

# Agilent 4UHV Ion Pump Controller

## User Manual



# Notices

## Manual Part Number

87-900-137-01

Edition F.00, May 2023

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## Safety Notices

### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

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## Informazioni su questo manuale

### Validità

Questo manuale elenca le istruzioni per gli utenti del Controller 4UHV, con particolare riferimento alle nozioni relative a sicurezza, funzionamento e manutenzione di primo livello, limitatamente alle operazioni di manutenzione di cui l'utente è responsabile.

Le operazioni di manutenzione, illustrate nelle sezioni specifiche, con disposizioni specifiche relative al livello più elevato di manutenzione (personale appositamente addestrato per le operazioni di manutenzione) non devono essere eseguite dall'utente.

Per una corretta installazione e avvio/arresto, consultare il capitolo "Installazione".  
Per un uso tecnico più dettagliato, consultare il capitolo "Technical Information".

#### NOTA

- 1** Questo manuale contiene informazioni utili affinché tutto il personale che utilizza il Controller 4UHV possa utilizzarlo in sicurezza e garantire la perfetta efficienza, per tutta la sua durata.
  - 2** Conservare questo manuale, insieme a tutte le pubblicazioni ad esso correlate, in un luogo accessibile, conosciuto da tutti gli operatori/personale di manutenzione.
-

## Definizioni e terminologia

### Definizione di Attenzione, Avvertenza e Nota

Alcuni riferimenti importanti di questo manuale sono evidenziati e incorniciati in colori contrastanti.

#### ATTENZIONE

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

---

#### AVVERTENZA



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

---

#### NOTA

Le note contengono informazioni importanti e forniscono maggiori dettagli su passaggi specifici.

---

## Simboli di avvertenza

Di seguito si riporta un elenco di simboli che vengono visualizzati insieme agli avvisi del Controller 4UHV. Viene mostrato anche il pericolo che descrivono.

Un simbolo triangolare indica un'avvertenza. I significati dei simboli che possono apparire accanto alle avvertenze nella documentazione o sullo strumento stesso sono i seguenti:



Presenza di tensioni pericolose



Pericolo generico



Dichiarazione Europea di Conformità



Sito di produzione



Certificazione CSA



Rifiuti di  
Apparecchiature  
Elettriche ed Elettroniche



Certificazione  
RoHS China



Certificazione UK CA



Istruzioni per l'uso

Il seguente simbolo può essere usato sulle etichette di avvertenza attaccate allo strumento. Quando viene visualizzato questo simbolo, consultare il relativo manuale operativo o di servizio per la procedura corretta a cui fa riferimento tale etichetta di avvertenza.



I seguenti simboli appaiono sullo strumento per vostra informazione.

	Presenza di tensioni pericolose
	Pericolo generico
	Certificazione CE
	Certificazione CSA
	Certificazione RoHS China
	Rifiuti di Apparecchiature Elettriche ed Elettroniche
	Certificazione UK CA

### Sicurezza

Questa sezione contiene le informazioni prescritte dalla direttiva sulla bassa tensione 2014/35/UE, essenziali per la conformità e l'osservanza delle norme di sicurezza sia in generale sia in relazione all'uso specifico del prodotto.

La mancata osservanza di queste istruzioni e delle altre istruzioni contenute nel presente manuale può rendere inefficaci le condizioni di sicurezza previste in fase di progettazione e causare incidenti a chi utilizza la macchina.

Agilent Technologies declina ogni responsabilità per danni alla macchina o per la sicurezza fisica dell'operatore o di terzi, derivanti dal mancato rispetto delle norme di sicurezza indicate nella documentazione tecnica.

### Uso corretto

Questo manuale contiene importanti avvertenze e istruzioni di sicurezza da osservare affinché l'unità funzioni in sicurezza.

Il prodotto descritto in questo manuale è destinato esclusivamente all'ambito specificato nelle istruzioni. Il manuale fornisce inoltre indicazioni relative ai requisiti essenziali per l'applicazione e il funzionamento del prodotto, nonché le misure di sicurezza che possono essere adottate per garantire un funzionamento regolare. Agilent Technologies non fornisce alcuna garanzia né si assume alcuna responsabilità per applicazioni diverse da quelle descritte nel presente manuale o in cui i requisiti essenziali e le misure di sicurezza non siano rispettati. Il prodotto deve essere utilizzato solo da personale qualificato in grado di adottare le misure di sicurezza necessarie in condizioni che non causano danni o lesioni.

Gli accessori e le attrezzature utilizzati con il prodotto devono essere forniti o approvati da Agilent Technologies.

Qualsiasi operazione di regolazione o manutenzione deve essere eseguita da un tecnico professionista informato dei rischi.

Le riparazioni sul prodotto devono essere eseguite esclusivamente da personale autorizzato Agilent.

## Istruzioni per l'uso

### Uso improprio

Agilent Technologies declina ogni responsabilità derivante dall'uso improprio del Controller 4UHV.

L'uso improprio comporterà la perdita di tutti i reclami per responsabilità e garanzie. L'uso improprio è definito come:

- installazione del dispositivo con materiale di montaggio non specificato
- funzionamento in ambiente condensante
- funzionamento in ambienti ad alta umidità fuori dal range specificato
- funzionamento in ambienti polverosi
- funzionamento con tensioni di alimentazione fuori dal range specificato
- funzionamento del dispositivo in aree con radiazioni ionizzanti
- funzionamento in aree potenzialmente esplosive
- utilizzo del dispositivo in sistemi in cui stress e vibrazioni simili a impatti o forze periodiche influiscono sul dispositivo.
- funzionamento in ambienti con temperatura fuori dal range specificato.

### Attrezzatura di protezione

L'attrezzatura di protezione degli operatori che stanno operando sul controller deve essere sempre adeguata al tipo di operazione da eseguire. Inoltre, deve soddisfare i requisiti di sicurezza della legislazione in vigore nel paese in cui viene utilizzata la macchina. In generale, l'operatore deve indossare scarpe antinfortunistiche durante la manipolazione del controller e durante l'installazione.

#### AVVERTENZA

#### Rischio di lesioni dovute alla caduta di oggetti



Durante il trasporto manuale dei controller, sussiste il pericolo che i carichi scivolino e cadano.

- Trasportare i controller con due mani.

**AVVERTENZA**



Rischio di lesioni a causa di spigoli vivi



I controller hanno bordi molto affilati.



- Se necessario, indossare guanti protettivi secondo la EN 420.

---

**Linee guida per la sicurezza dei controller di pompe ioniche**

I controller della pompa ionica, come descritto nel seguente manuale, non devono essere aperti dall'utente per evitare il rischio di danneggiare i componenti interni.

**AVVERTENZA**



Per evitare danni alle apparecchiature e per prevenire lesioni al personale operativo, è necessario seguire scrupolosamente le istruzioni di installazione fornite nel presente manuale!

## Trasporto e immagazzinamento

Per trasportare e immagazzinare il controller occorre osservare le seguenti condizioni ambientali:

- Temperatura:  $-20\text{ °C} \div +70\text{ °C}$
- Umidità relativa:  $0 \div 95\%$  (senza condensa)

## Descrizione del prodotto

Questa apparecchiatura è destinata ad uso professionale. L'utente deve leggere attentamente il presente Manuale di istruzioni ed ogni altra informazione aggiuntiva fornita dall'Agilent prima dell'utilizzo dell'apparecchiatura.

L'Agilent declina ogni responsabilità dovuta alla mancata osservanza totale o anche parziale delle istruzioni fornite in questo documento, all'uso improprio dell'apparecchiatura da parte di personale non addestrato, all'esecuzione di interventi non autorizzati o alla mancata osservanza delle specifiche normative nazionali.

Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante l'utilizzo dell'apparecchiatura.

Nel capitolo "Technical Information" vengono fornite delle informazioni dettagliate.

## Installazione

### Preparazione per l'installazione

Il controller viene fornito in un imballo protettivo speciale; nel caso in cui si presentassero segni di danni che potrebbero essere stati causati durante il trasporto, contattare l'ufficio vendite locale.

Durante l'operazione di disimballo, prestare particolare attenzione a non lasciar cadere il controller e a non sottoporlo ad urti.

Il materiale dell'imballo è completamente riciclabile e risponde alla direttiva CEE 94/62 per la tutela dell'ambiente.

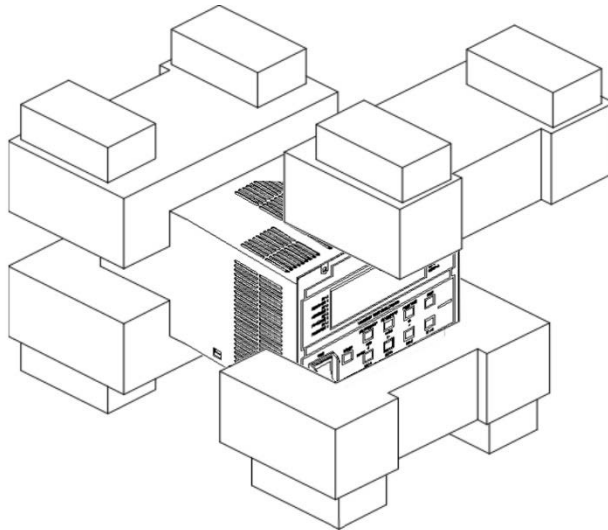


Figura 1 Imballo del Controller

## Set-up

### AVVERTENZA



Per la sicurezza dell'operatore il controller 4UHV (versione 100-240Vac) deve essere alimentato con un cavo di alimentazione a 3 fili dotato di una spina approvata a livello internazionale. Utilizzare questo cavo e spina insieme ad una presa adeguatamente connessa a terra per evitare scosse elettriche e soddisfare i requisiti delle norme CE. Le alte tensioni che si sviluppano nel controller possono provocare gravi lesioni o la morte. Dopo lo spegnimento dell'unità rimane dell'energia residua all'interno del controller per un po' di tempo. Attendere circa 1 minuto per essere sicuri che l'energia residua sia stata dissipata.

