

# ***MicroVac Controller***

**Model 929-0200  
Model 929-0201**

*(I) MANUALE DI ISTRUZIONI*

*(D) BEDIENUNGSHANDBUCH*

*(F) NOTICE DE MODE D'EMPLOI*

*(GB) INSTRUCTION MANUAL*

# MicroVac Controller



**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>_____</p>		
<p>REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.) :</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">DATE _____</p>		

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



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## INFORMAZIONI GENERALI

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Varian prima dell'utilizzo dell'apparecchiatura. La Varian si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche. Il MicroVac è un alimentatore ad alta tensione e bassa potenza, utilizzato per alimentare le pompe ioniche, è dotato di un microprocessore utilizzato per pilotare il pannello frontale.

Oltre al connettore per alimentare la pompa, è presente anche un spinotto che svolge la funzione di Interlock, se questo non è inserito sul connettore di uscita non è presente alcuna tensione.

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

**Questo manuale utilizza le seguenti convenzioni:**



### PERICOLO!

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



### ATTENZIONE!

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

### NOTA

*Le note contengono informazioni importanti estrapolate dal testo.*

## IMMAGAZZINAMENTO

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

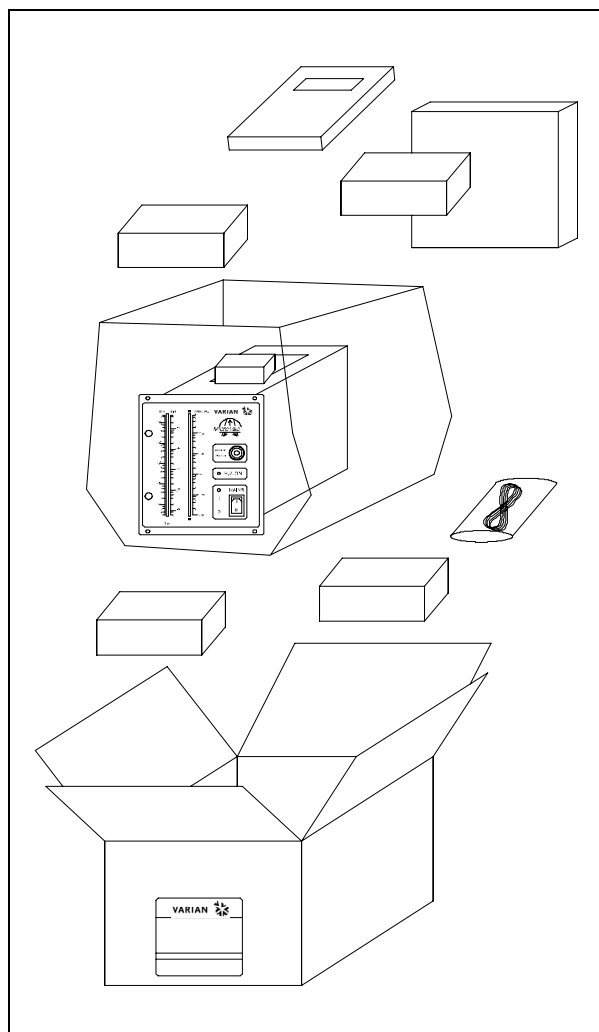
- temperatura: da -20 °C a +70 °C
- umidità relativa: 0 - 95% (non condensante)

## PREPARAZIONE PER L'INSTALLAZIONE

Il controller 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 disimballo, prestare particolare attenzione a non lasciar cadere il modulo 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 dei controller*

Ogni controller giunge dalla Varian predisposto per una certa tensione di alimentazione:

- il modello 929-0201 KINGS type High voltage connector (220 Vac, 50/60 Hz)
- il modello 929-0200 KINGS type High voltage connector (120 Vac, 50/60 Hz)



## INSTALLAZIONE



**PERICOLO!**

Il controller 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 controller si sviluppano alte tensioni che possono recare gravi danni o la morte. Prima di eseguire qualsiasi operazione di installazione o manutenzione del controller scollegarlo dalla presa di alimentazione.

### NOTA

*Il controller deve essere installato all'interno di un apposito rack. In ogni caso occorre che l'aria di raffreddamento possa circolare liberamente intorno all'apparato. Non installare e/o utilizzare il controller 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 +45 °C
- umidità relativa: 0 - 95% (non condensante).

Per il collegamento del controller con la relativa pompa utilizzare il cavo specifico del controller stesso.

Per gli altri collegamenti e l'installazione degli accessori opzionali, vedere la sezione "Technical Information".

## USO

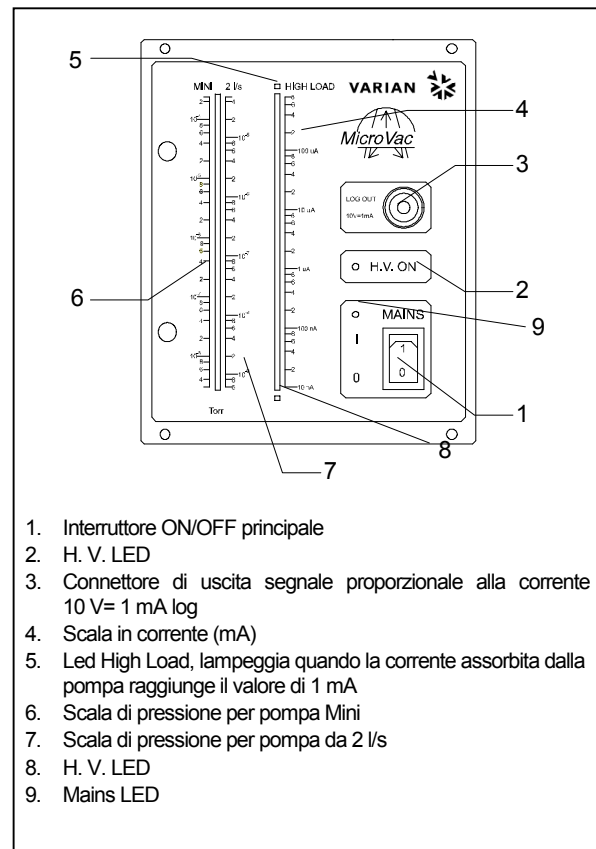
In questo paragrafo sono riportate le principali procedure operative. Per ulteriori dettagli e per procedure che coinvolgono collegamenti o particolari opzionali, fare riferimento al paragrafo "Use" della sezione "Technical Information".

Prima di usare il controller effettuare tutti i collegamenti elettrici e pneumatici e fare riferimento al manuale della pompa collegata.

## Comandi, Indicatori e Connettori Del Controller

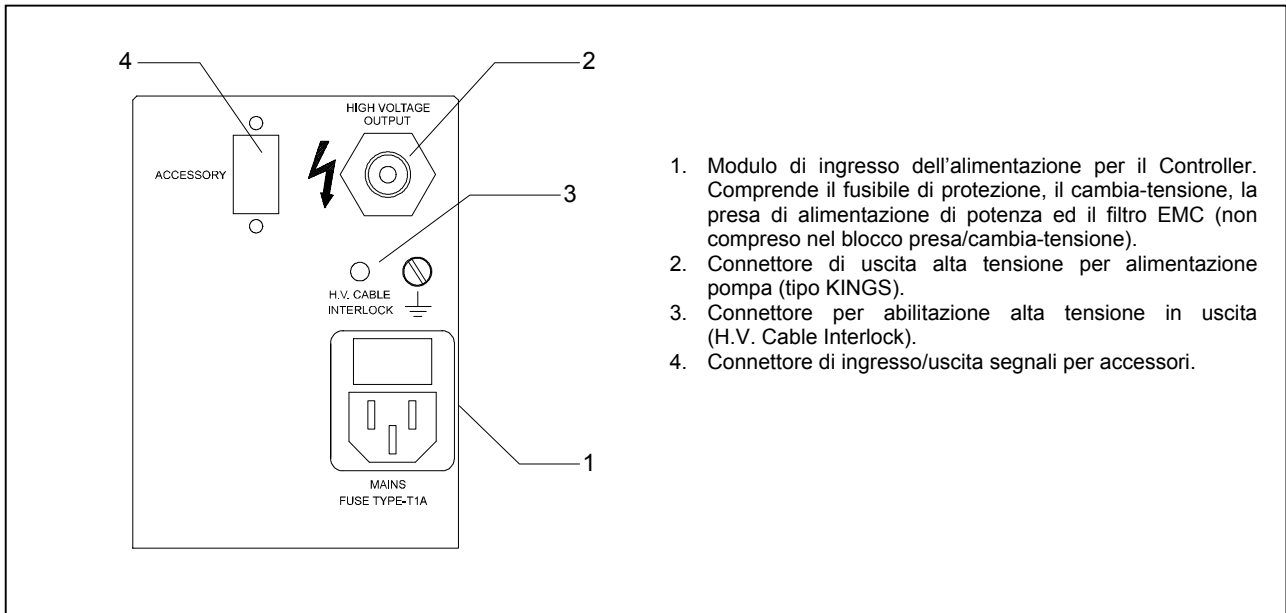
Di seguito sono illustrati sia il pannello frontale che quello posteriore con le interconnessioni.

Per maggiori dettagli fare riferimento alla sezione "Technical Information".



1. Interruttore ON/OFF principale
2. H. V. LED
3. Connettore di uscita segnale proporzionale alla corrente 10 V= 1 mA log
4. Scala in corrente (mA)
5. Led High Load, lampeggia quando la corrente assorbita dalla pompa raggiunge il valore di 1 mA
6. Scala di pressione per pompa Mini
7. Scala di pressione per pompa da 2 l/s
8. H. V. LED
9. Mains LED

*Pannello frontale del Controller*



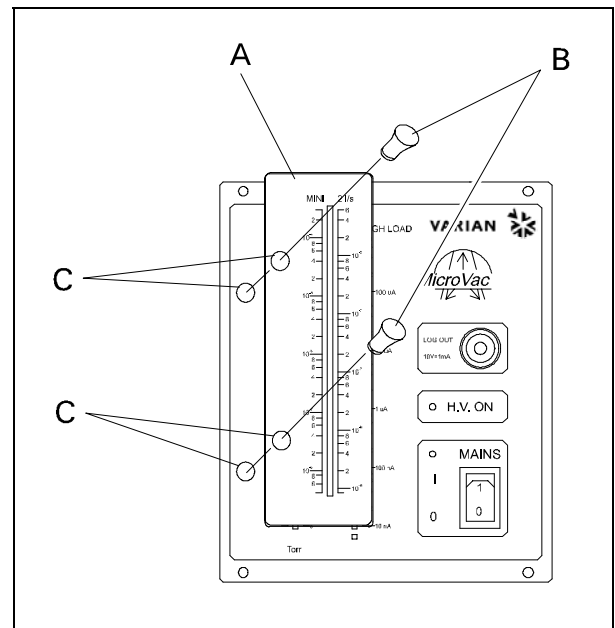
1. Modulo di ingresso dell'alimentazione per il Controller. Comprende il fusibile di protezione, il cambia-tensione, la presa di alimentazione di potenza ed il filtro EMC (non compreso nel blocco presa/cambia-tensione).
2. Connettore di uscita alta tensione per alimentazione pompa (tipo KINGS).
3. Connettore per abilitazione alta tensione in uscita (H.V. Cable Interlock).
4. Connettore di ingresso/uscita segnali per accessori.

*Pannello posteriore dei Controller*

**Installazione scala graduata in Pascal o in Millibar fornita come accessorio**

I controller della linea MicroVac vengono forniti con la scala della pressione espressa in Torr (Torricelli); è comunque possibile sostituirla con un'altra graduata in Pa (Pascal) o mBar (Millibar) (fornita come accessorio). Di seguito viene descritto come effettuare tale sostituzione.

