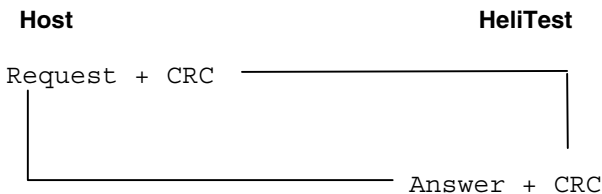
**Communication Protocol**

The communication protocol is a Master-Slave type:

Host computer = Master

Helitest = slave

The communication is performed in the following way:



*Request* is an ASCII character identifying the action that must be performed by the HeliTest Rack (command) or the requested information (request).

*CRC* corresponds to the sum with inverted sign of all the preceding bytes.

*Answer* is the answer of the HeliTest Rack after a command or a request from the host.

The Helitest Rack will always answer in one of the following ways:

- After a command:
  - "ACK" + CRC
  - or
  - "NACK" + CRC
- After a request:
  - "MESSAGE" + CRC where MESSAGE contains the requested information
  - or
  - "NACK" + CRC if the request has not been correctly received

**COMMANDS**

**LOCAL/REMOTE Selection**

"@"+CRC

It allows to switch from LOCAL (commands sent to HeliTest Rack via front panel) to REMOTE (commands sent to HeliTest Rack via RS-232 interface) mode of operation.

It is equivalent to push PROBE + SENS buttons on the HeliTest Rack front panel.

When set to REMOTE operation only the following functions are available on the HeliTest Rack keyboard:

- OFF
- LIGHT
- AUDIO
- PROBE + SENS (local/remote selection)

The local/remote selection can be always done through the HeliTest Rack front panel or through the RS-232 interface.

When the REMOTE mode of operation is selected an "R" is flashing in the lower right corner of the display.

**CALIBRATION COEFFICIENT Writing**

"H"+<-sign>+<+sign>+CRC

It writes the new calibration coefficient into the EEPROM of HeliTest Rack. The new parameter is used immediately by the measurement software. The Helitest Rack will respond with "ACK" if writing is possible, or "NACK" if writing is not possible.

**LIGHT ON/OFF**

"J"+CRC

It allows to switch ON or OFF the retroillumination of the HeliTest Rack display. It is equivalent to press the two button AUDIO and SENS together on the HeliTest Rack front panel.

**CONFIGURATION PARAMETERS Writing**

"K"<language>+<meas.  
unit>+<<set point  
mantissa>+<setpoint  
exponent>+CRC

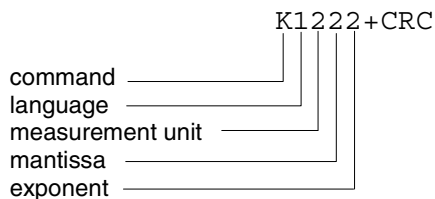
where:

- "language" can be one of the following values:  
0 = Italian  
1 = English  
2 = French  
3 = German
- "measurement unit" can be one of the following values:  
0 = ppm  
1 = mbarL/s  
2 = cm<sup>3</sup>/s  
3 = cm<sup>3</sup>/min  
4 = TorrL/s  
5 = PaL/s  
6 = Pam<sup>3</sup>/s  
7 = kg/h  
8 = g/y R12
- "set point mantissa" is a number between 1 and 9
- "set point exponent" is a number between 0 and 6 depending on the chosen measurement unit according to the following table:

MEAS. UNIT	EXPONENT						
	0	1	2	3	4	5	6
0	10 <sup>0</sup>	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	10 <sup>-4</sup>	10 <sup>-5</sup>	10 <sup>-6</sup>
1	10 <sup>-5</sup>	10 <sup>-5</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10 <sup>-1</sup>	10 <sup>0</sup>
2	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10 <sup>-1</sup>	10 <sup>0</sup>
3	10 <sup>-4</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10 <sup>-1</sup>	10 <sup>0</sup>	10 <sup>1</sup>	10 <sup>2</sup>
4	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10 <sup>-1</sup>	10 <sup>0</sup>
5	10 <sup>-4</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10 <sup>-1</sup>	10 <sup>0</sup>	10 <sup>1</sup>	10 <sup>2</sup>
6	10 <sup>-7</sup>	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10 <sup>-1</sup>
7	10 <sup>-1</sup>	10 <sup>0</sup>	10 <sup>1</sup>	10 <sup>2</sup>	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>
8	10 <sup>-1</sup>	10 <sup>0</sup>	10 <sup>1</sup>	10 <sup>2</sup>	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>

**Example:**

to send a set point value of 2 x 10<sup>-4</sup> cm<sup>3</sup>/s with English language you must send the following command:



This command writes into EEPROM the configuration parameters. Incorrect value are not accepted. The HeliTest Rack will respond with "ACK" if writing is possible, or "NACK" if writing is not possible.