---

### AVVERTENZA



Il controller deve essere installato in modo che possa essere facilmente scollegato il cavo di alimentazione.

Se questo controller non è usato come indicato dal costruttore, le protezioni del controller potrebbero non funzionare correttamente.

---

### AVVERTENZA



Per la versione a 100-240 Vca.

Cavo di alimentazione deve essere formato da tre cavi conduttori. (L+N+PE). La sezione dei cavi deve essere almeno AWG18, 0,83 mm<sup>2</sup>.

Cavo di alimentazione: il cavo corretto per i collegamenti elettrici è a tre conduttori (L+N+PE).

La sezione del cavo deve essere almeno AWG18, 0,83 mm<sup>2</sup>

PIN 1 = Connettore positivo

PIN 2 = Connettore negativo

PIN 3 = Terra di protezione

---

### ATTENZIONE

Il controller può essere utilizzato sia come unità da tavolo che come modulo installato in un rack. In ogni caso deve essere posizionato in modo tale che l'aria possa circolare liberamente attraverso i fori di areazione presenti sulla copertura.

Nel caso in cui il controller venga utilizzato come modulo rack, deve essere installato in un adattatore alto 3 unità rack per evitare che cada all'interno del rack stesso. Il pannello frontale del controller non è previsto per reggere il peso dell'unità.

Non installare o utilizzare il controller in ambienti esposti ad agenti atmosferici (pioggia, neve, ghiaccio) in presenza di polvere, gas corrosivi o in ambienti esplosivi o ad alto rischio di infiammabilità.

---

### ATTENZIONE

Il controller appartiene alla seconda categoria di installazione (o sovratensione) prevista dalla normativa EN 61010: 2010 AMD 1 (2017). Connettere quindi il dispositivo ad una linea di alimentazione che soddisfi tale categoria.

Il controller ha dei connettori per gli ingressi/uscite e per la comunicazione seriale che devono essere connessi ai circuiti esterni in modo che nessuna parte sotto tensione sia accessibile. Assicurarsi che l'isolamento del dispositivo connesso al controller abbia un isolamento adeguato anche in condizione di guasto singolo come previsto dalla normativa EN 61010: 2010 AMD 1 (2017).

---



### NOTA

Nel caso in cui il controller venga installato in un rack, rimuovere i quattro piedini in modo che venga posizionato con almeno 30 mm di spazio sotto e sopra.

---

### ATTENZIONE

**In casi rari di guasto il controller potrebbe emettere fumo. Se il cliente usa il controller in camere pulite è necessario prevedere adeguate protezioni per evitare di contaminare l'ambiente con l'eventuale fumo.**

---

Durante il funzionamento, occorre che siano rispettate le seguenti condizioni ambientali:

- Temperatura: da 0 °C a +40 °C
- Umidità relativa: 0 – 90 % (senza condensa)

## Fissaggio del 4UHV

In questo paragrafo vengono riportate le principali procedure operative.

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

### AVVERTENZA



**Accendere il canale di alta tensione solo se connessi alle pompe ioniche tramite gli appositi cavi di alta tensione dotati del cavo di interlock.**

**L'uso del controller è inteso con cavo di alta tensione provvisto di interlock.**

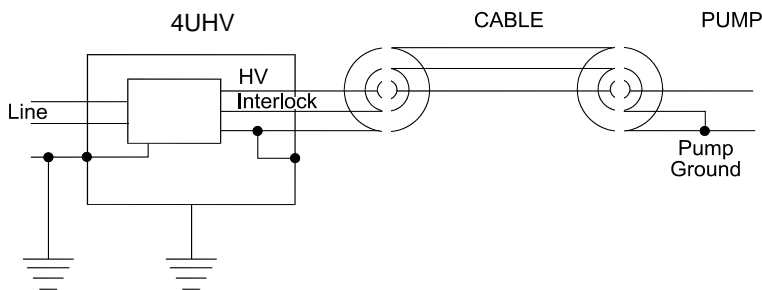


Figura 2 Collegamenti delle masse

### NOTA

Se si vuole utilizzare un cavo HV senza interlock nel sacchetto accessori è fornito un apposito kit di cavetti per interlock preassemblato. Con questo utilizzo si perde la funzionalità di sicurezza offerta dall'utilizzo dell'interlock.

## Istruzioni per l'uso

Fare riferimento alla seguente figura per montare correttamente il cavo di interlock fornito nel sacchetto accessori, qualora si voglia rinunciare al cavo di alta tensione dotato di interlock.

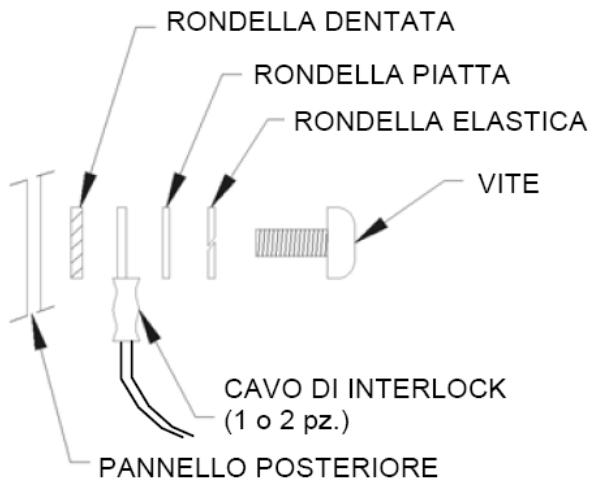


Figura 3

### NOTA

L'interlock del cavo viene chiuso sulla massa della pompa. Se il collegamento è interrotto l'alta tensione viene disabilitata.

Per collegare il controller alla pompa, utilizzare un cavo HV dotato di interlock (vedere nelle parti ordinabili).

Nella figura "Collegamenti delle masse" sono riportati i corretti collegamenti delle masse, del cavo HV tra il controller e la pompa e del cavo di interlock.

### ATTENZIONE

**Se si monta il cavo di interlock fornito nel sacchetto accessori fare molta attenzione affinché nessuna parte cada accidentalmente all'interno del controller.**

## Avvio e funzionamento del Controller 4UHV dal pannello frontale (modalità LOCAL)

### NOTA

Per accendere l'alta tensione (HV) occorre che l'interlock del cavo HV (cable interlock) sia chiuso (connettore inserito).

---

Procedere come segue per alimentare il controller e abilitare la tensione sui connettori di alta tensione (H.V.):

- Collegare il cavo di alimentazione al pannello posteriore.
- Spegnerne il controller.
- Collegare il cavo HV e l'interlock del cavo H.V. nei relativi connettori sul pannello posteriore.
- Verificare che l'unità sia in modalità LOCAL entrando nel menù e nel sottomenu "Mode". Selezionare l'opzione "LOCAL".
- Tenere premuto il pulsante HV ON/OFF (2) mentre si preme il pulsante HV-x (3,4,5,6) dove x è il numero del canale che si vuole accendere o spegnere.

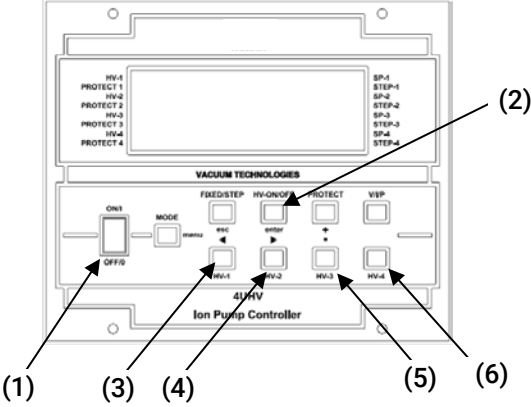


Figura 4 Pannello Frontale del Controller 4UHV

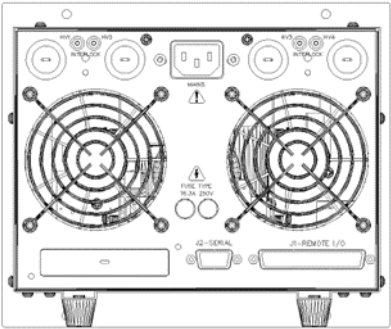


Figura 5 Pannello Posteriore del Controller 4UHV

## Arresto del 4UHV

Per spegnere i canali HV:

- Tenere premuto il pulsante HV ON/OFF (2) mentre si preme il pulsante HV-x (3,4,5,6) dove x è il numero del canale che si vuole accendere o spegnere.

Per ulteriori dettagli sull'uso del controller e sulla descrizione delle informazioni del display fare riferimento alla sezione "Technical Information".

## Arresto di Emergenza

### AVVERTENZA



In condizioni di emergenza per spegnere l'unità e tutti i canali alta tensione disattivare l'interruttore generale (1) posto sul pannello anteriore.

Mettendo in off l'interruttore generale si spegnerà l'unità HV.

---

## Manutenzione

Il Controller 4UHV non richiede alcun intervento di manutenzione. Qualsiasi tipo di intervento sull'unità deve essere eseguito da personale tecnico autorizzato.

In caso di guasto è possibile usufruire del servizio di riparazione Agilent o del "Agilent advanced exchange service", che permette di ottenere un controller rigenerato in sostituzione di quello guasto. Qualora un controller dovesse essere rottamato, procedere nel rispetto delle normative nazionali specifiche.