Dopo aver estratto dalla confezione degli accessori l'etichetta che interessa, sovrapporre l'etichetta **A** a quella esistente, avendo cura di far coincidere i fori **C**; quindi fissarla utilizzando i fermi a pressione **B**.



*Installazione etichetta graduata in Pascal o in Millibar*



## **PROCEDURE DI USO**

### **Accensione del Controller**

Per accendere il controller portare l'interruttore principale in posizione ON dopo aver inserito il cavo di alimentazione nella presa di rete.

### **Avvio della Pompa**

La pompa si avvia solo se il controller è acceso e i due interlock (H.V. Cable e Remote ON/OFF) sono cortocircuitati. Per ulteriori informazioni fare riferimento alla sezione "Technical Information".

### **Arresto della Pompa**

Per arrestare la pompa portare in posizione OFF l'interruttore principale posizionato sul pannello frontale.

## **MANUTENZIONE**

I controller della serie MicroVac non richiedono alcuna manutenzione. Qualsiasi intervento deve essere eseguito da personale autorizzato.

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



**PERICOLO!**

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

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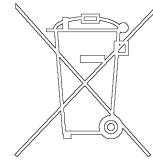
Qualora un controller dovesse essere rottamato, procedere alla sua eliminazione nel rispetto delle normative nazionali specifiche.

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## **SMALTIMENTO**

### **Significato del logo "WEEE" presente sulle etichette.**

Il simbolo qui sotto riportato è applicato in ottemperanza alla direttiva CE denominata "WEEE". Questo simbolo (**valido solo per i paesi della Comunità Europea**) indica che il prodotto sul quale è applicato, NON deve essere smaltito insieme ai comuni rifiuti domestici o industriali, ma deve essere avviato ad un sistema di raccolta differenziata. Si invita pertanto l'utente finale a contattare il fornitore del dispositivo, sia esso la casa madre o un rivenditore, per avviare il processo di raccolta e smaltimento, dopo opportuna verifica dei termini e condizioni contrattuali di vendita.



**ALLGEMEINES**

Dieser Apparat ist für Fachbetriebe bestimmt. Vor Gebrauch sollte der Benutzer dieses Handbuch sowie alle weiteren mitgelieferten Zusatzdokumentationen genau lesen. Bei - auch nur teilweiser - Nichtbeachtung 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. Der MicroVac ist ein Hochspannungsnetzgerät niedriger Leistung, das zur Versorgung von Ionenpumpen verwendet wird. Er ist mit einem Mikroprozessor zur Steuerung des Bedienfelds ausgerüstet.

Außer des Steckers zur Versorgung der Pumpe gibt es auch einen Stift, der zur Verriegelung dient. Wenn dieser nicht auf dem Ausgangsstecker eingesteckt ist, liegt keine Spannung an.

In den folgenden Abschnitten sind alle erforderlichen Informationen für die Sicherheit des Bedieners bei der Anwendung des Geräts aufgeführt. Detaillierte technische Informationen sind im Anhang "Technical Information" enthalten.

**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:

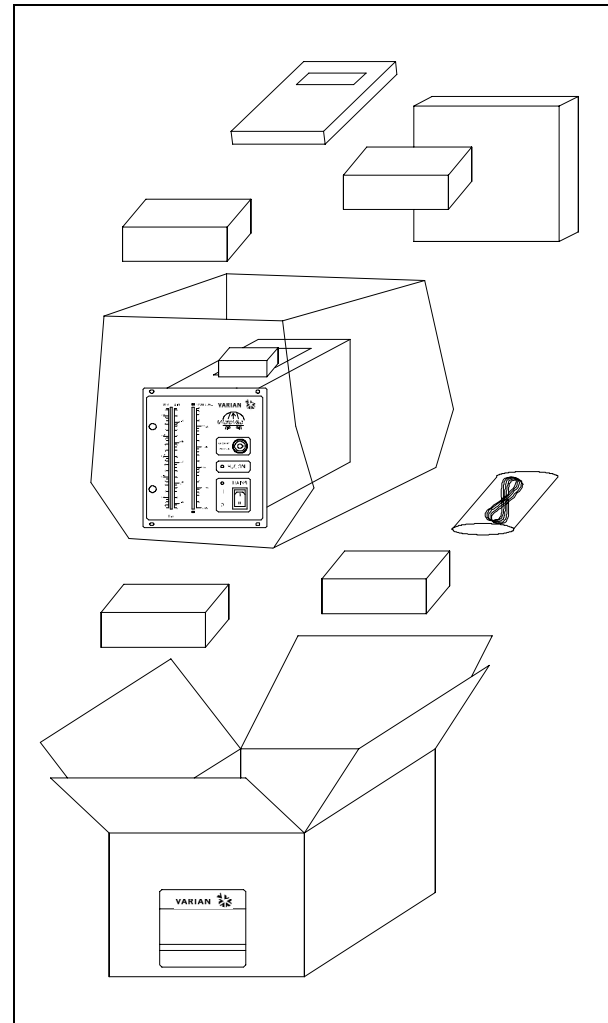
- Temperatur: von -20 °C bis +70 °C
- Relative Luftfeuchtigkeit: 0-95 % (nicht kondensierend)

**VOR DER INSTALLATION**

Der Controller wird mit einer speziellen Schutzverpackung geliefert. Eventuelle Transportschäden müssen der zuständigen örtlichen Verkaufsstelle gemeldet werden.

Beim Auspacken vorsichtig vorgehen, damit der Controller 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 der Controller*

Alle Varian-Controller sind für eine bestimmte Anschlußspannung ausgelegt:

- das Modell 929-0201 KINGS type High voltage connector (220 V, 50/60 Hz)
- das Modell 929-0200 KINGS type High voltage connector (120 V, 50/60 Hz)

**INSTALLATION**



**GEFAHR!**

Der Controller wird mit einem 3-adrigen Netzkabel geliefert, das 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 Controllers entstehen hohe Spannungen, die schwere Schäden verursachen und lebensgefährlich sein können. Vor jedem Montage- bzw. Wartungseingriff muß deshalb der Netzstecker gezogen werden.

**ANMERKUNG**

*Der Controller kann auf einen Tisch oder ein Gestell montiert werden. In beiden Fällen muß auf die ungehinderte Zirkulation der Kühlluft im Bereich des Geräts geachtet werden.*

*Der Controller 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 den Anschluß des Controllers an die Pumpe muß das zum Controller gehörende Kabel benutzt werden.

Andere Anschlüsse und die Installation optionalen Zubehörs ist im Abschnitt "Technical Information" beschrieben.

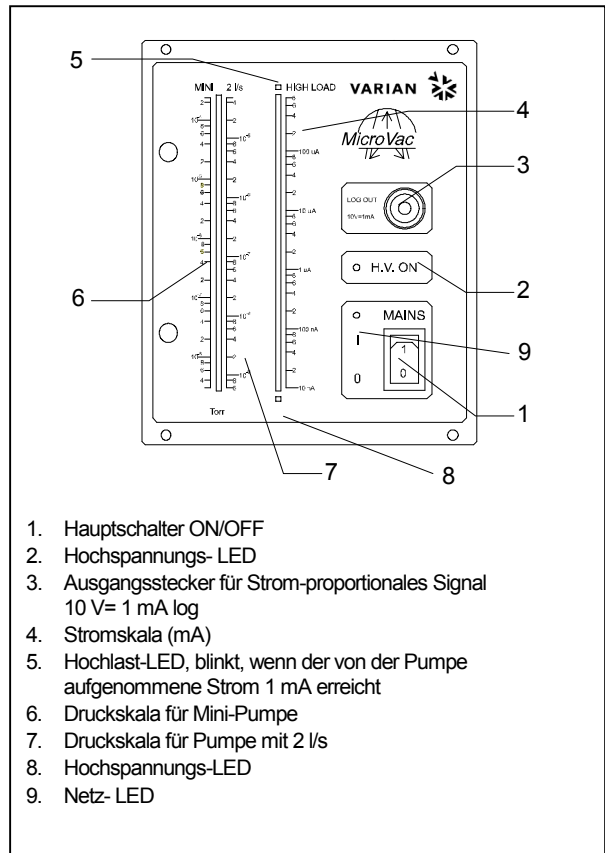
**GEBRAUCH**

In diesem Kapitel sind die wichtigsten Betriebsvorgänge aufgeführt. Für weitere Hinweise bezüglich Anschlüsse und Montage des bestellbaren Zubehörs siehe Kapitel "Use" im Anhang zu "Technical Information".

Vor Benutzung des Controllers sämtliche elektrischen und pneumatischen Anschlüsse ausführen, und die Betriebsanleitung der angeschlossenen Pumpe durchlesen.

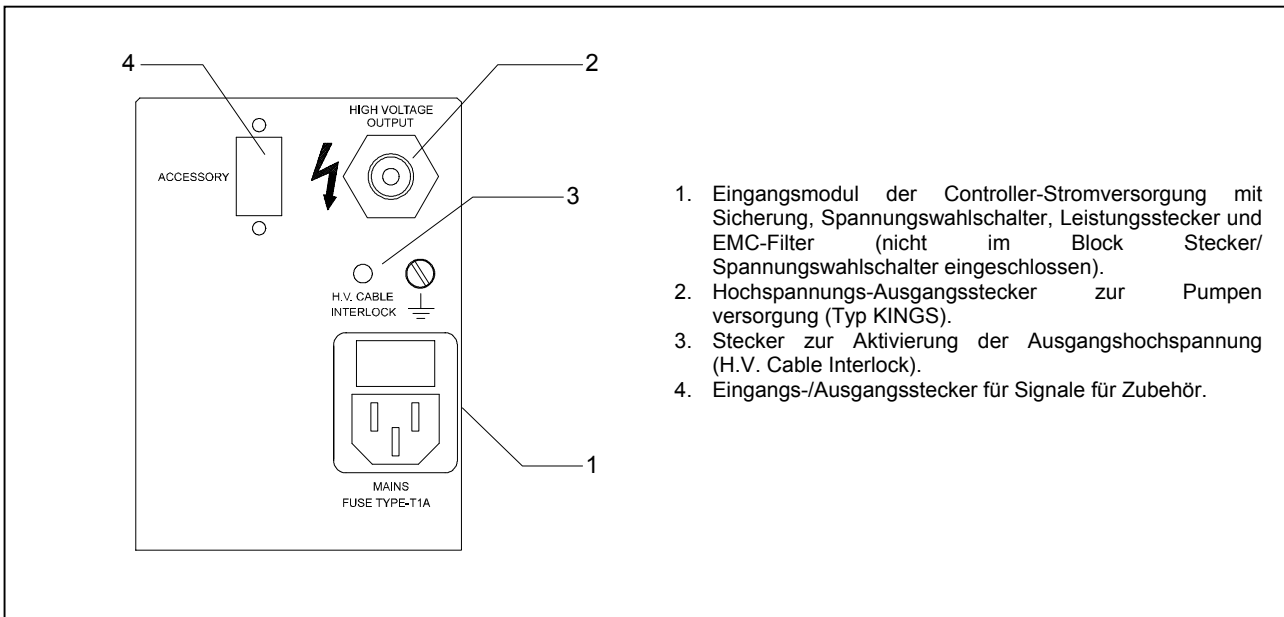
**Steuerungen, Anzeigen und Anschlüsse des Controllers**

Nachstehend werden das Bedienfeld des Controllers sowie die Anschlußfelder beschrieben. Für weitere Einzelheiten siehe "Technical Information".