**ZERO Function**

"L" + CRC

This command switches the unit from AUTOMATIC (AZ) to FIX ZERO (FZ) mode and viceversa. It is equivalent to push the ZERO button on the HeliTest Rack front panel.

This command is available only when the unit is in the REMOTE operation mode (letter "R" is flashing on the HeliTest Rack display).

**SENSITIVITY Selection**

"M" + CRC

This command switches the unit from HIGH (HS) to LOW (LS) sensitivity mode and viceversa. It is equivalent to push the SENS button on the HeliTest Rack front panel.

This command is available only when the unit is in the REMOTE operation mode (letter "R" is flashing on the HeliTest Rack display).

**MODE Selection**

"N" + CRC

This command switches the unit from MEASUREMENT (MS) to SET POINT (SP) mode and viceversa. It is equivalent to push the MODE button on the HeliTest Rack front panel.

This command is available only when the unit is in the REMOTE operation mode (letter "R" is flashing on the HeliTest Rack display).

**PROBE Function**

"O" + CRC

This command enables or disables the sampling pump. It is equivalent to push the PROBE button on the HeliTest Rack front panel.

This command is available only when the unit is in the REMOTE operation mode (letter "R" is flashing on the HeliTest Rack display).

**AUDIO ON/OFF**

"P" + CRC

This command switches the beeper ON or OFF. It is equivalent to push the AUDIO button on the HeliTest Rack front panel.

This command is available only when the unit is in the REMOTE operation mode (letter "R" is flashing on the HeliTest Rack display).

**CLEANUP Function**

"Q" + CRC

This command activates the cleaning function. It is equivalent to push the two buttons ZERO and PROBE together on the HeliTest Rack front panel. This command is available only when the unit is in the REMOTE operation mode (letter "R" is flashing on the HeliTest Rack display).

**REQUEST OF INFORMATION**

**Operating Status Request**

"A" + CRC

The HeliTest Rack answers with a character (+CRC) with the following meaning:

7	6	5	4	3	2	1	0
---	---	---	---	---	---	---	---

- bit 0 = zero: 0 = AZ; 1 = FZ
- bit 1 = probe: 0 = OFF; 1 = ON
- bit 2 = audio: 0 = OFF; 1 = ON
- bit 3 = sensitivity: 0 = HS; 1 = LS
- bit 4 = mode: 0 = MS; 1 = SP
- bit 5 = local/remote: 0 = loc.; 1 = rem.
- bit 6 = light: 0 = OFF; 1 = ON
- bit 7 = always 1.

This information can be requested also when the HeliTest Rack is set for LOCAL operation.

**Operating Phase Request**

"B" + CRC

The HeliTest Rack answers with a character (+CRC) (with the bit 7 always 1) indicating the actual operating phase.

The character has the meaning detailed in the following table.

CHARACTER	OPERATING PHASE DESCRIPTION
0 to 4	Self test phase
4	READY phase
6	STANDBY phase
7	Wait time STANDBY - OPERATIVE
8	Sampling line test
9	Measurement phase
10	Transition from High Sensitivity (HS) to Low Sensitivity (LS) during measurement phase
11	Transition from Low Sensitivity (LS) to High Sensitivity (HS) during measurement phase
13	Transition from High Sensitivity (HS) to Low Sensitivity (LS) during ready phase
14	Transition from Low Sensitivity (LS) to High Sensitivity (HS) during ready phase
17	Wait time before calibration routine
18	Calibration phase
20	Cleanup phase
21	Cleanup phase completed
22	Cleanup phase not completed. The HeliTest Rack does not accept any more command and it must be turned off to be reset.
23	Transition from High Sensitivity (HS) to Low Sensitivity (LS) at the end of cleanup phase
25	Heater defective. The HeliTest Rack does not accept any more command and it must be turned off to be reset.
26	Sampling line fault. The HeliTest Rack does not accept any more command and it must be turned off to be reset.
27	Battery out of order or low voltage The HeliTest Rack does not accept any more command and it must be turned off to be reset.
29	Sensitivity Test Fault. The HeliTest Rack does not accept any more command and it must be turned off to be reset.