### AVVERTENZA



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

---

## Pulizia

Per motivi di sicurezza, prima di pulire il controller:

- spegnere il controller;
- scollegare la spina di alimentazione del controller dalla presa elettrica;
- scollegare tutti i cavi;
- se l'esterno del controller si sporca, utilizzare un panno morbido e asciutto.

## Compatibilità elettromagnetica

### EN55011/CISPR11

**Gruppo 1 apparecchi ISM:** Il gruppo 1 contiene tutte le apparecchiature ISM in cui viene generata e/o utilizzata intenzionalmente energia a radiofrequenza ad accoppiamento conduttivo necessaria per il funzionamento interno dell'apparecchiatura stessa.

I **dispositivi di Classe A** sono adatti all'utilizzo in tutte le strutture tranne quelle domestiche e quelle direttamente collegate alla rete pubblica di alimentazione a bassa tensione destinata agli edifici adibiti ad usi domestici.

Questo dispositivo è conforme ai requisiti di CISPR11, Gruppo 1, Classe A come apparecchiatura radioterapica professionale. Pertanto possono sussistere potenziali difficoltà per garantire la compatibilità elettromagnetica in altri ambienti a causa di disturbi condotti e irradiati.

L'utilizzo è soggetto alle seguenti due condizioni:

- il dispositivo non deve causare interferenze nocive;
- il dispositivo deve accettare le interferenze ricevute, comprese le interferenze che potrebbero causare problemi di funzionamento.

Se questa apparecchiatura causa interferenze dannose alla ricezione radio o televisiva, che possono essere determinate spegnendo e riaccendendo l'apparecchiatura, si consiglia di adottare una o più delle seguenti misure:

- assicurarsi di utilizzare cavi appropriati per collegare il dispositivo alle periferiche

## Istruzioni per l'uso

- variazioni o modifiche non espressamente approvate da Agilent Technologies potrebbero inficiare l'autorizzazione dell'utente a utilizzare la presente apparecchiatura.

### Dichiarazione EMC di Classe A della Corea del Sud

Questa apparecchiatura è di Classe A, è adatta all'uso professionale ed è destinata all'uso in ambienti elettromagnetici esterni alla casa.

A 급 기기  
( 업무용 방송통신기자재 )

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### ICES/NMB-001

Questo dispositivo ISM è conforme alla normativa canadese ICES-001/NMB-001.



## 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.



Figura 6 Logo "WEEE"

Per maggiori informazioni consultare:

<http://www.agilent.com/environment/product/index.shtml>

## Servizio Post Vendita

Nel caso in cui un cliente necessiti di un servizio di sostituzione o riparazione avanzato, si prega di contattare il distributore locale o scrivere direttamente a:

[vpt-customer@agilent.com](mailto:vpt-customer@agilent.com)

[vpl-customer@agilent.com](mailto:vpl-customer@agilent.com)

È necessario completare il modulo "Request for Return" per restituire il prodotto ad Agilent per l'assistenza (fornito alla fine di questo manuale).

## 2

## Betriebsanleitung

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# Informationen über diese Betriebsanleitung

## Gültigkeit

Diese Betriebsanleitung enthält die Anweisungen für die Benutzer der 4UHV-Ionenpumpen-Controller mit besonderer Bezugnahme auf die Begriffe für Sicherheit, Betrieb und Wartung auf der ersten Ebene, auf die Wartungsarbeiten beschränkt, für die der Benutzer verantwortlich ist.

Die in den spezifischen Abschnitten dargestellten Wartungsarbeiten mit spezifischen Verordnungen hinsichtlich der höheren Wartungsebene (entsprechend geschultes Personal für die Wartungsarbeiten) dürfen nicht durch den Benutzer ausgeführt werden.

Für eine korrekte Installation und Start/Stopps das Kapitel „Installation“ konsultieren. Für eine detailliertere technische Verwendung das Kapitel „Technical Information“ konsultieren.

### HINWEIS

- 1 Diese Betriebsanleitung enthält nützliche Informationen, damit das gesamte Personal, das die 4UHV verwendet, diese in Sicherheit verwenden und die perfekte Funktionstüchtigkeit für ihre gesamte Betriebsdauer garantieren kann.
  - 2 Diese Betriebsanleitung muss zusammen mit allen mit dieser zusammenhängenden Veröffentlichungen an einem zugänglichen Ort, der allen Bedienern/Wartungspersonal bekannt ist, aufbewahrt werden.
-

## Definitionen und Terminologie

### Definition von Vorsicht, Warnung und Hinweis

Einige wichtige Bezüge dieser Betriebsanleitung werden durch Kontrastfarben hervorgehoben und eingerahmt.

#### VORSICHT

Die Vorsichtshinweise werden vor Verfahren angezeigt, die Schäden am Gerät verursachen könnten, wenn sie nicht beachtet werden.

---

#### WARNUNG



Die Warnhinweise lenken die Aufmerksamkeit des Bedieners auf ein Verfahren oder einen spezifischen Vorgang, der schwere Verletzungen von Personen zur Folge haben könnte, wenn er nicht korrekt ausgeführt wird.

---

#### HINWEIS

Die Hinweise enthalten wichtige Informationen und liefern weitere Details über spezifische Arbeitsschritte.

---

## Warning Symbols

Das Folgende ist eine Liste von Symbolen, die in Verbindung mit den Warnungen auf dem 4UHV angezeigt werden. Die von ihnen beschriebene Gefahr wird ebenfalls angezeigt.

Ein dreieckiges Symbol weist auf eine Warnung hin. Die Bedeutung der Symbole, die neben Warnhinweisen in der Dokumentation oder auf dem Gerät selbst erscheinen können, ist wie folgt:



Hochspannung



Allgemeine Gefahr



Europäische  
Konformitätserklärung



Herstellungsbetrieb



CSA certification



Elektro- und  
Elektronikaltgeräte



RoHS-  
Chinazertifizierung



UKCA-Zertifizierung

Betriebsanleitung

Das folgende Symbol kann auf am Gerät angebrachten Warnschildern verwendet werden. Wenn Sie dieses Symbol sehen, finden Sie in der jeweiligen Betriebs- oder Wartungsanleitung das richtige Verfahren, auf das sich dieses Warnschild bezieht.



Die folgenden Symbole werden zu Ihrer Information auf dem Instrument angezeigt.

	Hochspannung
	Allgemeine Gefahr
	CE-Zertifizierung
	CSA-Zertifizierung
	RoHS-Chinazertifizierung
	Elektro- und Elektronikaltgeräte
	UKCA-Zertifizierung

# Sicherheit

Dieser Abschnitt enthält die von der Niederspannungsrichtlinie 2014/35/EG vorgegebenen Informationen, die für die Übereinstimmung und Einhaltung der Sicherheitsvorschriften sowohl allgemein als auch in Bezug auf die spezifische Verwendung des Produkts wesentlich sind.

Die Nichtbeachtung dieser Anweisungen und der anderen in diesem Handbuch enthaltenen Anweisungen kann die in der Konstruktionsphase vorgesehenen Sicherheitsbedingungen ineffizient machen und Unfälle bei den Bedienern der Maschine verursachen.

Agilent Technologies lehnt jede Verantwortung für Schäden an der Maschine oder für die physische Sicherheit des Bedieners oder Dritter ab, die sich aus der Nichtbeachtung der in den technischen Unterlagen angegebenen Sicherheitsregeln ergeben.

## Sachgemäße Verwendung

Dieses Handbuch enthält wichtige Warnungen und Sicherheitshinweise, die beachtet werden müssen, damit das Gerät sicher funktioniert.

Das in dieser Anleitung beschriebene Produkt ist ausschließlich für den in der Anleitung angegebenen Anwendungsbereich bestimmt. Das Handbuch enthält auch Angaben zu den grundlegenden Anforderungen für die Anwendung und den Betrieb des Produkts sowie zu den Sicherheitsmaßnahmen, die zur Gewährleistung eines regelmäßigen Betriebs ergriffen werden können. Agilent Technologies übernimmt keine Garantie oder Verantwortung für Anwendungen, die nicht in diesem Handbuch beschrieben sind oder bei denen die grundlegenden Anforderungen und Sicherheitsmaßnahmen nicht eingehalten werden.

Das Produkt darf nur von qualifiziertem Personal verwendet werden, das in der Lage ist, die erforderlichen Sicherheitsmaßnahmen unter Bedingungen zu treffen, die keine Schäden oder Verletzungen verursachen. Alle mit dem Produkt verwendeten Zubehörteile und Geräte müssen von Agilent Technologies geliefert oder genehmigt werden.

Einstellungs- oder Wartungsarbeiten müssen von einem Fachmann durchgeführt werden, der über die Risiken informiert ist.

Reparaturen am Produkt dürfen ausschließlich von Agilent-autorisiertem Personal durchgeführt werden.



### Unsachgemäße Anwendung

Agilent Technologies lehnt jede Verantwortung ab, die sich aus der unsachgemäßen Benutzung vom 4UHV Controller ergibt.

Bei unsachgemäßer Verwendung verfallen alle Haftungs- und Gewährleistungsansprüche. Unsachgemäße Verwendung ist definiert als:

- Montage des Geräts unter Verwendung von nicht vorgesehenem Befestigungsmaterial
- Betrieb in Kondenswasserumgebung.
- Betrieb in einer Umgebung mit hoher Luftfeuchtigkeit über dem angegebenen Wertebereich hinaus
- Betrieb in staubiger Umgebung
- Betrieb mit Versorgungsspannungen außerhalb des spezifizierten Bereichs
- Betrieb des Geräts in Bereichen mit ionisierender Strahlung
- Betrieb in explosionsgefährdeten Bereichen
- Einsatz des Geräts in Anlagen, in denen stoßartige Einwirkungen und Vibrationen oder regelmäßig auftretende Kräfte auf das Gerät einwirken.
- Betrieb in Umgebungen mit Temperaturen außerhalb des angegebenen Bereichs.