1. Hauptschalter ON/OFF
2. Hochspannungs- LED
3. Ausgangsstecker für Strom-proportionales Signal 10 V= 1 mA log
4. Stromskala (mA)
5. Hochlast-LED, blinkt, wenn der von der Pumpe aufgenommene Strom 1 mA erreicht
6. Druckskala für Mini-Pumpe
7. Druckskala für Pumpe mit 2 l/s
8. Hochspannungs-LED
9. Netz- LED

*Bedienfeld der Controller*



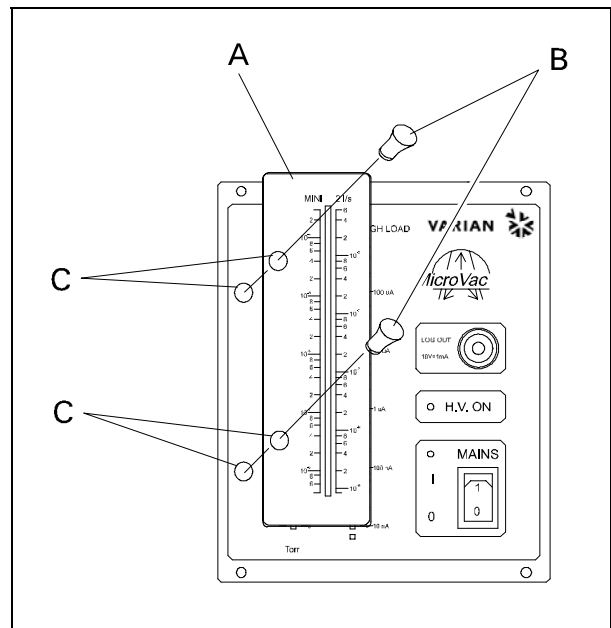
1. Eingangsmodule der Controller-Stromversorgung mit Sicherung, Spannungswahlschalter, Leistungsstecker und EMC-Filter (nicht im Block Stecker/ Spannungswahlschalter eingeschlossen).
2. Hochspannungs-Ausgangsstecker zur Pumpenversorgung (Typ KINGS).
3. Stecker zur Aktivierung der Ausgangshochspannung (H.V. Cable Interlock).
4. Eingangs-/Ausgangsstecker für Signale für Zubehör.

Rücktafel der Controller

**Installation der als Zubehör gelieferten Skala in Pascal oder Millibar**

Die Controller der MicroVac Serie werden mit Druckskala in Torr (Torricelli) geliefert. Diese kann jedoch durch eine solche in Pa (Pascal) oder mBar (Millibar) ersetzt werden, die als Zubehör geliefert wird. Im folgenden ist dieser Austausch beschrieben.

Das betreffende Etikett aus der Zubehörverpackung ziehen. Dies Etikett **A** über den vorhandenen legen. Dabei darauf achten, daß die Löcher **C** übereinander liegen. Dann mit den Druckknöpfen **B** fest machen.



Installation der Skala in Pascal oder in Millibar

### BEDIENUNG

#### **Einschalten des Controllers**

Zum Einschalten des Controllers genügt es, das Netzkabel an die Steckdose anzuschließen.

#### **Pumpenstart**

Die Pumpe startet nur, wenn der Controller eingeschaltet ist und die beiden Verriegelungen (Hochspannungskabel und Remote ON/OFF) kurzgeschlossen sind. Weiteres findet sich im Abschnitt "Technical Information".

#### **Pumpenstopp**

Zum Stoppen der Pumpe muß der Hauptschalter auf dem Bedienfeld auf OFF gesetzt werden.

### WARTUNG

Die Controller der MicroVac Serie brauchen keinerlei Wartung. Alle Eingriffe dürfen nur von autorisiertem Personal vorgenommen werden.

Bei Defekten kann der Reparatur Service von Varian oder der "Varian Advance Exchange Service" in Anspruch genommen werden, der den defekten Controller durch ein Austauschgerät ersetzt.



**GEFAHR!**

Vor jedem Eingriff am Controller muß der Netzstecker gezogen werden.

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

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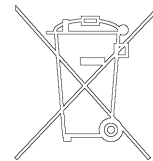
### ENTSORGUNG

#### **Bedeutung des "WEEE" Logos auf den Etiketten.**

Das folgende Symbol ist in Übereinstimmung mit der EU-Richtlinie WEEE (Waste Electrical and Electronic Equipment) angebracht.

Dieses Symbol (**nur in den EU-Ländern gültig**) zeigt an, dass das betreffende Produkt nicht zusammen mit Haushaltsmüll entsorgt werden darf sondern einem speziellen Sammelsystem zugeführt werden muss.

Der Endabnehmer sollte daher den Lieferanten des Geräts - d.h. die Muttergesellschaft oder den Wiederverkäufer - kontaktieren, um den Entsorgungsprozess zu starten, nachdem er die Verkaufsbedingungen geprüft hat.



**INDICATIONS GENERALES**

Cet appareillage a été conçu en vue d'une utilisation professionnelle. L'utilisateur doit lire attentivement cette notice d'instructions ainsi que toute autre indication supplémentaire fournie par Varian, avant l'utilisation de l'appareil. Varian décline toute responsabilité quant à: non-respect total ou partiel des instructions pour l'utilisation, mauvais usage par du personnel non formé, opérations non autorisées usage contraire aux réglementations nationales spécifiques.

Micro Vac est un alimentateur à haute tension, faible puissance, conçu pour alimenter les pompes ioniques; il est équipé d'un microprocesseur pour le pilotage du panneau avant.

Il est doté d'un connecteur pour l'alimentation de la pompe et d'une broche d'interverrouillage. Si cette dernière n'est pas branchée sur le connecteur de sortie le dispositif n'est pas alimenté en tension.

Les paragraphes suivants donnent toutes les indications nécessaires pour garantir la sécurité de l'opérateur pendant l'utilisation de l'appareillage. Des renseignements plus détaillés se trouvent dans la section "Technical Information".

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



**DANGER!**

Les messages de danger attirent l'attention de l'opérateur sur une procédure ou une manœuvre 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.*

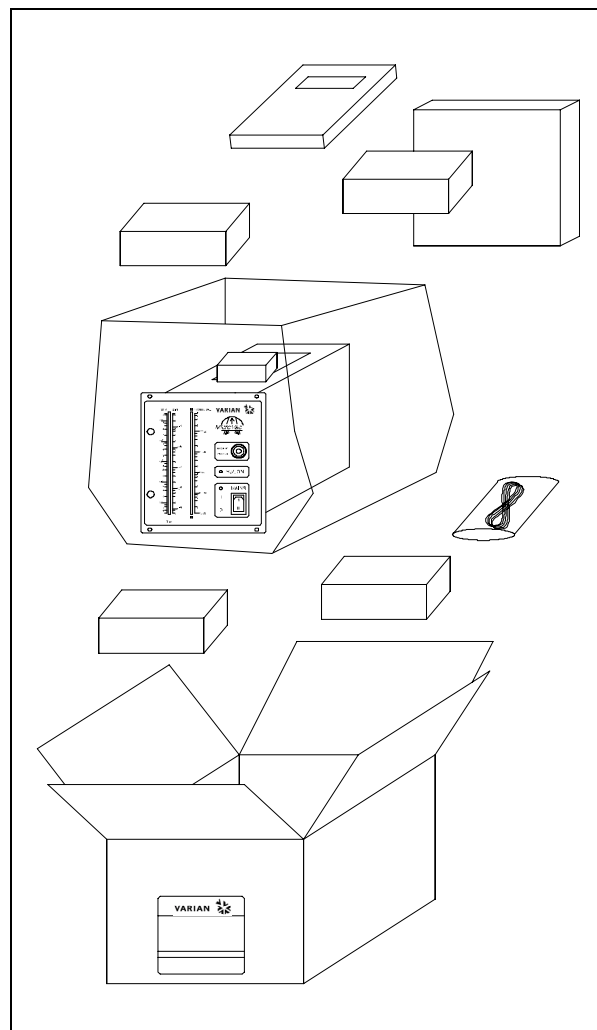
**EMMAGASINAGE**

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

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

**PREPARATION POUR L'INSTALLATION**

Le contrôleur est fourni dans un emballage de protection spécial; si vous constatez des marques de dommages pouvant s'être produits pendant le transport, adressez-vous aussitôt au bureau de vente local. Pendant l'opération d'ouverture de l'emballage, veiller tout particulièrement à ne pas laisser tomber le contrôleur 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 à la directive CEE 83/399 en matière de protection de l'environnement.



*Emballage des Contrôleurs*

Chaque contrôleur est fourni par Varian prééquipé pour une certaine tension d'alimentation:

- modèle 929-0201 KINGS type High voltage connector (220 Vca, 50/60 Hz)
- modèle 929-0200 KINGS type High voltage connector (120 Vca, 50/60 Hz)

## INSTALLATION



**DANGER!**

Le contrôleur 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 contrôleur se développent de hautes tensions qui peuvent provoquer de graves dommages et même la mort. Avant d'effectuer toute opération d'installation ou d'entretien du contrôleur, le débrancher de la prise d'alimentation.

### NOTE

Le contrôleur doit être installé dans une baie prévue 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 contrôleur dans des milieux exposés aux agents atmosphériques (pluie, gel, neige), aux poussières, aux gaz de combat ni dans des milieux explosifs ou à risque élevé d'incendie.

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

- Température: 0 °C à + 40 °C
- Humidité relative: 0 - 95% (non condensante).

Pour la connexion du contrôleur à la pompe correspondante, utiliser le câble du contrôleur prévu à cet effet.

Pour les autres connexions et pour l'installation des accessoires en option, voir la section "Technical Information".

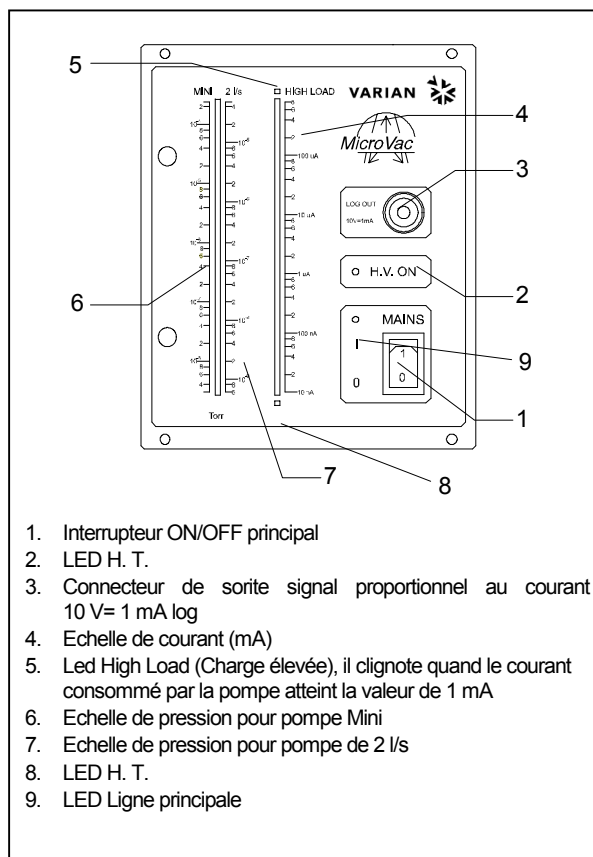
## UTILISATION

Ce paragraphe décrit les principales procédures de fonctionnement. Pour tout autre complément d'information et pour les procédures concernant des connexions ou des éléments en option, se reporter au paragraphe "Use" de la section "Technical Information".

Avant d'utiliser le contrôleur, effectuer toutes les connexions électriques et pneumatiques et se référer à la notice de la pompe connectée.