**Self Test Phase Request**

"C" + CRC

The HeliTest Rack answers with a character (+CRC) (with the bit 7 always 1) indicating the actual self test phase (corresponding to the operating phase 0 to 4). The character has the following meaning:

CHARACTER	SELF TEST PHASE DESCRIPTION
0	Initial delay time
1	Start self test procedure
2	Heater test
3	Heater test OK
4	Battery test
5	Battery test OK
6	Sensitivity test
7	Sensitivity test result: if operating phase is 3, then sensitivity test is OK; if operating phase is different from 3, then the sensitivity test has not been completed and the HeliTest Rack needs a higher He concentration (the display shows the message SPRAY HELIUM)
8	Sampling line test
15	Self test completed
21	Sensor test
23	The sensor test can not be completed due to a too high Helium concentration (the display shows the message SPRAY NITROGEN)

This information can be requested also when the HeliTest Rack is set for LOCAL operation.

**Filament Voltage Request**

"D" + CRC

The HeliTest Rack answers with a character (+CRC) corresponding to the filament voltage divided by 255.

I.e. Filament voltage = character x 13.7 / 255.

**Filament Current Request**

"E" + CRC

The HeliTest Rack answers with a character (+CRC) corresponding to the filament current divided by 255.

I.e. Filament current = character x 4.545 / 255.

**Sensor Current Request**

"F" + CRC

The HeliTest Rack answers with:

"Less Significant Byte"+  
"Most Significant Byte"+CRC

corresponding to the sensor current expressed in quarters (0.25) of nanoampere.

**Calibration Coefficient Request**

"G" + CRC

The HeliTest Rack answers with:

"Less Significant Byte"+  
"Most Significant Byte"+CRC

corresponding to the actual value of the calibration coefficient.

**Measurement Request**

"I" + CRC

The HeliTest Rack answers with:

"Exponent" + "Mantissa" + CRC

corresponding to the Helium concentration expressed in parts per million (ppm).

The He concentration is always expressed in ppm also if the measurement unit set on the HeliTest Rack front panel is different.

In the following table the conversion factor from ppm to the other measurement units are shown.

1 ppm corresponds to:	
mbarL/s	$2.5 \times 10^{-5}$
cm <sup>3</sup> /s	$2.5 \times 10^{-5}$
cm <sup>3</sup> /min	$1.5 \times 10^{-3}$
TorrL/s	$1.9 \times 10^{-5}$
PaL/s	$2.5 \times 10^{-3}$
Pam <sup>3</sup> /s	$2.5 \times 10^{-6}$
kg/h	$1.1 \times 10^{-7}$
g/y R12	$3.9 \times 10^0$

***Fine Measurement Request***

"R" + CRC

The HeliTest Rack answers with a character (+CRC) corresponding to the measured ppm in the range 0 to 100.

If the value is higher, the character is 255.

***Set Point Request***

"S" + CRC

The HeliTest Rack answers with:

"Mantissa" + "Exponent" + CRC

corresponding to the set point value expressed in the set measurement unit.

For the exponent value see the table of command K in the previous pages.

***Language/Measurement Unit Request***

"T" + CRC

The HeliTest Rack answers with the following characters:

"Language" + "Meas. unit" + CRC

corresponding to the set language and measurement unit.

For the character values see the command K in the previous pages.

***Set Point Status Request***

"U" + CRC

The HeliTest Rack answers with a character (+CRC) corresponding to the set point status:

- 0 = threshold not exceeded
- 1 = threshold exceeded

***Duty Cycle Request***

"V" + CRC

The HeliTest Rack answers with the following characters:

"n" + CRC

corresponding to the duty cycle value of the heater power control. The "n" value is from 460 to 18431, and the duty cycle value is n/18432.

**TEST PROGRAM**

A program to test all the HeliTest Rack functionality is shown in the following pages.

The test also include a DEMO option to simulate the HeliTest Rack front panel on the computer screen.

The program is written in BASIC.

In order to execute the program the following steps should be performed:

- store the program into a file with .BAS extension
- connect the HeliTest Rack to the port COM1 of your PC
- activate the BASIC interpreter of your PC and load the program.