### Schutzausrüstung

Die Schutzausrüstung des Bedienpersonals an der Steuerung muss immer für den auszuführenden Vorgang geeignet sein. Sie muss auch den Sicherheitsanforderungen der geltenden Gesetzgebung des jeweiligen Einsatzlandes der Maschine entsprechen. Generell muss der Bediener beim Bedienen des Steuergerätes und bei der Montage Sicherheitsschuhe tragen.

#### **WARNUNG**

#### **Verletzungsgefahr durch herunterfallende Gegenstände**



**Beim Tragen von Vakuum-Controllern von Hand besteht die Gefahr, dass Lasten verrutschen und herunterfallen.**

- Controller mit zwei Händen transportieren.

### WARNUNG



**Verletzungsgefahr durch scharfe Kanten**



- Controller haben sehr scharfe Kanten.



- Gegebenenfalls Schutzhandschuhe nach EN 420 tragen.
- 

### Sicherheitsrichtlinien für Ionische Pumpensteuerung

Zur Vermeidung des Risikos einer Beschädigung interner Komponenten dürfen die in dieser Bedienungsanleitung beschriebenen Ionische pumpen-Steuergeräte nicht vom Benutzer geöffnet werden.

### WARNUNG



**Um Geräteschäden und Verletzungen des Bedienpersonals zu vermeiden, sind die in diesem Handbuch enthaltenen Installationsanweisungen unbedingt zu beachten!**

---

## Transport und Lagerung

Bei Transport und Lagerung der Controller müssen folgende Umgebungsbedingungen eingehalten werden:

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

## Produktbeschreibung

Dieser Apparat ist für Fachbetriebe bestimmt. Vor Gebrauch sollte der Benutzer dieses Handbuch 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 Agilent keinerlei Haftung.

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.

## Installation

### Vorbereitung zum Einbau

Der Controller wird mit einer speziellen Schutzverpackung geliefert.

Eventuelle Transportschäden müssen sofort der zuständigen örtlichen Verkaufsstelle gemeldet werden.

Das Verpackungsmaterial muss korrekt entsorgt werden. Es ist vollständig recyclebar und entspricht der EG-Richtlinie 94/62 für Umweltschutz.

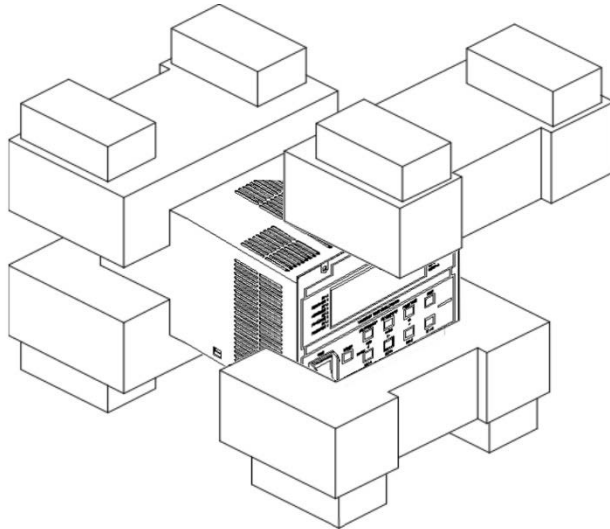


Abbildung 7 Verpackung der Controller

## Set-up

### **WARNUNG**



Zur Sicherheit des Controller-Bedieners muss der 4UHV (Version 100-240Vac) an ein 3-Draht-Speisekabel mit einem international anerkannten Stecker angeschlossen sein. Dieses Kabel und dieser Stecker müssen an eine angemessen geerdete Steckdose angeschlossen sein, um Stromschläge zu vermeiden und den Anforderungen der CE-Normen gerecht zu werden. Die Hochspannungen, die im Controller entstehen, können schwere Verletzungen oder den Tod verursachen. Nach Ausschalten des Geräts bleibt noch einige Zeit lang Reststrom im Controller. Warten Sie etwa 1 Minute, um sicher zu sein, dass der restliche Strom dissipiert ist.

---

### **WARNUNG**



Der Controller muss so installiert werden, dass er leicht vom Netzkabel getrennt werden kann.

Bei Benutzung des Gerätes auf eine nicht vom Hersteller angegebene Weise könnte die Leistung der mit dem Gerät mitgelieferte Schutzvorrichtung beeinträchtigt sein.

---

### **WARNUNG**



Für die Version 100-240 Vac

Das Netzkabel muss aus drei Leiter gebildet werden (L+N+PE).  
Der Kabelquerschnitt muss mindestens 0,83 mm<sup>2</sup> (AWG18) betragen.  
Stromanschlusskabel: Das richtige Kabel zur elektrischen Verkabelung ist ein dreidrahtiges Kabel (L+N+PE).  
Der Kabelquerschnitt muss mindestens 0,83 mm<sup>2</sup> (AWG18) betragen.  
PIN 1= Positiver Steckverbinder  
PIN 2= Negativer Steckverbinder  
PIN 3= Schutzleiter

---

### VORSICHT

Der Controller kann auf einen Tisch oder ein Gestell montiert werden. In beiden Fällen muss eine ungehinderte Zirkulation der Kühlluft durch die im Gehäuse vorne und unten eingelassenen Luftöffnungen gewährleistet sein.

Wenn der Controller in einem Gestell montiert wird, MUSS er in einer drei Rackeinheiten hohen Adapter-Einheit installiert werden, um zu vermeiden, dass der Controller nicht in das Gestell fällt. Die vordere Schalttafel des Controllers ist nicht geeignet, das gesamte Gewicht der Einheit zu tragen.

Der Controller darf nicht in Umgebungen installiert u/o benutzt werden, die Witterungseinflüsse (Regen, Frost, Schnee), Staub und aggressiven Gasen ausgesetzt sind und in denen Explosions- und erhöhte Brandgefahr besteht.

---

### VORSICHT

Der Controller gehört zu der zweiten Einbaukategorie (oder auch Überspannung), die von der EN 61010: 2010 AMD 1 (2017) geregelt ist. Schließen Sie daher das Gerät an eine Stromleitung an, die dieser Kategorie gerecht wird.

Der Controller hat Anschlüsse für die Ein-/Ausgänge und die Serienkommunikation, die an externe Kreisläufe angeschlossen sein müssen, so dass man zu keinem unter Strom stehenden Teil Zugriff hat. Vergewissern Sie sich, dass die Isolierung des Gerätes, das an den Controller angeschlossen ist, auch bei Einzelstörungen, wie sie von der Vorschrift EN 61010: 2010 AMD 1 (2017) vorgesehen sind, angemessen isoliert ist.

---

### HINWEIS

Wenn der Controller in einem Gestell installiert werden soll, müssen alle vier Füße abmontiert und über- und unterhalb wenigstens 30 mm (1,2 Zoll) Platz gelassen werden.

---

### VORSICHT

**In seltenen Fällen könnte der Controller bei Störungen Rauch ausstoßen. Wenn der Controller in sauberen Räumlichkeiten verwendet wird, muss er mit angebrachten Schutzvorrichtungen versehen werden, um zu verhindern, dass die Räumlichkeiten durch den Rauch verschmutzt werden.**

---

Während des Betriebs müssen folgende Umgebungsbedingungen eingehalten werden:

- Temperatur: von 0 °C bis +40 °C
- Rel. Luftfeuchtigkeit: 0 - 90 % (nicht kondensierend).

## Fixieren des 4UHV

In diesem Kapitel sind die wichtigsten Betriebsvorgänge aufgeführt.

Vor Benutzung des Controllers müssen sämtliche elektrischen Anschlüsse ausgeführt und die Betriebsanleitung der angeschlossenen Pumpe durchlesen werden.

### WARNUNG



Schalten Sie die Hochspannungsleitungen erst ein, wenn diese mit Hilfe der dafür bestimmten Hochspannungskabel des Interlock-Kabels an die Ionenpumpen angeschlossen sind.

Der Gebrauch des Controllers muss unter Verwendung eines Hochspannungskabels mit Interlock erfolgen

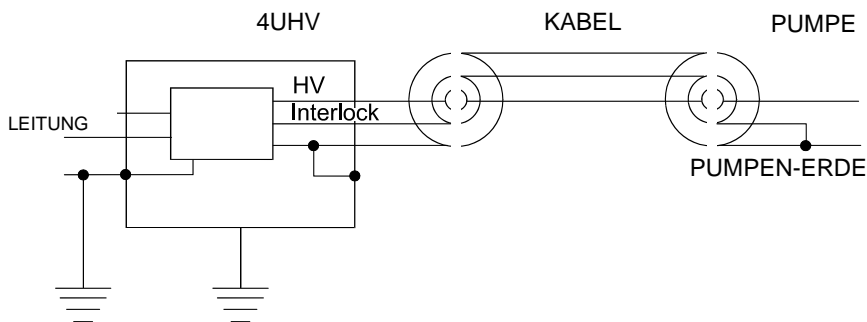


Abbildung 8 Erdung

### HINWEIS

Soll ein HV-Kabel ohne Interlock zum Einsatz kommen, befindet sich in dem Zubehörbeutel ein dafür bestimmtes Kabelset für vormontierte Interlock-Teile. Bei diesem Gebrauch geht die Sicherheitsfunktion verloren, die man bei der Interlock-Verwendung hat.