## Commandes, Indicateurs et Connecteurs du Contrôleur

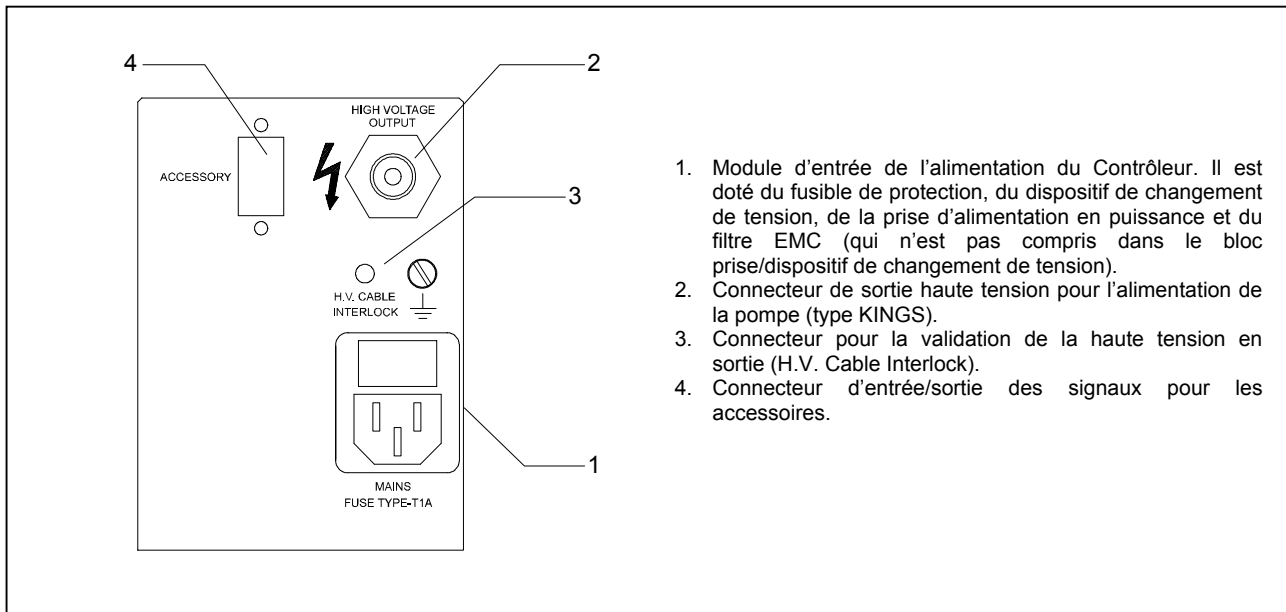
La figure ci-après représente le tableau de commande du Contrôleur et les tableaux d'interconnexion. Pour de plus amples détails, se reporter à la section "Technical Information".



1. Interrupteur ON/OFF principal
2. LED H. T.
3. Connecteur de sortie signal proportionnel au courant 10 V= 1 mA log
4. Echelle de courant (mA)
5. Led High Load (Charge élevée), il clignote quand le courant consommé par la pompe atteint la valeur de 1 mA
6. Echelle de pression pour pompe Mini
7. Echelle de pression pour pompe de 2 l/s
8. LED H. T.
9. LED Ligne principale

Tableau avant du Contrôleur





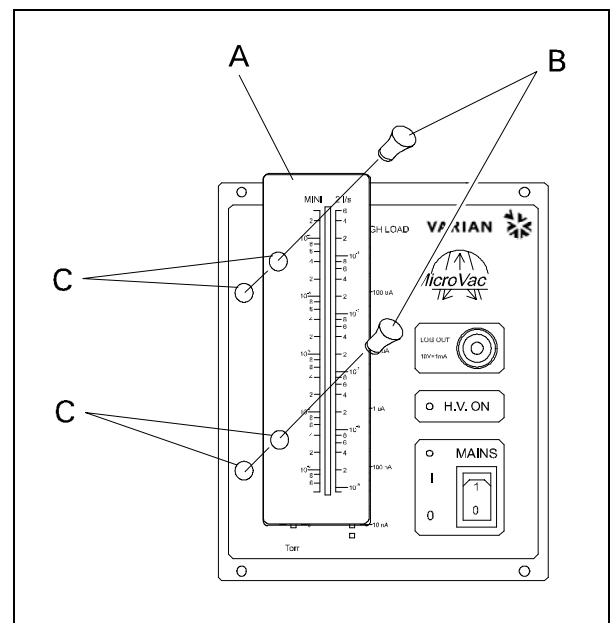
1. Module d'entrée de l'alimentation du Contrôleur. Il est doté du fusible de protection, du dispositif de changement de tension, de la prise d'alimentation en puissance et du filtre EMC (qui n'est pas compris dans le bloc prise/dispositif de changement de tension).
2. Connecteur de sortie haute tension pour l'alimentation de la pompe (type KINGS).
3. Connecteur pour la validation de la haute tension en sortie (H.V. Cable Interlock).
4. Connecteur d'entrée/sortie des signaux pour les accessoires.

*Tableau arrière des Contrôleurs*

**Installation échelle graduée en Pascal ou en Millibar livrée comme accessoire**

Les contrôleurs de la gamme MicroVac sont livrés avec l'échelle de la pression exprimée en Torr (Torricelli); toutefois, il est possible de la remplacer avec une autre graduée en Pa (Pascal) ou mBar (Millibar) (livrée comme accessoire). La procédure de remplacement est décrite ci-après.

Après avoir enlevé de l'emballage des accessoires l'étiquette requise, superposer l'étiquette **A** à celle existante, en prenant soin de faire coïncider les trous **C**; la fixer par des dispositifs de fixation par pression **B**.



*Installation étiquette graduée en Pascal ou en Millibar*

**PROCEDURES D'UTILISATION**

**Mise sous tension du Contrôleur**

Pour mettre le contrôleur sous tension, il suffit de mettre l'interrupteur principal sur ON après avoir branché le câble d'alimentation sur la prise du réseau.

**Mise en marche de la Pompe**

La pompe se met en marche uniquement si le contrôleur est sous tension et si les deux dispositifs d'interverrouillage (H.V. Cable et Remote ON/OFF) sont court-circuités. Pour tout autre complément d'information se reporter à la section "Technical Information".

**Arrêt de la Pompe**

Pour arrêter la pompe, mettre l'interrupteur principal situé sur le tableau avant sur OFF.

**ENTRETIEN**

Les contrôleurs de la série MicroVac ne requièrent aucun entretien. Toute intervention doit être effectuée par du personnel autorisé.

En cas de panne, il est possible de faire appel au service de réparation Varian ou au "Varian advance exchange service", qui permet d'obtenir un contrôleur régénéré à la place de celui en panne.



**DANGER!**

Avant d'effectuer toute intervention sur le contrôleur, débrancher le câble d'alimentation.

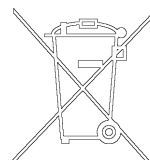
Si un contrôleur doit être mis au rebut l'éliminer conformément aux réglementations nationales en la matière.

**MISE AU REBUT**

**Signification du logo "WEEE" figurant sur les étiquettes.**

Le symbole ci-dessous est appliqué conformément à la directive CE nommée "WEEE".

Ce symbole (**uniquement valide pour les pays de la Communauté européenne**) indique que le produit sur lequel il est appliqué NE doit PAS être mis au rebut avec les ordures ménagères ou les déchets industriels ordinaires, mais passer par un système de collecte sélective. Après avoir vérifié les termes et conditions du contrat de vente, l'utilisateur final est donc prié de contacter le fournisseur du dispositif, maison mère ou revendeur, pour mettre en œuvre le processus de collecte et mise au rebut.



**GENERAL INFORMATION**

This equipment is destined for use by professionals. 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 persons, non-authorized interference with the equipment or any action contrary to that provided for by specific national standards. The MicroVac is a high voltage and low power feeder used to feed the ionic pumps; it is equipped with a microprocessor used to control the front panel. In addition to the connector to feed the pump, there is also a jack acting as an interlock; if it is not inserted into the output connector, no voltage is present. The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment. Detailed information is supplied in the section "Technical Information".

**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.



**CAUTION!**

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.

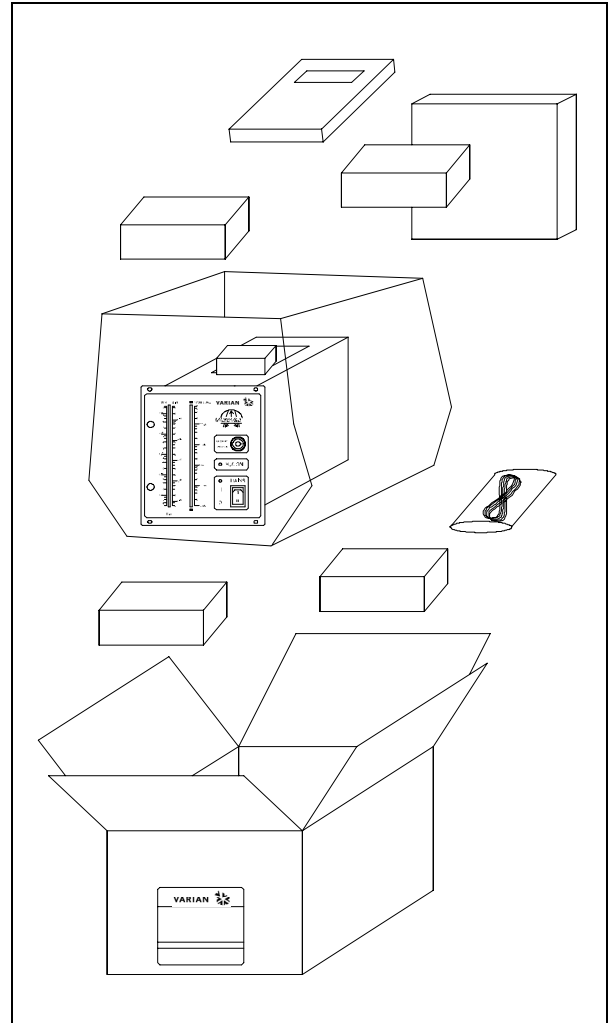
**STORAGE**

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

- temperature: from -20 °C to + 70 °C
- relative humidity: 0 - 95% (without condensation)

**PREPARATION FOR INSTALLATION**

The controller 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, ensure that the module is not dropped or subjected to any form of impact. Do not dispose of the packing materials in an unauthorised manner. The material is 100% recyclable and complies with EEC Directive 85/399.



*Controller Packing*

Each controller is factory set for a specific power supply:

- model 929-0201 KINGS type High voltage connector (220 Vac, 50/60 Hz)
- model 929-0200 KINGS type High voltage connector (120 Vac, 50/60 Hz)

**INSTALLATION**



**WARNING!**

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

**NOTE**

The controller must be installed inside a rack module, but it must be positioned so that free air can flow through the holes. Do not install or use the controller 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 +45 °C
- relative humidity: 0 - 95% (without condensation)

To connect the controller to the pump use the specific cable supplied with the controller.

See the section "Technical Information" for detailed information about the above mentioned and the other connections, and about the options installation.

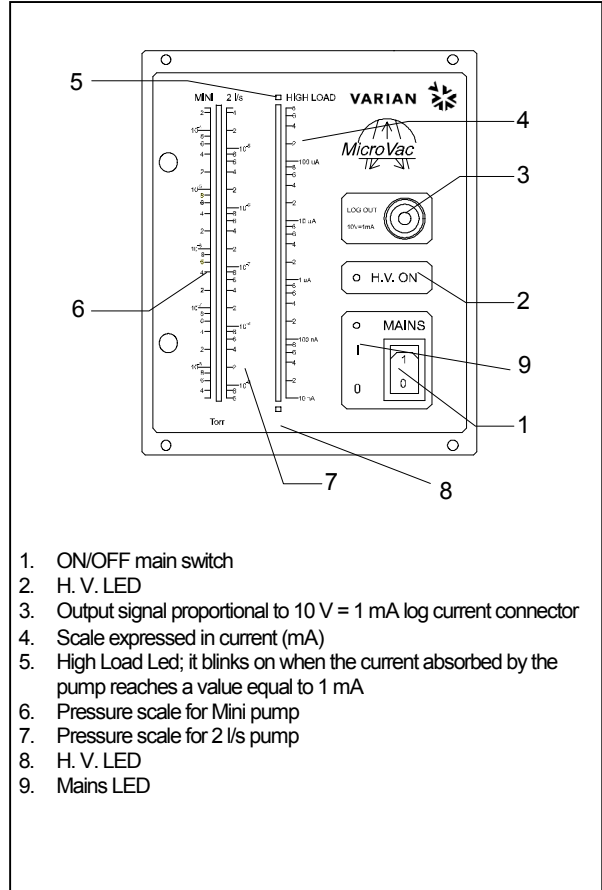
**USE**

This paragraph describes the fundamental operating procedures. Detailed information and operating procedures that involve optional connections or options are supplied in the paragraph "USE" of the section "Technical Information".