If the program is run with the HeliTest Rack switched off or the RS232 interface disconnected, the program will send an error message.

```

DECLARE SUB answer (lung%)
OPEN "com1:1200,n,8,2,rs,ds" FOR RANDOM AS 1
ON ERROR GOTO ai
star:
demo = 0
CLS
WHILE 1
PRINT "1-STATUS"
PRINT "3-SELF-TEST PHASE"
PRINT "5-FILAMENT CURRENT"
PRINT "7-READ CALIBRATION COEFFICIENT"
PRINT "9-LIGHT ON/OFF"
PRINT "A-ZERO BUTTON"
PRINT "C-MODE BUTTON"
PRINT "E-AUDIO BUTTON"
PRINT "H-WRITE CALIBRATION COEFFICIENT"
PRINT "K-WRITE CONFIGURATION"
PRINT "U-READ SETPOINT STATUS"
PRINT "V-READ DUTY CYCLE"
PRINT
PRINT "G-DEMO"
PRINT "Q-QUIT"
a$ = ""
WHILE a$ = "": a$ = INKEY$: WEND
SELECT CASE a$
CASE "G", "g"
dem:
demo = 1
CLS
LOCATE 25, 1
LOCATE 2, 10: PRINT "+-----+"
LOCATE 3, 10: PRINT "|----HeliTest----|"
LOCATE 4, 10: PRINT "|-----|"
LOCATE 5, 10: PRINT "+-----+"
PRINT "1-ZERO 2-PROBE 3-AUDIO 4-SENS 5-MODE 6-CLEANUP ";
PRINT "7-LIGHT 8-LOC/REM 9-END";
WHILE 1
PRINT #1, "A"; CHR$(&HBF);
answer 2
IF risp$ = "" THEN
LOCATE 8, 1: PRINT "NOT CONNECTED"
WHILE risp$ = ""
PRINT #1, "A", CHR$(&HBF);
answer 2
a$ = INKEY$
IF a$ = "9" GOTO star
WEND
END IF
LOCATE 8, 1: PRINT " "
stato% = ASC(LEFT$(risp$, 1))
LOCATE 4, 26
IF (stato% AND &H20) THEN PRINT "R"; ELSE PRINT "*";
PRINT #1, "B"; CHR$(&HBE);
answer 2
IF risp$ = "" THEN GOTO fineloop
fase% = ASC(LEFT$(risp$, 1)) AND &H7F
SELECT CASE fase%
CASE 0, 1, 2, 3, 4
PRINT #1, "C"; CHR$(&HBD);
answer 2
IF risp$ = "" THEN GOTO fineloop
fasest% = ASC(LEFT$(risp$, 1)) AND &H7F
SELECT CASE fasest%
2-OPERATING PHASE"
4-FILAMENT VOLTAGE"
6-SENSOR CURRENT"
8-MEASURE"
0-LOCAL/REMOTE"
B-SENS BUTTON"
D-PROBE BUTTON"
F-CLEANUP"
R-HIGH RESOLUTION"
S-READ SETPOINT VALUE"
T-READ CONFIGURATION"

```

```

CASE 0:
  LOCATE 3, 11: PRINT "----HeliTest----"
  LOCATE 4, 11: PRINT "      Welcome      "
CASE 1:
  LOCATE 3, 11: PRINT "  Self test  "
  LOCATE 4, 11: PRINT "  procedure  "
CASE 2:
  LOCATE 3, 11: PRINT "  Heater test  "
  LOCATE 4, 11: PRINT "                "
CASE 3:
  LOCATE 3, 11: PRINT "  Heater test  "
  LOCATE 4, 11: PRINT "                "
CASE 4:
  LOCATE 3, 11: PRINT "  Battery test  "
  LOCATE 4, 11: PRINT "                "
CASE 6:
  LOCATE 3, 11: PRINT "Sensitivity Test"
  LOCATE 4, 11: PRINT "                "
CASE 7:
  LOCATE 3, 11: PRINT "Sensitivity Test"
  LOCATE 4, 11
  IF fase% = 3 THEN
    PRINT "          OK          "
  ELSE
    PRINT " SPRAY HELIUM  "
  END IF
CASE 8:
  LOCATE 3, 11: PRINT " Sampling line  "
  LOCATE 4, 11: PRINT "                "
CASE 15:
  LOCATE 3, 11: PRINT "  Self test    "
  LOCATE 4, 11: PRINT "  COMPLETED  "
CASE 21:
  LOCATE 3, 11: PRINT "  Sensor test  "
  LOCATE 4, 11: PRINT "                "
END SELECT
CASE 5:
  LOCATE 3, 11: PRINT "      READY      "
  LOCATE 4, 11
  IF (stato% AND 8) THEN PRINT "LS"; ELSE PRINT "HS";
  LOCATE 4, 14
  IF (stato% AND &H10) THEN PRINT "SP"; ELSE PRINT "MS";
  LOCATE 4, 17
  IF (stato% AND 2) THEN PRINT "P.ON"; ELSE PRINT "P.OFF";
LOCATE 4, 23
  IF (stato% AND 1) THEN PRINT "FZ"; ELSE PRINT "AZ";
CASE 6:
  LOCATE 3, 11: PRINT "      STAND-BY      "
  LOCATE 4, 11
  IF (stato% AND 8) THEN PRINT "LS"; ELSE PRINT "HS";
  LOCATE 4, 14
  IF (stato% AND &H10) THEN PRINT "SP"; ELSE PRINT "MS";
  LOCATE 4, 17
  IF (stato% AND 2) THEN PRINT "P.ON"; ELSE PRINT "P.OFF";
  LOCATE 4, 23
  IF (stato% AND 1) THEN PRINT "FZ"; ELSE PRINT "AZ";
CASE 7, 8
  LOCATE 3, 11: PRINT "  --->> OPERATIVE"
  LOCATE 4, 11: PRINT "  PLEASE WAIT  "
CASE 10, 13, 23
  LOCATE 3, 11: PRINT "  HS -->> LS    "
  LOCATE 4, 11: PRINT "  PLEASE WAIT  "
CASE 11, 14