## Betriebsanleitung

Sehen Sie sich folgende Abbildung genau an, um das im Zubehörbeutel mitgelieferte Interlock-Kabel richtig zu montieren, wenn auf das Hochspannungskabel mit Interlock verzichtet werden soll.

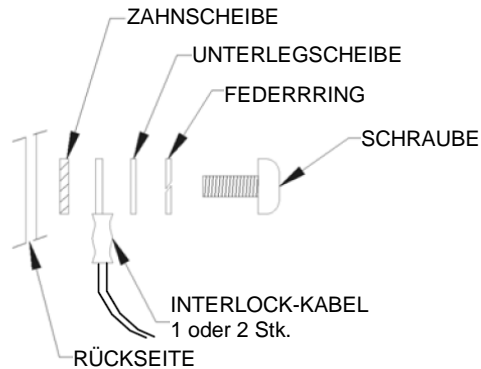


Abbildung 9

### HINWEIS

Die Verriegelung des Kabels wird auf der Masse der Pumpe geschlossen. Wenn die Verbindung unterbrochen wird, wird die Hochspannung deaktiviert.

Beim Anschluss des Controllers an die Pumpe ist ein HV-Kabel mit Interlock (siehe Bestellteile) zu verwenden.

Auf der Abbildung "Anschlüsse" sind die richtigen Anschlüsse der Erdungen, des HV-Kabels des Controllers an die Pumpe und des Interlock-Kabels ersichtlich.

### VORSICHT

Beim Montieren des im Zubehörbeutel mitgelieferten Interlock-Kabels gehen Sie sehr vorsichtig vor, damit dabei kein Teil in den Controller fällt.

## Start und Betrieb des 4UHV-Controllers von der Vorderteil (LOCAL-Modus)

### HINWEIS

Um die Hochspannung (HV) einzuschalten, muss der Interlock des HV-Kabels (Kabel-Interlock) geschlossen sein (Verbinder eingesteckt).

---

Gehen Sie wie folgt vor, um den Controller mit Strom zu versorgen und die Spannung an den Hochspannungsverbindern (H.V.) freizugeben:

- Schließen Sie das Netzkabel an der Rückenteil an.
- Schalten Sie den Controller aus.
- Schließen Sie das HV-Kabel und den Interlock des H.V-Kabels an die jeweiligen Verbinder am Rückenteil.
- Wählen Sie den LOCAL-Modus über Eingabe in das Menü und Untermenü von "Mode". Wählen Sie die Option "LOCAL".
- Taste HV ON/OFF (2) gedrückt halten und gleichzeitig die Taste HV-x (3,4,5,6) drücken, wobei x für die Nummer des Kanals steht, der ein- oder ausgeschaltet werden soll.

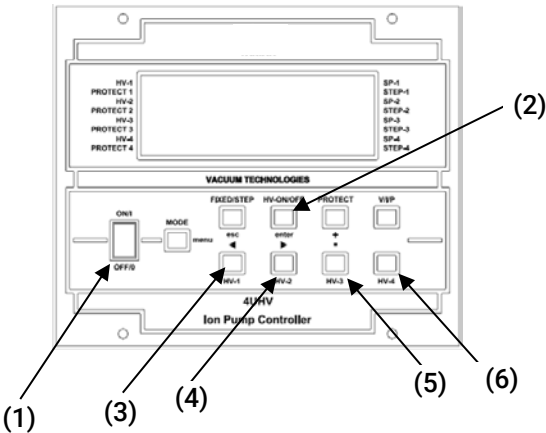


Abbildung 10 Vorderteil 4UHV Ionenpumpen-Controller

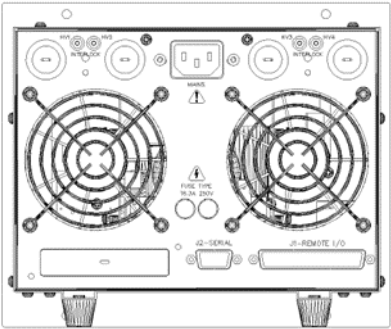


Abbildung 11 Rückenteil 4UHV Ionenpumpen-Controller

## Abschalten des 4UHV

Um die HV-Leitungen auszuschalten:

- Taste HV ON/OFF (2) gedrückt halten und gleichzeitig die Taste HV-x (3,4,5,6) drücken, wobei x für die Nummer des Kanals steht, der ein- oder ausgeschaltet werden soll.

Weitere Einzelheiten zur Verwendung des Controllers und die Beschreibung der Displayinformationen finden Sie im Abschnitt "Technical Information".

### Not-Aus

Weitere Einzelheiten zum Gebrauch des Controllers und zur Beschreibung der Display-Angaben entnehmen Sie bitte dem Abschnitt "Technical Information".

#### WARNUNG



**Zum Ausschalten des Geräts und aller Hochspannungskanäle in einem Notfall schalten Sie den Hauptschalter (1) an der Gerätefront aus.**

**Beim Ausschalten des Hauptschalters wird auch das Hochspannungsgerät abgeschaltet.**

---

## Wartung

Für den 4UHV ist keine Wartung erforderlich. Jeder Eingriff unterliegt autorisiertem Personal. Vor jedem Eingriff, die elektrische Versorgung unterbrechen. Bei einem Störfall kann der Reparaturservice Agilent oder der Service "Agilent Advanced Exchange service" in Anspruch genommen werden, durch den man einen regenerierten Controller als Ersatz für den defekten erhält. Im Falle einer Verschrottung des Systems, muss diese nach den nationalen Vorschriften erfolgen.

#### WARNUNG



**Trennen Sie den Controller vor jedem beliebigen Eingriff vom Netz.**

---

# Reinigen

Aus Sicherheitsgründen muss vor der Reinigung des Controllers Folgendes durchgeführt werden:

- Den Controller ausschalten.
- Den Netzstecker des Controllers aus der Steckdose ziehen.
- Sämtliche Kabel abklemmen.
- Bei verschmutzter Controller-Verkleidung diese bitte mit einem trockenen, weichen Tuch reinigen.

# Elektromagnetische Verträglichkeit

## EN55011/CISPR11

**Gruppe 1 ISM Geräte:** Gruppe 1 umfasst alle ISM-Geräte, in denen absichtlich leitfähige Funkfrequenzenergie erzeugt und/oder verwendet wird, die für den internen Betrieb des Geräts selbst erforderlich ist.

**Geräte der Klasse A** sind Geräte, die zur Verwendung in allen Einrichtungen geeignet sind, die nicht zum Wohnen dienen und auch nicht direkt an ein Niederspannungsnetz angeschlossen sind, das Wohngebäude mit Strom versorgt.

Dieses Gerät erfüllt die Anforderungen von CISPR11, Gruppe 1, Klasse A als professionelles Strahlungsgerät. Daher kann es in anderen Umgebungen aufgrund von leiter- und strahlungsgebundenen Störungen zu möglichen Schwierigkeiten bei der Sicherstellung der elektromagnetischen Verträglichkeit kommen.

Der Betrieb unterliegt den folgenden zwei Bedingungen:

- Dieses Gerät darf keine schädlichen Störungen verursachen.
- Dieses Gerät muss alle empfangenen Interferenzen tolerieren, einschließlich Interferenzen, die einen unbeabsichtigten Betrieb verursachen können.

Sollte dieses Gerät den Radio- oder Fernsehempfang stören, was durch Aus- und Einschalten des Geräts festgestellt werden kann, wird dem Benutzer empfohlen, eine oder mehrere der folgenden Maßnahmen zu ergreifen:

- Sicherstellen, dass geeignete Kabel für den Anschluss des Gerätes an Zusatzgeräte verwendet werden.
- Änderungen oder Umbauten, die nicht ausdrücklich von Agilent Technologies genehmigt wurden, können dazu führen, dass der Benutzer die Berechtigung zum Betrieb des Geräts verliert.

### Südkoreanische Klasse A EMV-Erklärung

Dieses Gerät entspricht der Klasse A und ist für den professionellen Einsatz und die Verwendung in elektromagnetischen Umgebungen außerhalb des Wohnbereichs geeignet.

A 급 기기  
( 업무용 방송통신기자재 )

이 기기는 업무용 ( A 급 ) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### ICES/NMB-001

Dieses ISM-Gerät entspricht den kanadischen Bestimmungen ICES-001/NMB-001.

## Entsorgung

### Bedeutung des „WEEE“ Logos auf den Schildern.

Das folgende Symbol ist in Übereinstimmung mit der EG-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 Haushalts- oder Industriemüll 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.



Abbildung 12 Logo "WEEE"

Für weitere Informationen siehe:

<http://www.agilent.com/environment/product/index.shtml>

## Service

Sollte ein Kunde einen erweiterten Austausch- oder Reparaturservice benötigen, wenden Sie sich bitte an den örtlichen Händler oder direkt an die Email-Adresse:

[vpt-customer care@agilent.com](mailto:vpt-customer care@agilent.com)

[vpl-customer care@agilent.com](mailto:vpl-customer care@agilent.com)

Das Ausfüllen des "Request for Return" formulars ist erforderlich, um das Produkt zur Wartung an Agilent zurückzusenden (am Ende dieses Handbuchs angegeben).



## 3 Mode d'emploi

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## À propos de ce manuel

### Validité

Le présent manuel contient les instructions destinées aux utilisateurs du 4UHV, notamment celles relatives à la sécurité, au fonctionnement et à la maintenance de premier niveau, dans la limite des activités de maintenance incombant à l'utilisateur.