Make all vacuum manifold and electrical connections and refer to the pump instruction manual prior to operating the controller.

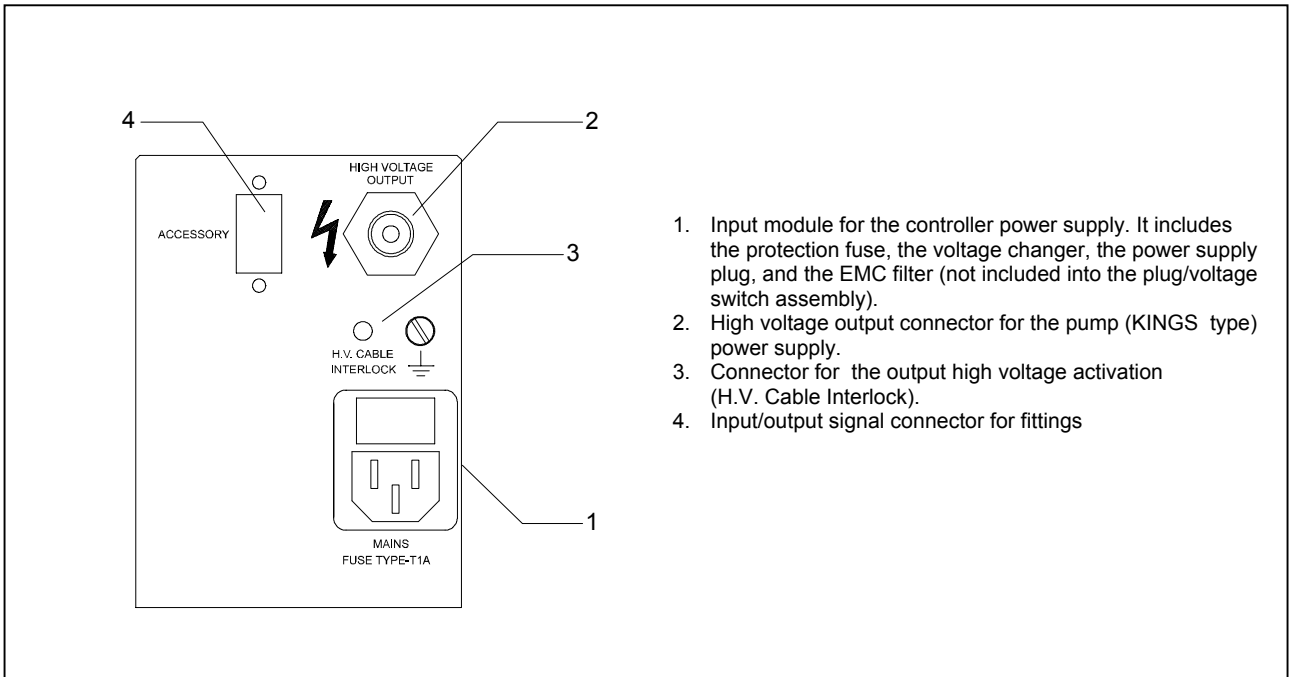
**Controller Controls, Indicators and Connectors**

The following paragraph illustrates either the front and rear panel with its interconnections. More details are contained in the appendix "Technical Information".



1. ON/OFF main switch
2. H. V. LED
3. Output signal proportional to 10 V = 1 mA log current connector
4. Scale expressed in current (mA)
5. High Load Led; it blinks on when the current absorbed by the pump reaches a value equal to 1 mA
6. Pressure scale for Mini pump
7. Pressure scale for 2 l/s pump
8. H. V. LED
9. Mains LED

Controller Front Panel



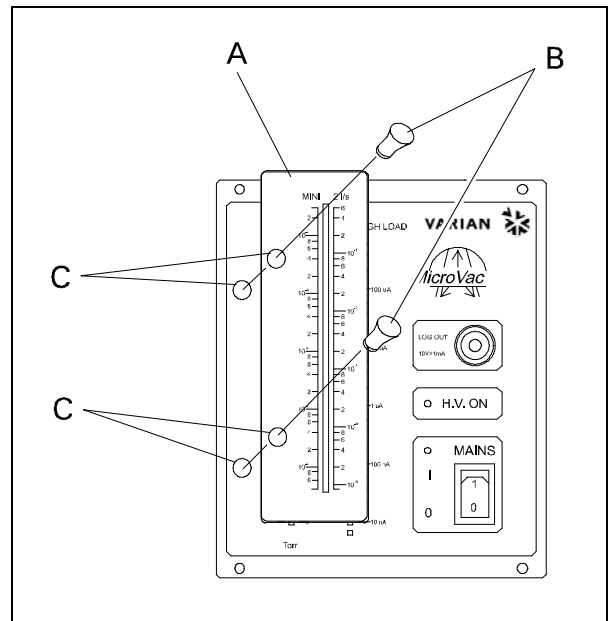
1. Input module for the controller power supply. It includes the protection fuse, the voltage changer, the power supply plug, and the EMC filter (not included into the plug/voltage switch assembly).
2. High voltage output connector for the pump (KINGS type) power supply.
3. Connector for the output high voltage activation (H.V. Cable Interlock).
4. Input/output signal connector for fittings

*Controller Rear Panel*

**Pascal or Millibar Graduated Scale Installation (Supplied as a Fitting)**

The MicroVac series controllers are supplied with the pressure scale expressed in Torr (Torricelli); however, it is possible to replace it with another one, a Pa (Pascal) or mBar (Millibar) graduated scale (supplied as a fitting). To replace, proceed as follows.

After removing the desired label from the fitting package, put label **A** on the existing one, matching the holes **C**; then fix it using the push locks **B**.



*Pascal or Millibar Graduated Label Installation*

**USE PROCEDURE**

**Controller Start-up**

To start-up the controller, turn the main switch to ON, after plugging the power cable into a suitable power source.

**Starting the Pump**

The pump starts only when the controller is turned on and the two interlocks (H.V. Cable and Remote ON/OFF) are short-circuited. Please refer to section "Technical Information" for further information.

**Pump Shutdown**

To shutdown the pump, turn the main switch placed on the front panel to OFF.

**MAINTENANCE**

The MicroVac series controllers do not require any maintenance interventions. Any intervention must be performed by authorised personnel only.

When a fault has occurred it is possible to use the Varian repair service or the "Varian advance exchange service", that allows to obtain a regenerated controller replacing the faulty one.



**WARNING!**

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

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If a pump is to be scrapped, it must be disposed of in accordance with the specific national standards.

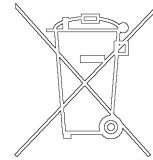
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**DISPOSAL**

**Meaning of the "WEEE" logo found in labels**  
The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.

This symbol (**valid only in countries of the European Community**) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system.

The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.



**MICROVAC CONTROLLER DESCRIPTION**

The MicroVac controller is a quarter rack solid state power supply with self protection features, which generates the high voltage for the pump.

The MicroVac ion pump controller is designed to operate the Mini and the 2 l/s ion pumps, but can also operate the 8 l/s ion pump.

The controller is designed to withstand continuous operation at short circuit condition, without any damage to the ion pump or to the controller itself.

The MicroVac controller is available in two versions, which differ in the factory-set input voltage and in the high voltage output connector type.

- Model 929-0200 KINGS type High voltage connector (120 Vac, 50/60 Hz)
- Model 929-0201 KINGS type High voltage connector (220 Vac, 50/60 Hz)

A voltage change over allows to select different operating voltages.

Inspect the controller for any shipping damage.

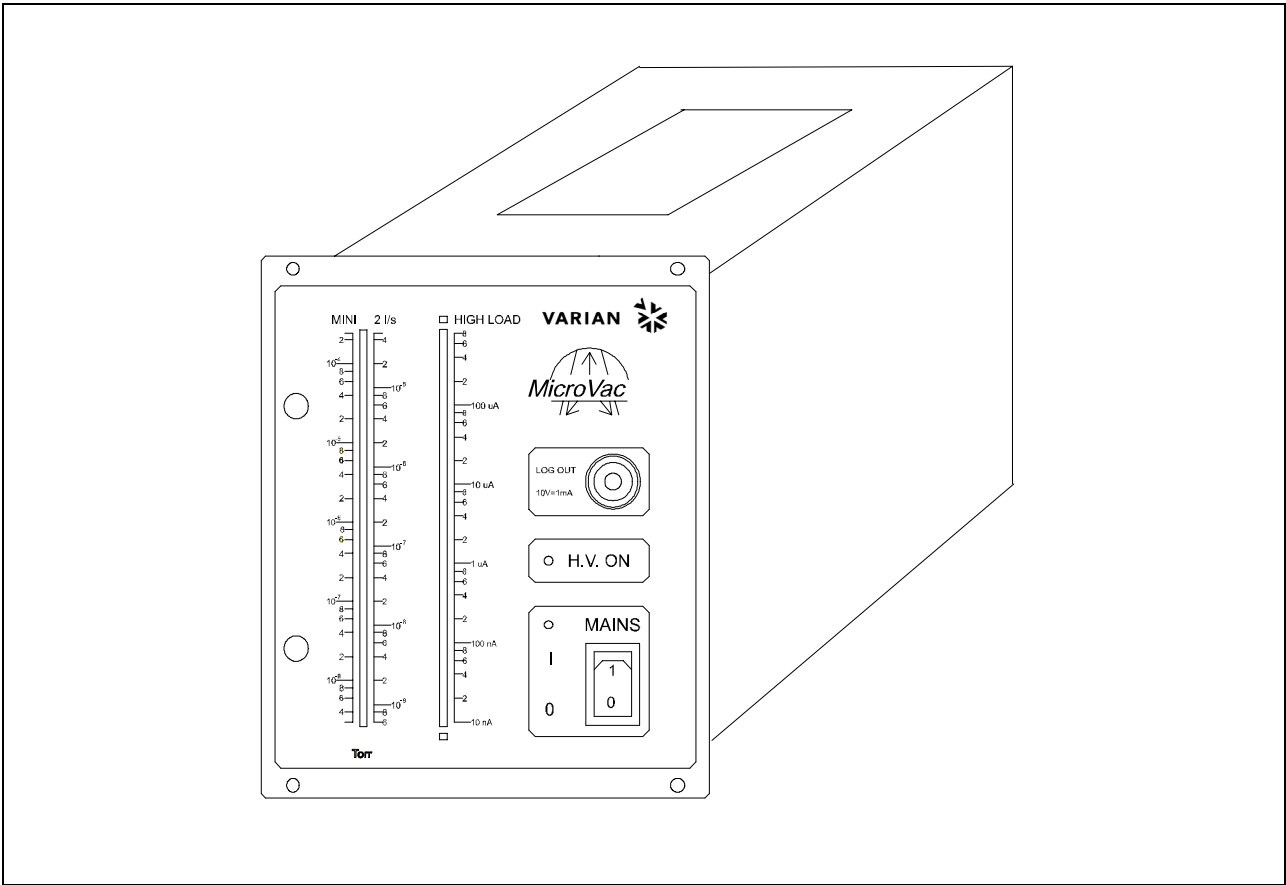
- Model 929-0200 is factory set for 120 Vac operation.
- Model 929-0201 is factory set for 220 Vac operation.