```

```

LOCATE 3, 11: PRINT "   LS -->> HS   "
LOCATE 4, 11: PRINT "   PLEASE WAIT  "
CASE 17
LOCATE 3, 11: PRINT "-- Calibration "
LOCATE 4, 11: PRINT "   PLEASE WAIT  "
CASE 20
LOCATE 3, 11: PRINT "--- CLEANUP --- "
LOCATE 4, 11: PRINT "                   "
CASE 21
LOCATE 3, 11: PRINT "--- CLEANUP --- "
LOCATE 4, 11: PRINT "                   OK          "
CASE 22
LOCATE 3, 11: PRINT "--- CLEANUP --- "
LOCATE 4, 11: PRINT "   NOT COMPLETED  "
CASE 9
LOCATE 4, 18: PRINT "ppm  "
PRINT #1, "I"; CHR$(&HB7);
answer 3
IF risp$ = "" THEN GOTO fineloop
b$ = risp$
LOCATE 3, 11: PRINT "           ";
a$ = RIGHT$(STR$(ASC(MID$(b$, 2, 1))), 1)
IF a$ = "0" THEN LOCATE 3, 11: PRINT " | ..... " | ";
IF a$ = "1" THEN LOCATE 3, 11: PRINT " | ■ ..... " | ";
IF a$ = "2" THEN LOCATE 3, 11: PRINT " | ■■ ..... " | ";
IF a$ = "3" THEN LOCATE 3, 11: PRINT " | ■■ ■ ..... " | ";
IF a$ = "4" THEN LOCATE 3, 11: PRINT " | ■■ ■■ ..... " | ";
IF a$ = "5" THEN LOCATE 3, 11: PRINT " | ■■ ■■ ■ ..... " | ";
IF a$ = "6" THEN LOCATE 3, 11: PRINT " | ■■ ■■ ■■ ..... " | ";
IF a$ = "7" THEN LOCATE 3, 11: PRINT " | ■■ ■■ ■■ ■ ..... " | ";
IF a$ = "8" THEN LOCATE 3, 11: PRINT " | ■■ ■■ ■■ ■■ ..... " | ";
IF a$ = "9" THEN LOCATE 3, 11: PRINT " | ■■ ■■ ■■ ■■ ■ ..... " | ";
PRINT a$; "E";
a$ = RIGHT$(STR$(ASC(LEFT$(b$, 1))), 1)
PRINT a$; " "
LOCATE 4, 23
IF (stato% AND 1) THEN PRINT "FZ "; ELSE PRINT " ";
LOCATE 4, 11
IF (stato% AND 8) THEN PRINT "LS "; ELSE PRINT " ";
LOCATE 4, 14
IF (stato% AND &H10) THEN PRINT "SP "; ELSE PRINT " ";
END SELECT
timeout = 1000
a$ = ""
WHILE timeout <<>> 0 AND a$ = ""
  timeout = timeout - 1
  a$ = INKEY$
WEND
IF a$ <<>><N>" THEN
  SELECT CASE a$
    CASE "1"
      PRINT #1, "L"; CHR$(&HB4);
      answer 2
    CASE "2"
      PRINT #1, "O"; CHR$(&HB1);
      answer 2
    CASE "3"
      PRINT #1, "P"; CHR$(&HB0);
      answer 2
    CASE "4"
      PRINT #1, "M"; CHR$(&HB3);
      answer 2
  