Les opérations de maintenance décrites dans des paragraphes spécifiques qui contiennent des dispositions relevant d'un niveau de maintenance plus élevé (personnel spécialement formé aux opérations de maintenance) ne doivent pas être effectuées par l'utilisateur.

Pour une installation et une mise en marche/arrêt correctes, consultez le chapitre « Installation ».

Pour une utilisation technologique plus détaillée, consultez le chapitre « Technical Information ».

#### NOTE

- 1** Ce manuel contient des informations utiles pour que l'ensemble du personnel puisse utiliser le 4UHV en toute sécurité et pour garantir un fonctionnement parfait pendant toute sa durée de vie.
- 2** Veuillez conserver ce manuel et tous les documents connexes dans un lieu accessible connu de tous les opérateurs et du personnel de maintenance.

## Définitions et terminologie

### Signification des messages d'attention, d'avertissement et des notes

Dans ce manuel, certaines informations importantes sont surlignées et encadrées avec des couleurs voyantes.

#### ATTENTION

Les messages d'attention sont affichés au début de procédures qui, si elles ne sont pas respectées, peuvent entraîner des dommages aux équipements.

---

#### AVERTISSEMENT



Les messages d'avertissement attirent l'attention de l'opérateur sur une procédure ou une pratique particulière qui, si elle n'est pas effectuée correctement, peut entraîner de graves blessures.

---

#### NOTE

Les remarques contiennent des informations importantes et fournissent des précisions sur certains passages particuliers.

---

## Symboles d'avertissement

Voici une liste de symboles qui apparaissent en conjonction avec les avertissements sur le 4UHV. Le danger qu'ils décrivent est également illustré.

Le symbole triangulaire indique un avertissement. Les significations des symboles qui peuvent apparaître à côté des avertissements dans la documentation ou sur l'appareil lui-même sont les suivantes.



Tensions dangereuses



Danger générique



Déclaration européenne  
de conformité



Site de fabrication



Certification CSA



Déchets d'équipements  
électroniques



Certification  
RoHS Chine










Certification UK CA

Mode d'emploi

Le symbole suivant peut être utilisé sur les étiquettes d'avertissement apposées sur l'appareil. Lorsque vous voyez ce symbole, reportez-vous au manuel d'utilisation ou d'entretien correspondant pour connaître la procédure correcte visée par cette étiquette d'avertissement.



Les symboles suivants apparaissent sur l'appareil pour votre information.

	Tensions dangereuses
	Danger générique
	Certification CE
	Certification CSA
	Certification RoHS Chine
	Déchets d'équipements électriques et électroniques
	Certification UK CA

# Sécurité

Cette section contient les informations prescrites par la Directive basse tension 2014/35/EU, qui est essentielle à la conformité et au respect des règles de sécurité en général ainsi qu'à l'utilisation spécifique de la machine.

Le non-respect de ces instructions et des autres instructions contenues dans le présent manuel peut rendre inefficaces les conditions de sécurité prévues dans la phase de conception et causer des accidents à ceux qui utilisent la machine.

Agilent Technologies décline toute responsabilité pour les dommages causés à la machine ou pour la sécurité physique de l'opérateur ou des tiers résultant du non-respect des règles de sécurité indiquées dans la documentation technique.

## Utilisation appropriée

Le présent manuel contient des avertissements importants et des instructions de sécurité à respecter pour que l'appareil puisse fonctionner en toute sécurité.

Le produit décrit dans le présent manuel est destiné exclusivement au domaine d'application spécifié dans les instructions. Le manuel fournit également des indications concernant les exigences essentielles pour l'application et le fonctionnement du produit ainsi que les mesures de sécurité qui peuvent être adoptées pour garantir un fonctionnement régulier. Agilent Technologies ne fournit aucune garantie ou n'assume aucune responsabilité pour des applications autres que celles décrites dans le présent manuel ou dans lesquelles les exigences essentielles et les mesures de sécurité ne sont pas respectées.

Le produit ne doit être utilisé que par un personnel qualifié capable de prendre les mesures de sécurité nécessaires dans des conditions qui ne causent pas de dommages ou de blessures. Tous les accessoires et équipements utilisés avec le produit doivent être fournis ou approuvés par Agilent Technologies.

Toute opération de réglage ou de maintenance doit être effectuée par un technicien professionnel informé des risques.

Les réparations du produit doivent être effectuées exclusivement par le personnel autorisé d'Agilent.

### Utilisation appropriée

Agilent Technologies décline toute responsabilité en raison de l'utilisation inappropriée du 4UHV Controller.

Une utilisation inappropriée entraînera l'annulation de toutes les créances et garanties. Une utilisation inappropriée est définie comme suit :

- installation de l'appareil à l'aide de matériel de montage inadapté
- utilisation dans un environnement exposé à de la condensation
- utilisation dans un environnement très humide en dehors de la plage spécifiée
- utilisation dans un environnement poussiéreux
- utilisation avec des tensions d'alimentation en dehors de la plage spécifiée
- utilisation de l'appareil dans des zones exposées à des rayonnements ionisants
- utilisation dans des zones potentiellement explosives
- utilisation de l'appareil dans des systèmes soumis à des contraintes et des vibrations ou des forces périodiques qui affectent l'appareil.
- fonctionnement dans des environnements avec des températures en dehors de la plage spécifiée.

### Équipements de protection

L'équipement de protection des exploitants qui opèrent avec le Contrôleur doit toujours être adéquat pour le type d'utilisation en cours. En outre, il doit être conforme aux exigences de sécurité de la législation en vigueur dans le pays où la machine est utilisée. En général, l'exploitant doit porter des chaussures de prévention des accidents lors de la manipulation et de l'installation du Contrôleur.

#### **AVERTISSEMENT** Risques de blessure dus à la chute d'objets.



**Pendant le transport manuel des contrôleur à vide, il existe un risque de glissement et de chute de la charge.**

- Déplacer les contrôleurs en utilisant les deux mains.

**AVERTISSEMENT**



Risque de blessure par des arêtes vives



Les contrôleurs ont des arêtes très vives.



- Si cela est nécessaire, porter des gants de protection conformément à la norme EN 420.

---

**Consignes de sécurité des contrôleurs de pompes ioniques**

Les contrôleurs de pompes ioniques décrits dans ce manuel ne doivent pas être ouverts par l'utilisateur afin d'éviter les risques d'endommager les composants internes.

**AVERTISSEMENT**



Pour éviter d'endommager les équipements et prévenir les risques de blessure des opérateurs, respectez rigoureusement les instructions d'installation fournies dans le présent manuel.



# Transport et Emmagasinage

Pour transporter et emmagasiner le contrôleur il faut observer les conditions suivantes d'environnement :

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

# Description du produit

Cet appareillage a été conçu en vue d'une utilisation professionnelle. Il est conseillé à l'utilisateur de lire attentivement cette notice d'instructions ainsi que toute autre indication supplémentaire fournie par Agilent, avant l'utilisation de l'appareillage. Agilent décline par conséquent toute responsabilité en cas d'inobservation totale ou partielle des instructions données, d'utilisation incorrecte de la part d'un personnel non formé, d'opérations non autorisées ou d'un emploi contraire aux réglementations nationales spécifiques.

Les paragraphes suivants donnent toutes les indications nécessaires à garantir la sécurité de l'opérateur pendant l'utilisation de l'appareillage.

Des renseignements plus détaillés se trouvent dans le chapitre « Technical Information ».

## Installation

### Préparation pour l'installation

Le contrôleur est fourni dans un emballage de protection spécial ; si l'on constate des dommages pouvant s'être produits pendant le transport, contacter tout de suite le 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. Le matériel est entièrement recyclable et il est conforme aux directives CEE 94/62 en matière de protection de l'environnement.

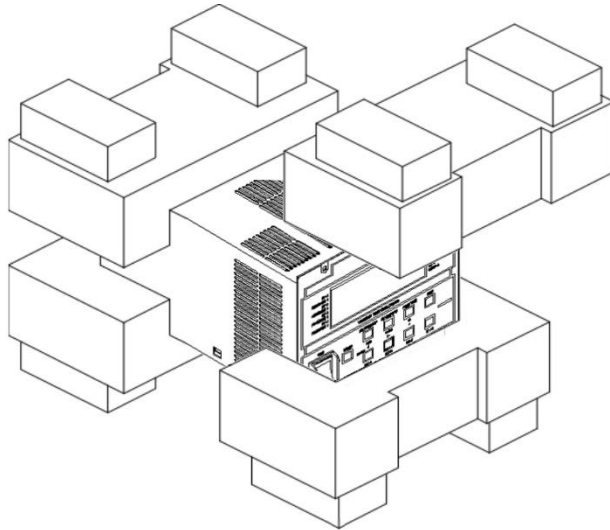


Figure 13 Emballage du contrôleur

## Set-up

### AVERTISSEMENT



Pour la sécurité de l'opérateur, le contrôleur 4UHV (version 100-240 Vca) doit être alimenté par un câble d'alimentation à 3 fils doté d'une prise mâle approuvée à un niveau international. Brancher le câble avec prise mâle à une prise femelle raccordée à la terre de façon adéquate afin d'éviter tout risque d'électrocution et de pouvoir remplir les conditions de conformité prescrites par les normes CE. Les hautes tensions qui se développent à l'intérieur du contrôleur peuvent être susceptibles de provoquer des blessures graves voire de causer la mort. Après l'extinction de l'unité, il reste de l'énergie à l'intérieur du contrôleur pendant quelques instants. Attendre environ 1 minute pour être sûr que l'énergie résiduelle s'est dissipée.