**WARNING!**

The MicroVac controller is equipped with a 3-wire power cord and plug (internationally approved) for user's safety. Use this power cord and plug in conjunction with a properly grounded power socket to avoid electrical shock.

High voltage developed in the controller can cause severe injury or death. Before servicing the unit, disconnect the input power cable.



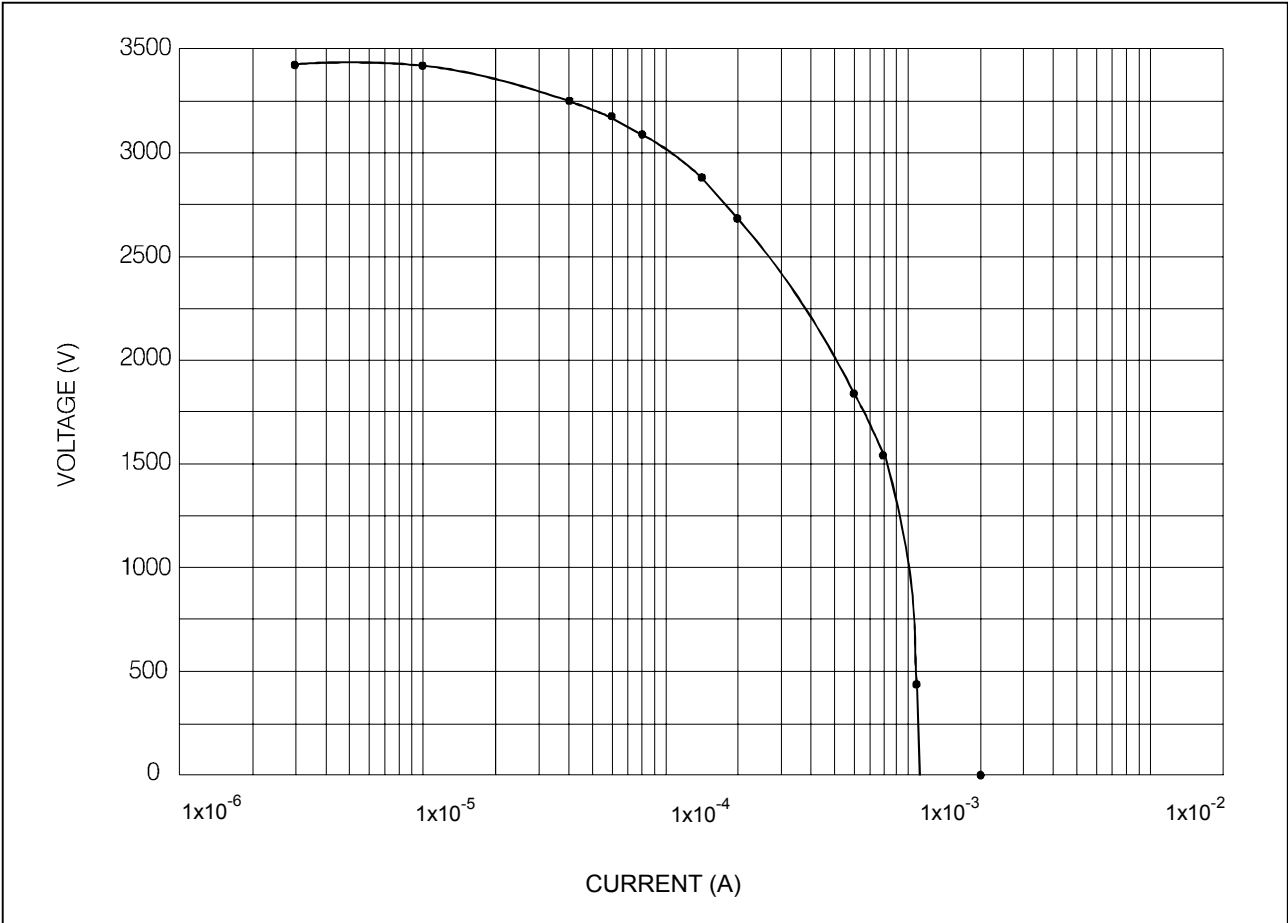
MicroVac Controller



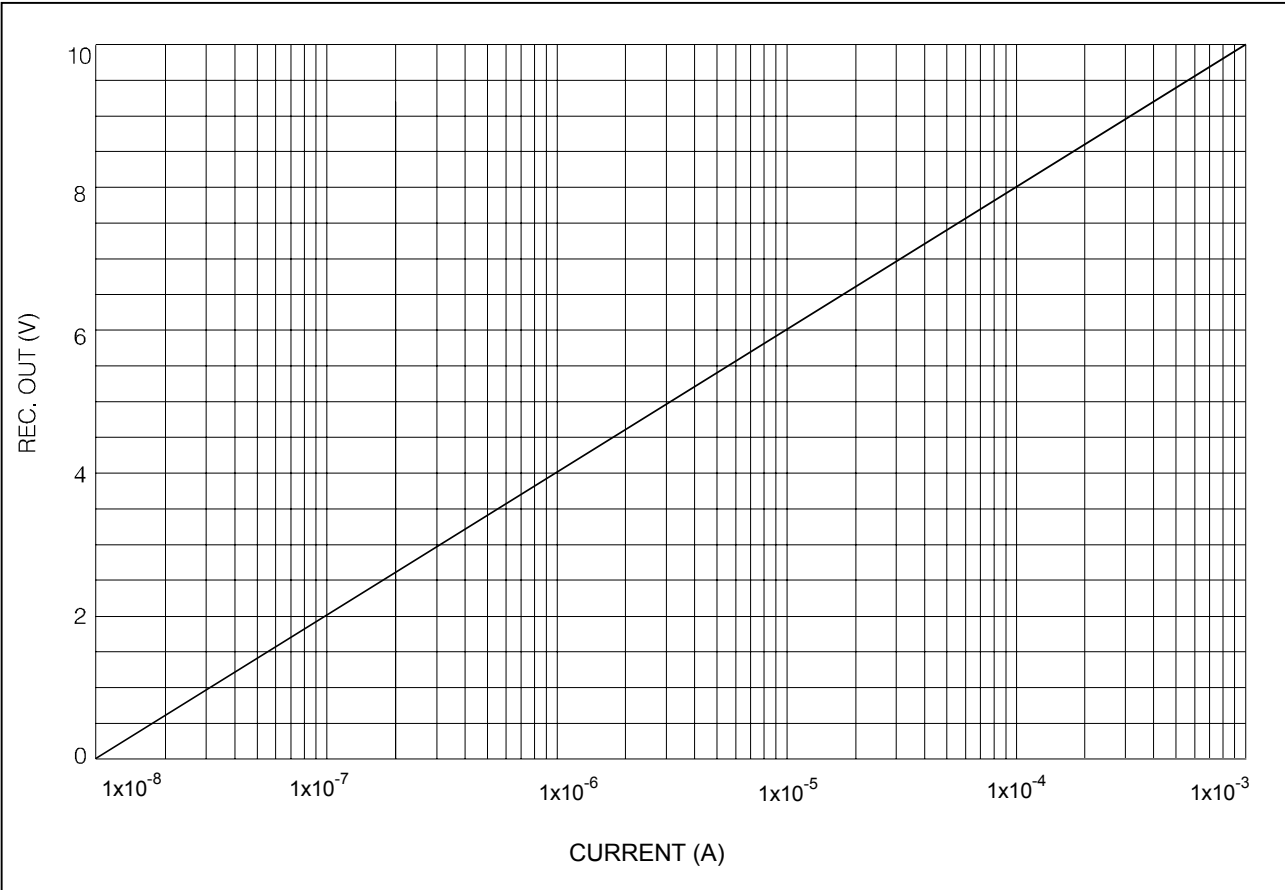
**CONTROLLER SPECIFICATIONS**

Operation	Mini, 2 l/s pumps
Input:	
Voltage	100, 120, 220, 240 Vac ±10%, 1-phase
Frequency	47 to 63 Hz
Power	40 VA maximum
Output:	
Voltage	3.300 Vdc nominal ±10%,
Current	1 mA (short circuit)
Power	1.2 W maximum
Current Recorder	
Output:	
- Log Rec Out (see attached graphs)	0 to 10 Vdc (10 V correspond to 1 mA; 10 nA resolution)
Voltage Recorder	
Output:	
- Rec Out	0 to 3.3 V corresponding to 0 to 3.3 KV with 1 V corresponding to 1 KV in linear mode) Available at pins 4 and 8 of rear panel Accessory connector.

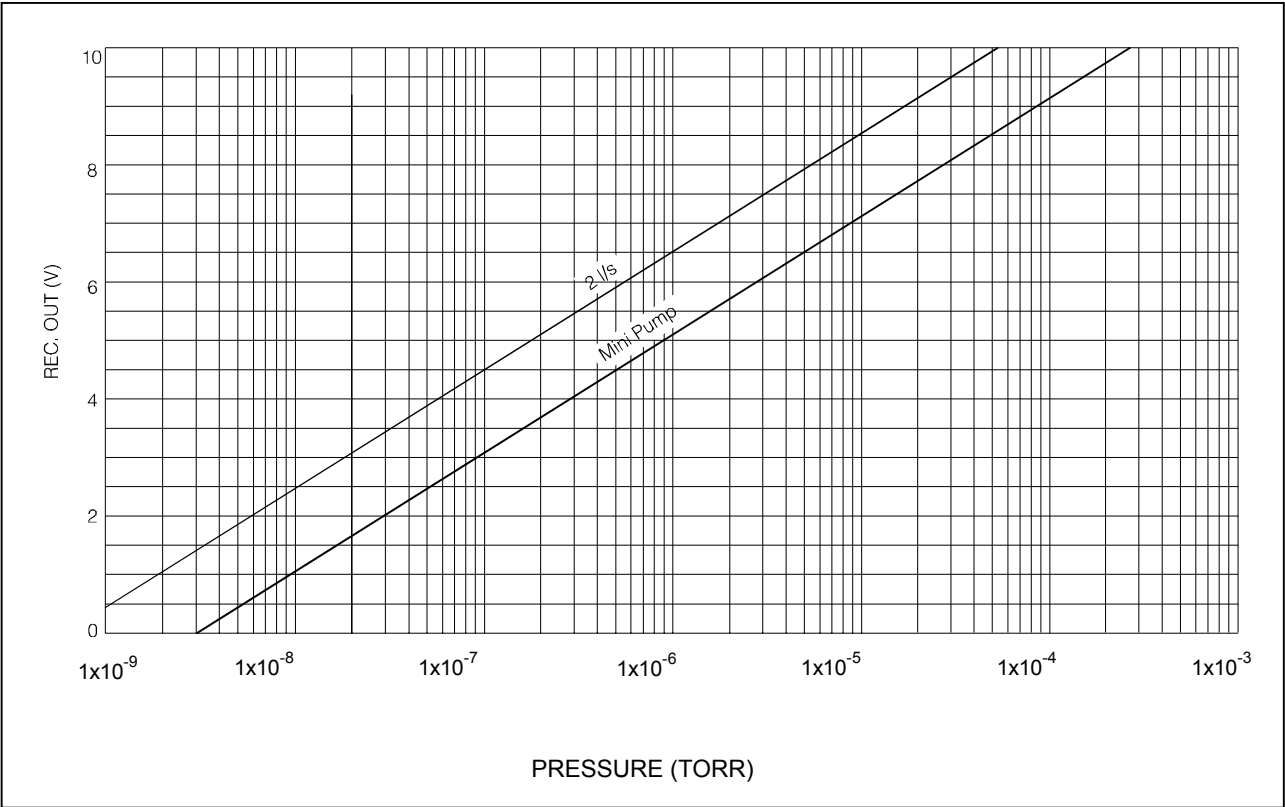
Operating temperature	0 °C to +45 °C
Storage temperature	-20 °C to +70 °C
Fuse (mains)	2 x T 1A (slow blow) disregarding the mains
Radio interference suppression	EN 55011 class A group 1 EN 61000-4 -2/3/4
Safety	EN 61010 - 1
Installation category	II
Pollution degree	2
Output Connector:	
- High voltage	KINGS type: P/N 10664-I for Model 929-0200 and 929-0201
- Accessory	J 101 input/output signal (9- pin "D" type socket)
Cable	Mains, 3 meters long
Weight:	1.7 Kg (4 lbs)