```



```

CASE "5"
  PRINT #1, "N"; CHR$(&HB2);
  answer 2
CASE "6"
  PRINT #1, "Q"; CHR$(&HAF);
  answer 2
CASE "7"
  PRINT #1, "J"; CHR$(&HB6);
  answer 2
CASE "8"
  PRINT #1, "@"; CHR$(&HC0);
  answer 2
CASE "9"
  GOTO star
END SELECT
END IF
fineloop:
WEND
CASE "A", "a"
  PRINT #1, "L"; CHR$(&HB4);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "ZERO BUTTON"
  END IF
  PRINT
CASE "B", "b"
  PRINT #1, "M"; CHR$(&HB3);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "SENS BUTTON"
  END IF
  PRINT
CASE "C", "c"
  PRINT #1, "N"; CHR$(&HB2);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "MODE BUTTON"
  END IF
  PRINT
CASE "D", "d"
  PRINT #1, "O"; CHR$(&HB1);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "PROBE BUTTON"
  END IF
  PRINT
CASE "E", "e"
  PRINT #1, "P"; CHR$(&HB0);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "AUDIO BUTTON"
  END IF
  PRINT

```

```

CASE "F", "f"
  PRINT #1, "Q"; CHR$(&HAF);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "CLEANUP"
  END IF
  PRINT
CASE "R", "r"
  PRINT #1, "R"; CHR$(&HAE);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "HIGH RESOLUTION= "; ASC(LEFT$(risp$, 1)); " ppm"
  END IF
  PRINT
CASE "1"
  PRINT #1, "A"; CHR$(&HBF);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    b% = ASC(LEFT$(risp$, 1))
    PRINT "STATUS HELITEST : "; HEX$(b%)
    PRINT "ZERO  PROBE  AUDIO  SENS  MODE  LOC/REM  LIGHT"
    IF (b% AND 1) THEN PRINT "FZ      "; ELSE PRINT "AZ      ";
    IF (b% AND 2) THEN PRINT "ON      "; ELSE PRINT "OFF     ";
    IF (b% AND 4) THEN PRINT "ON      "; ELSE PRINT "OFF     ";
    IF (b% AND 8) THEN PRINT "LS      "; ELSE PRINT "HS      ";
    IF (b% AND &H10) THEN PRINT "SP      "; ELSE PRINT "MS      ";
    IF (b% AND &H20) THEN PRINT "REMOTE  "; ELSE PRINT "LOCAL   ";
    IF (b% AND &H40) THEN PRINT "ON      "; ELSE PRINT "OFF     ";
    PRINT
  END IF
  PRINT
CASE "2"
  PRINT #1, "B"; CHR$(&HBE);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    b% = ASC(LEFT$(risp$, 1)) AND &H7F
    PRINT "OPERATING PHASE: "; b%
  END IF
  PRINT
CASE "3"
  PRINT #1, "C"; CHR$(&HBD);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    b% = ASC(LEFT$(risp$, 1)) AND &H7F
    PRINT "SELF-TEST PHASE : "; b%
  END IF
  PRINT
CASE "4"
  PRINT #1, "D"; CHR$(&HBC);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE

```

```

        b% = ASC(LEFT$(rISP$, 1))
        PRINT "FILAMENT VOLTAGE : "; ((13.77 * b%) / 255)
    END IF
    PRINT
CASE "5"
    PRINT #1, "E"; CHR$(&HBB);
    answer 2
    IF rISP$ = "" THEN
        PRINT "NOT CONNECTED"
    ELSE
        b% = ASC(LEFT$(rISP$, 1))
        PRINT "FILAMENT CURRENT : "; ((4.545 * b%) / 255)
    END IF
    PRINT
CASE "6"
    PRINT #1, "F"; CHR$(&HBA);
    answer 3
    IF rISP$ = "" THEN
        PRINT "NOT CONNECTED"
    ELSE
        a$ = LEFT$(rISP$, 2)
        PRINT "SENSOR CURRENT : "; CVI(a$)
    END IF
    PRINT
CASE "s", "S"
    PRINT #1, "S"; CHR$(&HAD);
    answer 3
    IF rISP$ = "" THEN
        PRINT "NOT CONNECTED"
    ELSE
        a$ = LEFT$(rISP$, 2)
        PRINT "MANTISSA : "; CHR$(48 + ASC(LEFT$(rISP$, 1)))
        PRINT "EXPONENT : "; CHR$(48 + ASC(MID$(rISP$, 2, 1)))
    END IF
    PRINT
CASE "t", "T"
    PRINT #1, "T"; CHR$(&HAC);
    answer 3
    IF rISP$ = "" THEN
        PRINT "NOT CONNECTED"
    ELSE
        PRINT "LANGUAGE : "; CHR$(48 + ASC(LEFT$(rISP$, 1)))
        PRINT "MEASUREMENT UNIT : "; CHR$(48 + ASC(MID$(rISP$, 2, 1)))
    END IF
    PRINT
CASE "7"
    PRINT #1, "G"; CHR$(&HB9);
    answer 3
    IF rISP$ = "" THEN
        PRINT "NOT CONNECTED"
    ELSE
        a$ = LEFT$(rISP$, 2)
        PRINT "CALIBRATION COEFFICIENT : "; CVI(a$)
    END IF
    PRINT
CASE "v", "V"
    PRINT #1, "V"; CHR$(&HAA);
    answer 3
    IF rISP$ = "" THEN
        PRINT "NOT CONNECTED"
    ELSE
        a$ = LEFT$(rISP$, 2)
        PRINT "DUTY CYCLE : "; CVI(a$)