---

### AVERTISSEMENT



Le contrôleur doit être installé de manière à ce que le câble d'alimentation puisse être facilement débranché. Si cet équipement est utilisé d'une manière non conforme aux prescriptions du fabricant, la protection assurée par l'équipement risque d'être compromise.

---

### AVERTISSEMENT



Pour la version 100-240 Vca  
Le câble d'alimentation doit être constitué de trois conducteurs (L+N+PE). La section du fil doit être d'au moins AWG18, 0,83 mm<sup>2</sup>.  
Câble d'alimentation : le câble d'alimentation électrique doit être constitué de trois fils (L+N+PE).  
La section du fil doit être d'au moins AWG18, 0,83 mm<sup>2</sup>  
PIN 1= Connecteur positif  
PIN 2= Connecteur négatif  
PIN 3= Terre de protection

---

**ATTENTION** Le contrôleur peut être utilisé soit comme unité de table que comme module installé dans une armoire. De toute façon, il doit être placé de manière à ce que l'air puisse circuler librement à travers les trous d'aération présents dans la couverture.

Lorsque le contrôleur est utilisé comme module armoire il DOIT être installé dans un adaptateur d'une hauteur de trois unités armoire afin d'éviter qu'il ne tombe à l'intérieur de l'armoire même. Le panneau frontal du contrôleur n'est pas prévu pour supporter le poids de l'unité. Ne pas installer ou utiliser le contrôleur dans des milieux exposés aux agents atmosphériques (pluie, neige, glace). En présence de poussière, de gaz corrosifs ou dans des milieux explosifs ou à fort risque d'inflammabilité.

---

**ATTENTION** Le contrôleur appartient à la seconde catégorie d'installation (ou surtension) prévue par la norme EN 61010: 2010 AMD 1 (2017). Il est donc nécessaire de brancher le dispositif à une ligne d'alimentation qui soit adaptée à cette catégorie d'appareils.

Le contrôleur dispose de connecteurs pour entrées/sorties et pour la communication en série qui doivent être branchés à des circuits externes de façon à ce qu'aucune des parties sous tension ne soit accessible. Veiller à ce que le système d'isolation du dispositif branché au contrôleur soit adapté, même en cas de pannes individuelles, et ce, tel que prévu par la norme EN 61010: 2010 AMD 1 (2017).

---

### NOTE

Si le contrôleur est installé dans une armoire, enlever les quatre pieds de manière à ce qu'il soit placé avec au moins 30 mm d'espace en haut et en bas.

---

### ATTENTION

**Dans quelques rares cas de panne, il est possible que le contrôleur dégage de la fumée. Si l'unité est utilisée dans des environnements propres, il est nécessaire de prévoir la mise en place de protections adéquates afin d'éviter que la fumée ne puisse contaminer la pièce.**

---

Pendant le fonctionnement, il est nécessaire de respecter les conditions d'environnement suivantes :

- Température : de 0 °C à +40 °C
- Humidité relative : 0 – 90 % (non condensante).

## Fixation de l'4UHV

Dans ce paragraphe, on indique les principales procédures opérationnelles.

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

### AVERTISSEMENT



**N'allumer les canaux haute tension que s'ils ont été branchés aux pompes ioniques par l'intermédiaire des câbles haute tension prévus à cet effet et dotés de câble Interlock.**

**L'usage du contrôleur est subordonné à l'usage d'un câble haute tension doté d'Interlock.**

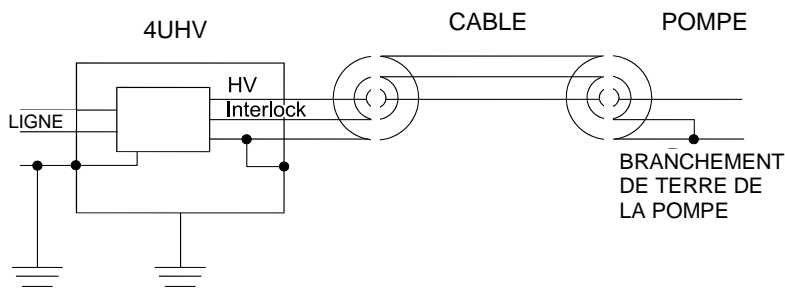


Figure 14 Connexions des masses

### NOTE

Si l'opérateur veut utiliser un câble HV sans interlock, le sachet d'accessoires contient un kit spécial de câbles pour interlocks préassemblés. L'utilisation de ces accessoires provoque la perte des fonctions de sécurité offertes par l'utilisation de l'interlock.

## Mode d'emploi

Consulter la figure ci-dessous pour monter correctement le câble d'interlock contenu dans le sachet d'accessoires en cas de non utilisation du câble de haute tension équipé d'un interlock.

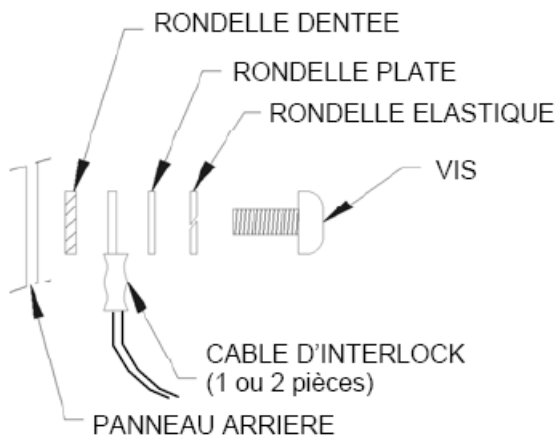


Figure 15

### NOTE

L'interlock du câble est serré sur la masse de la pompe. Si le branchement est coupé, la haute tension est interrompue.

Pour relier le contrôleur à la pompe, utiliser un câble HV équipé d'un interlock (voir le bordereau de commande des pièces).

Les branchements corrects des masses, du câble HV entre le contrôleur et la pompe, ainsi que du câble d'interlock sont reportés sur la figure "Connexions des masses".

### ATTENTION

En cas d'utilisation du câble d'interlock contenu dans le sachet d'accessoires, il faut veiller en particulier à ce qu'aucune pièce ne tombe à l'intérieur du contrôleur.

## Démarrage et fonctionnement du contrôleur 4UHV depuis le panneau avant (mode LOCAL)

**NOTE**

Pour allumer la haute tension (HV), il faut que l'interlock du câble HV (câble interlock) soit fermé (connecteur branché).

---

Procéder comme suit pour alimenter le contrôleur et habiliter la tension au niveau des connecteurs de haute tension (H.V.) :

- Connectez le cordon d'alimentation au panneau arrière.
- Eteindre le contrôleur.
- Brancher le câble HV et l'interlock du câble H.V. sur les connecteurs correspondants situés sur le panneau arrière.
- Vérifiez que l'unité est en mode LOCAL en entrant dans le menu et le sous-menu « MODE ». Sélectionner l'option « LOCAL ».
- Maintenez enfoncé le bouton HV ON/OFF (2) tout en appuyant sur le bouton HV-x (3,4,5,6) où x est le numéro du canal à activer ou désactiver.



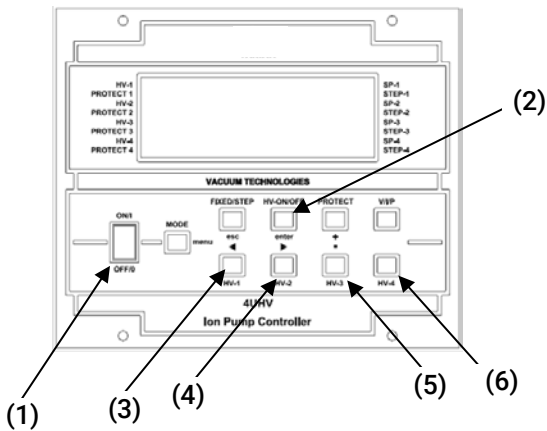


Figure 16 Panneau avant 4UHV sur le contrôleur de pompe

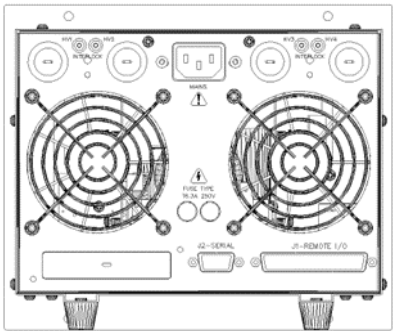


Figure 17 Panneau arrière 4UHV sur le contrôleur de pompe

## Arrêt de l'4UHV

Pour éteindre le canal HV :

- Maintenez enfoncé le bouton HV ON/OFF (2) tout en appuyant sur le bouton HV-x (3,4,5,6) où x est le numéro du canal à activer ou désactiver.

Pour plus de renseignements sur l'usage du contrôleur et sur la description des informations de l'écran, consulter la section " Technical Information ".

### Arrêt d'urgence

#### AVERTISSEMENT



**En cas d'urgence, éteindre l'appareil et tous les canaux élevés tension, éteignez l'interrupteur principal (1) situé sur le panneau avant.**

**L'arrêt de l'interrupteur principal éteindra l'unité HV.**

---

## Entretien

Le contrôleur n'exige aucun entretien particulier. Toute intervention doit être effectuée par un personnel agréé. En cas de panne, on peut s'adresser au service de réparation Agilent ou au service "Agilent advanced exchange service" qui permet d'obtenir un contrôleur régénéré en substitution de celui endommagé.

En cas de mise au rebut de la pompe, procéder à son élimination conformément aux réglementations nationales concernant la gestion des déchets.