Pump current/voltage diagram



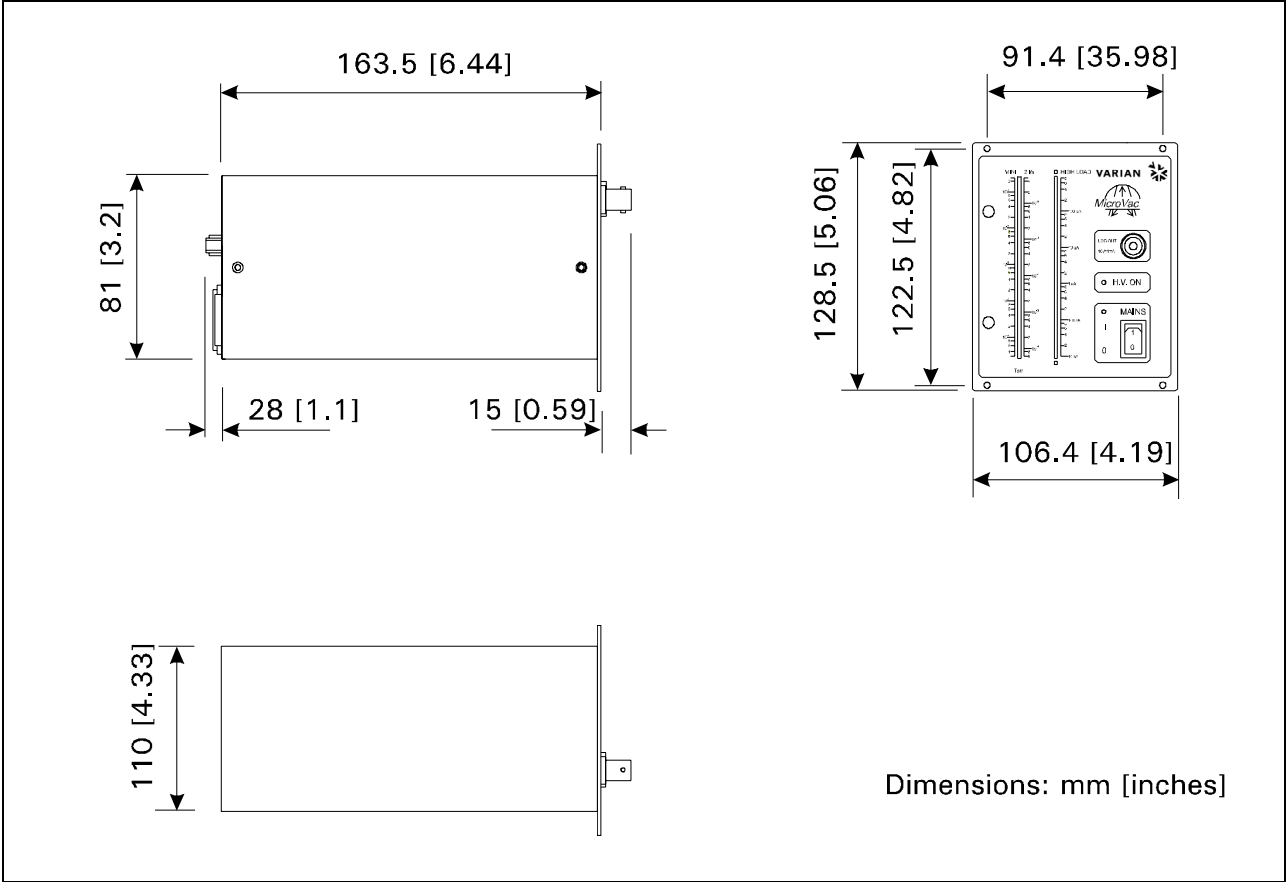
Voltage/current diagram on front connector



Pressure/voltage diagram on front connector for 2 l/s pump and Minipump

**CONTROLLER OUTLINE**

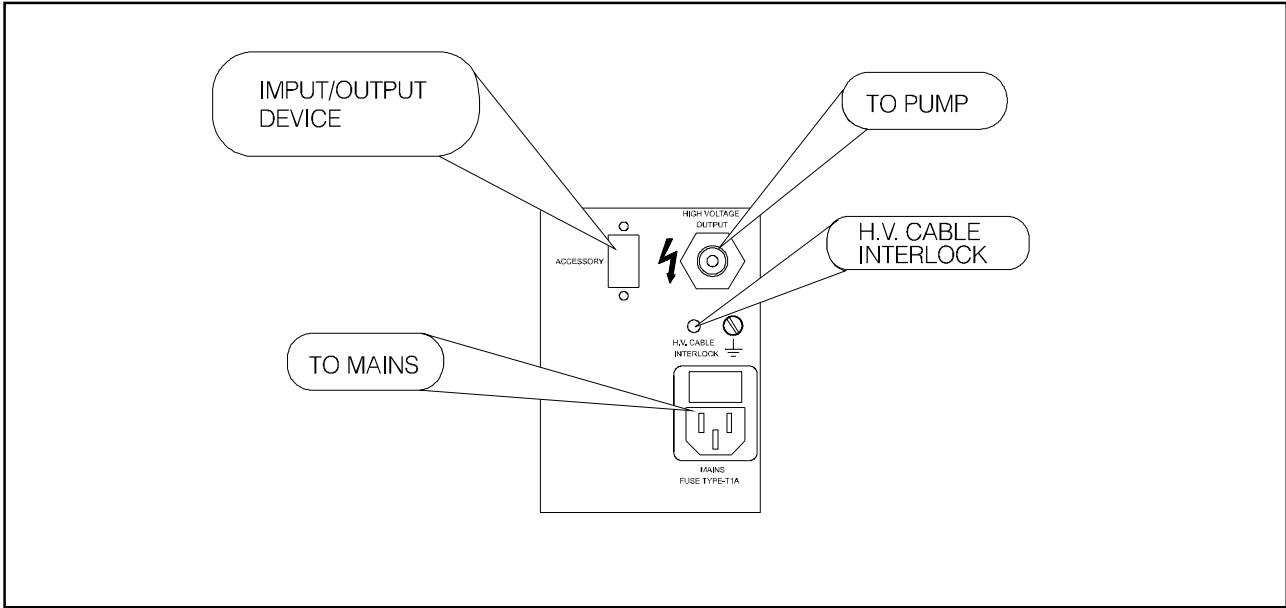
The outline dimensions for the MicroVac controllers are shown in the following figures.



Controller outline

**INTERCONNECTIONS**

The following figure shows the Controller interconnections.

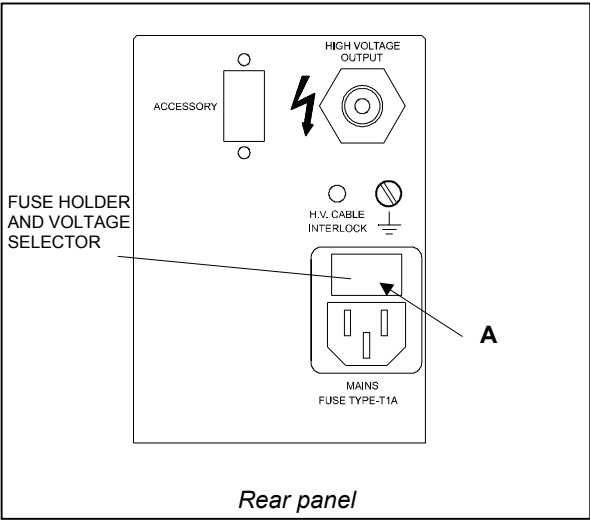


Controller interconnections

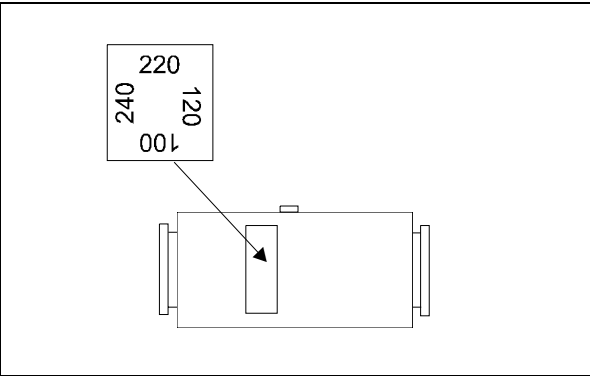
**FUSE HOLDER AND VOLTAGE CHANGER ASSEMBLY**

If a change in line voltage operation is desired, proceed as follows:

- Unplug the power cord from the controller rear panel socket.
- On the power entry module (rear panel), check back door for voltage selector set.
- Using a small screwdriver, pull out the voltage selector and fuses by levering in position A.
- Replace the fuse.  
Use only T-type fuses of the following characteristics:  
- 100/120 Vac 1 A  
- 220/240 Vac 1 A



- Select the operating voltage, then firmly insert the voltage selector and fuses in place.



- Check voltage selector window for correct set and connect the power cord.

**Input/Output Interconnections**

All input/output signals are accessible at J001 accessory connector.

With the provided P001 mating connector make the connections with AWG 24 (0.24 mm<sup>2</sup>) - or smaller wire - to the pins indicated in following figure, to obtain the desired capability.

**Input Signals**

**Pin 3-7** Remote high voltage ON/OFF or high voltage interlock; requires a permanent closed pin contact.

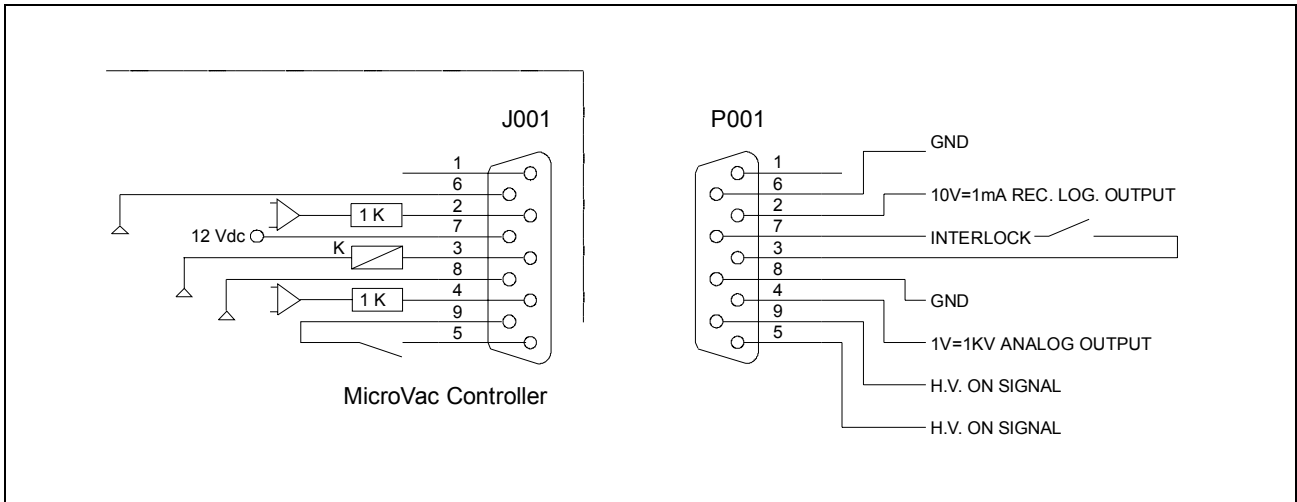
**NOTE**

Pin 3-7 must be shorted to allow the high voltage output if no remote interlock contact is connected.