```

```

END IF
PRINT
CASE "u", "U"
PRINT #1, "U"; CHR$(&HAB);
answer 2
IF risp$ = "" THEN
PRINT "NOT CONNECTED"
ELSE
b% = ASC(LEFT$(risp$, 1))
IF b% THEN
PRINT "SET-POINT ON"
ELSE
PRINT "SET-POINT OFF"
END IF
END IF
PRINT
CASE "H", "h"
INPUT "ADJ. COEFFICIENT : ", ct%
IF (ct% >= 100) AND (ct% <= 4170) THEN
cm$ = "H" + MKI$(ct%)
crc = 0
PRINT
FOR i = 1 TO LEN(cm$)
crc = crc - ASC(MID$(cm$, i, 1))
PRINT HEX$(ASC(MID$(cm$, i, 1))); " ";
NEXT
crc = crc AND &HFF
PRINT HEX$(crc)
cm$ = cm$ + CHR$(crc)
PRINT #1, cm$;
answer 10
IF risp$ = "" THEN
PRINT "NOT CONNECTED"
ELSE
PRINT "RECEIVED : "; LEN(risp$)
FOR i = 1 TO LEN(risp$)
PRINT HEX$(ASC(MID$(risp$, i, 1))); " ";
NEXT
PRINT
END IF
PRINT
END IF
CASE "K", "k"
INPUT "LANGUAGE ", l%
INPUT "MEASUREMENT UNIT ", u%
INPUT "MANTISSA ", m%
INPUT "EXPONENT ", e%
cm$ = "K" + CHR$(l%) + CHR$(u%) + CHR$(m%) + CHR$(e%)
crc = 0
PRINT
FOR i = 1 TO LEN(cm$)
crc = crc - ASC(MID$(cm$, i, 1))
PRINT HEX$(ASC(MID$(cm$, i, 1))); " ";
NEXT
crc = crc AND &HFF
PRINT HEX$(crc)
cm$ = cm$ + CHR$(crc)
PRINT #1, cm$;
answer 10
IF risp$ = "" THEN
PRINT "NOT CONNECTED"
END IF
PRINT

```

```

CASE "8"
  PRINT #1, "I"; CHR$(&HB7);
  answer 3
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "MEASURE: "; ASC(MID$(risp$, 2, 1)); "e"; ASC(LEFT$(risp$, 1))
  END IF
  PRINT
CASE "9"
  PRINT #1, "J"; CHR$(&HB6);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "RECEIVED : "; HEX$(ASC(LEFT$(risp$, 1)))
  END IF
  PRINT
CASE "0"
  PRINT #1, "@"; CHR$(&HC0);
  answer 2
  IF risp$ = "" THEN
    PRINT "NOT CONNECTED"
  ELSE
    PRINT "RECEIVED : "; HEX$(ASC(LEFT$(risp$, 1)))
  END IF
  PRINT
CASE "q", "Q"
  STOP
CASE ELSE
  BEEP
END SELECT
WEND
ai:
  CLOSE
  OPEN "com1:1200,n,8,1,rs,ds" FOR RANDOM AS 1
  IF demo = 0 THEN GOTO star ELSE GOTO dem
SUB answer (lung%)
  SHARED risp$
  timeout = 0
  risp$ = ""
  WHILE timeout <<<N>2000
    WHILE NOT EOF(1)
      a$ = INPUT$(1, 1)
      risp$ = risp$ + a$
      IF (LEN(risp$) = lung%) THEN EXIT SUB
    WEND
    timeout = timeout + 1
  WEND
END SUB

```

**SELF TEST MESSAGES**

For most types of failure, HeliTest Rack will self-diagnose the error, and the following messages will be displayed.

**NOTE**

The heater is tested continuously. If the heater test is negative, the display will show the following message:

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

This message is displayed for 1 minute, then HeliTest Rack is switched off automatically. Perform the self test procedure (see paragraph "HeliTest Rack Start Up"), then if the heater is still reported "DEFECTIVE", contact the sales office.

**NOTE**

If a fault occurs during the self test procedure of the sensor test, the following message is shown:

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

This message is displayed until the following action (see Note) has been taken or the HeliTest Rack is switched off.

**NOTE**

- Take HeliTest Rack away from helium sources.
- If available, spray Nitrogen (N2) or Argon (Ar) on the probe until OK is displayed (within 15 minutes maximum).
- Repeat the self test procedure following paragraph "HeliTest Rack Start Up"

If the sensor still shows "SPRAY NITROGEN", contact the sales office.

**NOTE**

If a fault occurs during the self test procedure of the sensor test, the following message is shown:

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

This message is displayed for 1 minute, then HeliTest Rack is switched off automatically.

To recover normal operation, proceed as follows:

- check and clean the dust filter at the top of the probe and/or extension (see paragraph "Probe Filter Cleaning")
- repeat the self test procedure (see paragraph "Self Test"), then if the sampling line still shows "FAULT", contact the sales office.

**NOTE**

If during start up, or operation, the battery voltage decreases below 10.2 V, but is still higher than 9.5 V, the display will show the following message for 1 minute, then HeliTest Rack automatically is switched off.

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

If the signal persists, contact the Varian sales office.

**HELITEST RACK SPARES AND ACCESSORIES**

Capillary leak	969-3540
Probe pin head set	969-3515
Long probe (includes 10m (33 ft) of tubing)	969-3525
Probe end cone	SR03.647608
Probe bronze filter	SR28.900009-01
Probe head o-ring	SR27.482013-01
Mains fuse	SR67.150416-01



# 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.

**North and South America**

Varian Vacuum Technologies  
 121 Hartwell Ave  
 Lexington, MA 02421  
 Phone : +1 781 8617200  
 Fax: +1 781 8609252

**Europe and Middle East**

Varian SpA  
 Via Flli Varian 54  
 10040 Leini (TO) – ITALY  
 Phone: +39 011 9979111  
 Fax: +39 011 9979330

**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.#: .....
<i>Europe only:</i> VAT reg. Number: .....	<i>USA only:</i> <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	<b>POSITION</b> <input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal <input type="checkbox"/> Upside-down <input type="checkbox"/> Other: .....	<b>PARAMETERS</b> Power:                      Rotational Speed: Current:                     Inlet Pressure: Temp 1:                      Foreline Pressure: Temp 2:                      Purge flow:
<b>TURBOCONTROLLER ERROR MESSAGE:</b>			<b>OPERATION TIME:</b>

**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.



## Sales and Service Offices

### Argentina

#### Varian Argentina Ltd.

Sucursal Argentina  
Av. Ricardo Balbin 2316  
1428 Buenos Aires  
Argentina  
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Fax: (54) 1 786 5172

### Australia

#### Varian Australia Pty Ltd.

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Mulgrave, Victoria ZZ 3170  
Australia  
Tel: (61) 395607133  
Fax: (61) 395607950

### Benelux

#### Varian Vacuum Technologies

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3956 CP Leersum  
The Netherlands  
Tel: (31) 343 469910  
Fax: (31) 343 469961

### Brazil

#### Varian Industria e Comercio Ltda.

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Vila Olimpia  
Sao Paulo 04548 005  
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Tel: (55) 11 3845 0444  
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### Canada

#### Central coordination through:

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121 Hartwell Avenue  
Lexington, MA 02421  
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Toll Free: (800) 882 7426

### China

#### Varian Technologies - Beijing

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#### Varian s.a.

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Les Ulis cedex (Orsay) 91941  
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### Germany and Austria

#### Varian Deutschland GmbH

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#### Varian India PVT LTD

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### Italy

#### Varian Vacuum Technologies

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10040 Leini, (Torino)  
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#### Varian Vacuum Technologies

Sumitomo Shibaura Building, 8th Floor  
4-16-36 Shibaura  
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### Korea

#### Varian Technologies Korea, Ltd.

Shinsa 2nd Bldg. 2F  
966-5 Daechi-dong  
Kangnam-gu, Seoul  
Korea 135-280  
Tel: (82) 2 3452 2452  
Fax: (82) 2 3452 2451

### Mexico

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