**Output Signals**

The front panel REC.OUT connector is a duplicate of this signal on a BNC connector.

PIN	DESCRIPTION
2-6	Current recorder output (pin 2 signal out, pin 6 ground). The output voltage 0 to +10 Vdc is proportional to the pump current 0 to 1 mA (e.g. 10 Vdc correspond to 1 mA). The resolution is 10 mV minimum.
4-8	Voltage recorder output (pin 4 signal out, pin 8 ground). The output voltage 0 to 3 V is proportional to the controller high voltage output 0 to 3 kV (e.g. 1 V corresponds to 1 kV in linear mode).
5-9	High voltage indication contact. This pure contact (which carries 1 A at 250 Vac and 0.2 A at 30 Vdc) is open when the high voltage is off and closes when the high voltage in on.



P001 mating connector and J001 accessory connector

**Pump Connection**

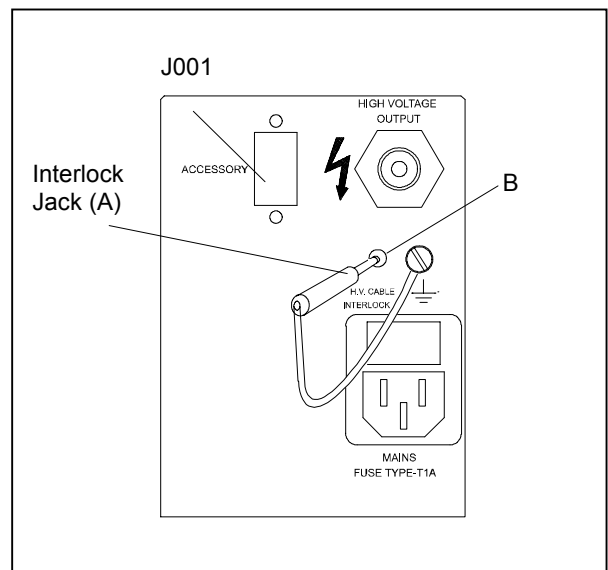
The pump is connected to the controller rear panel via the high voltage connector by a coaxial high voltage cable assembly.



**WARNING!**

High voltage can cause severe injury or death. Before installing or removing the connector:

- Turn the power off.
- When connecting the cable to 2 l/s pumps, or larger, be sure that the ground spring is in place on the high voltage connection of the pump.
- Install the pump connector and secure it with screws.
- Plug the controller connector.



Interlock Jack position

**Interlock**

The interlock is a safety device designed by Varian to prevent serious damages to the operator due to high voltage on the pump power connector.

Therefore, two serial electrically connected interlocks are planned; both of them should be closed, so that the pump can activate.

- H.V. Cable Interlock consists of a Jack (A) grounded through a cable connected to the metal frame.
- Remote ON/OFF Interlock consists of a P001 connector (included) whose 3 and 7 pins are short-circuited (please refer to the previous figure).

In order to activate the pump, you should:

1. Plug Jack (A) into plug (B).
2. Plug P001 connector into J001 connector.
3. Place the main switch to ON.

**USE**

**General**

Make all vacuum manifold and electrical connections and refer to the ion pump instruction manual prior to operating the MicroVac controller.

**NOTE**

The accessory P001 connector should be left in position including the jumper between pin 3 and 7 if no external connection has been made.



**CAUTION!**

Before plugging in the controller power cable, be sure that the selected operating voltage matches the power source to avoid equipment damage.

- Plug the controller power cable into a suitable power source.
- Place the ON/OFF switch in the ON position.
- Monitor the Vaclon pump current and the controller high voltage output by watching the LED lit, then read the corresponding current and pressure values
- If only the first LED of the bar graph is lit, the current drawn by the pump is less than 10 nA and the voltage output is 3 kV.
- If the entire bar is lit and the High Load LED is blinking, this means that the current is higher than  $\geq 1$  mA.

**Pressure Determination**

The bar graph at the left gives the indication of the pressure into the pump. The left scale is for Mini Pump, the right one for the 2 l/s pump.

**Power Failure**

In the event of a power failure (momentary or long period) the controller is switched off. When power is restored, the controller will automatically restart.

**Remote Control Mode Operation**

It is possible to remotely switch on and off the high voltage using a permanent contact connected to pins 3 and 7 of J001 accessory connector with the mains power ON/OFF switch to ON.

**REPLACEMENT**

**General**

Replacement controllers are available on advance exchange basis through Varian service/sales organization.



**WARNING!**

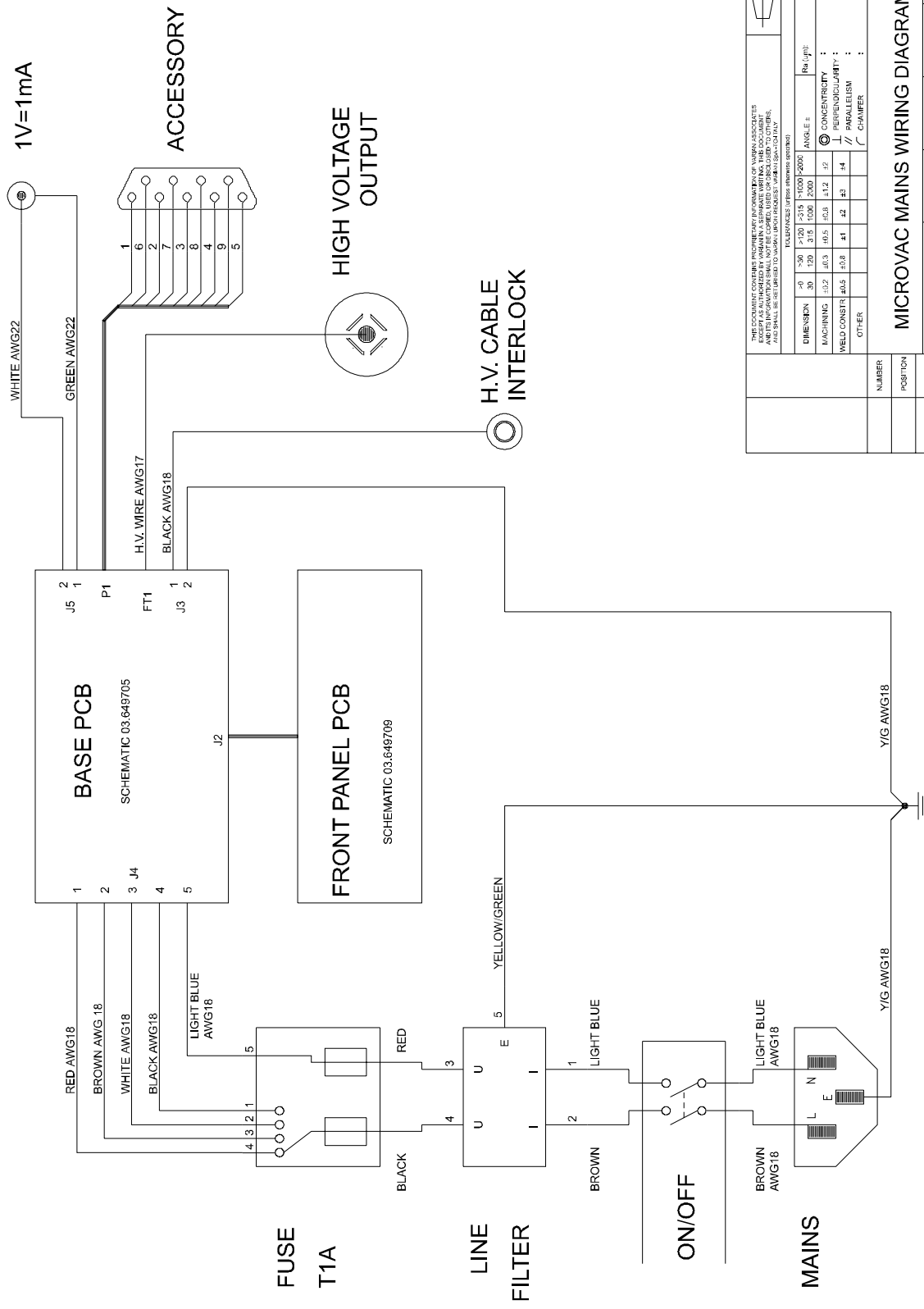
- High voltage in the controller can cause severe injury or death. Before servicing, turn power off and remove the power cable.

**Troubleshooting**

- a) No current/voltage LED bar graph lit with mains power ON but H.V. ON LED off (Mains LED on).
  - Verify mains connections and power fuses
  - Verify on P001 that pins 3-7 are shorted.
  - Verify the H.V. cable interlock
- b) Vac Ion pump is operating at High pressure and only the first LED is lit.
  - No high voltage output. Replace the unit.
- c) Vac Ion pump operating at Low pressure and all LED are lit.
  - Switch power off and disconnect the high voltage cable.
  - Switch power on and verify that only one LED is lit. If this happens the high voltage cable or the pump are shorted.
  - If not, replace the unit.

**ACCESSORIES AND SPARE PARTS**

DESCRIPTION	PART NUMBER
Mating accessory connector P001	03-648487
Fuse T1A (5x20 mm)	67.150410-01
Rack adapter	969-9191
Mains cable 120 Vac USA plug	03-660441-02
Mains cable 220 Vac European plug	03-660441-01



THE DOCUMENT CONTAINS PROPRIETARY INFORMATION OF VACUUM ASSOCIATES  
 EXCEPT AS INDICATED BY OTHERWISE APPEARING WRITING, THIS DOCUMENT  
 AND SHALL BE RETURNED TO VACUUM ASSOCIATES UPON REQUEST.

TOLERANCES (unless otherwise specified)		CLASS
DIMENSIONS	0 -100 ±.005 100-1000 ±.010 1000-2000 ±.015 2000-3000 ±.020	RA (.µm)
MACHINING	±.02 ±.03 ±.05 ±.08 ±.12 ±.15	CONCENTRICITY
WELD CONSTR.	±0.8 #1 #2 #3 #4	PERPENDICULARITY
OTHER		PARALLELISM
		CHAMFER

**H**

MICROVAC MAINS WIRING DIAGRAM			
NUMBER	POSITION	DATE	SCALE
		16/12/97	/
		C.M.	
		A3	03.649774
		SIZE	DRAWING NO.
		REVISION	REVISION





# 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.#: .....
<u>Europe only:</u> VAT reg. Number: .....	<u>USA only:</u> <input type="checkbox"/> Taxable <input type="checkbox"/> Non-taxable
Customer Ship To: .....	Customer Bill To: .....
.....	.....
.....	.....

### PRODUCT IDENTIFICATION

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

### TYPE OF RETURN (check appropriate box)

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

### HEALTH and SAFETY CERTIFICATION

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

The equipment listed above (check one):

**HAS NOT** been exposed to any toxic or hazardous materials

OR

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

Toxic  Corrosive  Reactive  Flammable  Explosive  Biological  Radioactive

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

.....

Print Name: ..... Customer Authorized Signature: .....

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

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

Do not write below this line

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

**FAILURE REPORT**

**TURBO PUMPS and TURBOCONTROLLERS**

<input type="checkbox"/> Does not start <input type="checkbox"/> Does not spin freely <input type="checkbox"/> Does not reach full speed <input type="checkbox"/> Mechanical Contact <input type="checkbox"/> Cooling defective	<input type="checkbox"/> Noise <input type="checkbox"/> Vibrations <input type="checkbox"/> Leak <input type="checkbox"/> Overtemperature	<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: <hr/> OPERATION TIME:
<b>TURBOCONTROLLER ERROR MESSAGE:</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

### France and Benelux

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From Benelux Fax: (31) 118 67 15 69

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### Customer Support & Service:

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[www.varianinc.com](http://www.varianinc.com)

Representative in most countries



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