#### AVERTISSEMENT



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

## Nettoyage

Pour des raisons de sécurité, avant de nettoyer le contrôleur :

- éteindre le contrôleur ;
- débrancher la prise d'alimentation du contrôleur du réseau électrique ;
- débrancher tous les câbles ;
- si l'extérieur du contrôleur est sale, utiliser un chiffon doux et sec.

## Compatibilité électromagnétique

### EN55011/CISPR11

**Équipements ISM du groupe 1** : le groupe 1 contient tous les équipements ISM dans lesquels est générée et/ou utilisée intentionnellement de l'énergie de fréquence radio couplée de manière conductrice indispensable au fonctionnement interne de ces équipements.

**Les équipements de classe A** sont adaptés à l'emploi dans tous les établissements autres que domestiques et concernent ceux qui sont connectés directement à un réseau électrique basse tension qui alimente des bâtiments à usage domestique.

Ce dispositif est conforme aux exigences de CISPR11, Groupe 1, Classe A en tant qu'équipement professionnel de radiation. Par conséquent, il est possible que la compatibilité électromagnétique soit difficile à garantir dans d'autres environnements en raison des perturbations conduites et rayonnées.

L'utilisation est soumise aux deux conditions suivantes :

- Ce dispositif ne peut pas provoquer d'interférences dangereuses.
- Ce dispositif doit tolérer toutes les interférences reçues, y compris celles susceptibles de provoquer un fonctionnement indésirable.

Si cet équipement provoque des interférences au niveau de la réception d'appareils de radio ou de télévision, phénomène qui peut être déterminé en éteignant et en rallumant l'équipement, l'utilisateur est invité à prendre une ou plusieurs mesures suivantes :

- Vérifier que les câbles appropriés sont utilisés pour raccorder l'appareil à l'équipement périphérique.
- Tout changement ou modification n'ayant pas été expressément approuvé par Agilent Technologies risque d'annuler l'autorisation de l'utilisateur à exploiter l'équipement.

### Déclaration CEM Classe A Corée du Sud

Cet équipement de la Classe A est adapté à un usage professionnel et est conçu pour être utilisé dans des environnements électromagnétiques hors domiciles.

A 급 기기  
( 업무용 방송통신기자재 )

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### ICES/NMB-001

Ce dispositif ISM est conforme à la norme canadienne ICES-001/NMB-001.

## Élimination

### Signification du logo « DEEE » présent sur les étiquettes.

Le symbole représenté ci-dessous est apposé conformément à la directive CE dite « DEEE ».

Ce symbole (valable uniquement pour les pays de la Communauté européenne) indique que le produit sur lequel il est apposé NE DOIT PAS être éliminé avec des déchets ménagers ou industriels communs mais qu'il doit être confié à un centre de collecte sélective. L'utilisateur est donc invité à contacter le fournisseur du produit, qu'il s'agisse du fabricant ou d'un revendeur, pour donner lieu au processus de collecte et d'élimination, après avoir vérifié les conditions générales de vente.



Figure 18 Logo « DEEE »

Pour plus de précisions, veuillez consulter :

<http://www.agilent.com/environment/product/index.shtml>

## Service

Si vous avez besoin d'un service d'échange ou de réparation avancé, veuillez contacter le distributeur local ou écrire directement à :

[vpt-customer care@agilent.com](mailto:vpt-customer care@agilent.com)

[vpl-customer care@agilent.com](mailto:vpl-customer care@agilent.com)

Vous devez remplir le formulaire de "Request for Return" pour retourner le produit à Agilent pour l'entretien (fourni à la fin du présent manuel).

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## Acerca del manual

### Validez

Este manual enumera las instrucciones para los usuarios del 4UHV, con particular referencia a la información relacionada con la seguridad, la operación y el mantenimiento de primer nivel que está limitado a las operaciones de mantenimiento que son responsabilidad del usuario.

Las operaciones de mantenimiento, ilustradas en las secciones particulares, con disposiciones específicas relacionadas con el nivel más elevado de mantenimiento (personal específicamente capacitado para las operaciones de mantenimiento) no deben ser realizadas por el usuario.

Para una instalación y un encendido/apagado correctos, consulte la sección "Technical Information".

#### NOTA

- 1** Este manual contiene información útil para que todo el personal que utilice el 4UHV pueda operarla de manera segura y garantizar un rendimiento perfecto, durante toda su vida útil.
  - 2** Guarde este manual, junto con todas las publicaciones relacionadas, en un lugar conocido y accesible para todos los operadores/personal de mantenimiento.
-



## Definiciones y terminología

### Definición de Precaución, Advertencia y Nota

Algunas referencias importantes de este manual están resaltadas y enmarcadas en color contrastante.

#### PRECAUCIÓN

Los mensajes de precaución se muestran antes de los procedimientos que, si no se respetan, pueden causar daños al equipo.

---

#### ADVERTENCIA



Los mensajes de advertencia llaman la atención del operador sobre un procedimiento o práctica específica que, si no se realiza correctamente, puede causar lesiones personales graves.

---

#### NOTA

Las notas están previstas para llamar la atención sobre información importante y proporcionar más detalles en relación con pasos específicos.

---

## Símbolos de advertencia

La siguiente es una lista de los símbolos que aparecen en conjunto con las advertencias en el 4UHV. También se muestra el peligro que describen.

Un símbolo triangular indica una advertencia. Los significados de los símbolos que pueden aparecer junto a las advertencias en la documentación son los siguientes:



Voltajes peligrosos



Peligro genérico



Declaración Europea  
de Conformidad



Lugar de fabricación



Certificación CSA



Equipo de Desecho  
Eléctrico y Electrónico



Certificación China  
RoHS



Certificación UK CA

Instrucciones de uso

El siguiente símbolo podría utilizarle en las etiquetas de advertencia fijadas al instrumento. Cuando vea este símbolo, consulte la operación relevante o el manual de servicio para el procedimiento referido por dicha etiqueta de advertencia.



Los siguientes símbolos aparecen en el instrumento para su información.

	Voltajes peligrosos
	Peligro genérico
	Certificación CE
	Certificación CSA
	Certificación China RoHS
	Equipo de Desecho Eléctrico y Electrónico
	Certificación UK CA

## Seguridad

La presente sección contiene la información, prescrita por la Directiva de Maquinario 2014/35/UE, que es esencial para el cumplimiento y seguimiento de las normativas de seguridad, tanto generales como en relación con el uso específico del producto.

El incumplimiento de las presentes instrucciones y las otras instrucciones en el presente manual pueden hacer que las condiciones de seguridad previstas en la fase de diseño sean ineficaces y causen accidentes a los que operen el producto.

Agilent Technologies niega cualquier responsabilidad por daños al producto o la seguridad física del operario o terceras partes derivados del incumplimiento de las reglas de seguridad indicadas en la documentación técnica. Advertencias CEM

### Uso correcto

El presente manual contiene advertencias importantes e instrucciones de seguridad a cumplir para que la unidad funcione de manera segura.

El producto descrito en el presente manual está destinado exclusivamente al área de aplicación especificado en las instrucciones. El manual también proporciona indicaciones acerca de los requisitos esenciales para la aplicación y funcionamiento del producto, así como las medidas de seguridad que pueden ser adoptadas para garantizar el funcionamiento regular. Agilent Technologies no proporciona ninguna garantía ni asume ninguna responsabilidad por aplicaciones que no sean las descritas en el presente manual, o en las que no se respeten los requisitos y medidas de seguridad esenciales.

El producto solo puede ser utilizado por personal cualificado que pueda tomar las medidas de seguridad necesarias bajo condiciones que no causen daños o lesiones. Cualquier accesorio y equipo utilizado con el producto debe ser proporcionado o aprobado por Agilent Technologies.

Cualquier ajuste u operación de mantenimiento debe ser realizada por un técnico profesional informado sobre los riesgos.

Las reparaciones del producto deberán ser realizadas exclusivamente por personal autorizado por Agilent.

### Uso incorrecto

Agilent Technologies niega cualquier responsabilidad derivada del uso incorrecto del Controlador 4UHV.

El uso incorrecto anulará todas las reclamaciones por responsabilidad y garantías.

El uso incorrecto se define como:

- instalación del dispositivo con material de montaje no especificado
- funcionamiento en un entorno de condensación
- funcionamiento en entornos de alta humedad fuera del rango especificado
- funcionamiento en entornos polvorientos
- funcionamiento con tensiones de alimentación fuera del rango especificado
- funcionamiento del dispositivo en áreas con radiación ionizante
- funcionamiento en zonas potencialmente explosivas
- uso del dispositivo en sistemas en los que la fuerza de impacto y las vibraciones o fuerzas periódicas afecten al dispositivo
- funcionamiento en ambientes con temperaturas fuera del rango especificado.

### Equipo de protección

El equipo de protección de los operarios que están operando sobre el Controlador debe ser siempre adecuado para el tipo de operación que se está ejecutando.

Asimismo, debe cumplir los requisitos de seguridad de la legislación vigente en el país donde se utilice la máquina. En general, el operario debe llevar calzado de prevención de accidentes mientras maneje el Controlador y durante la instalación.

### **ADVERTENCIA** Riesgo de lesiones debido a la caída de objetos



**Cuando se transportan los Controler de vacío manualmente, existe el peligro de que las cargas se resbalen y caigan.**

- **Traslade los Controler con las dos manos.**

**ADVERTENCIA**



**Riesgo de lesión por bordes afilados**



**Los controladores tienen bordes muy afilados.**



**Si es necesario lleve guantes de protección según EN 420.**

---

**Pautas de seguridad para Controladores de bombas iónicas**

Los Controladores de bombas iónicas descritos en el siguiente manual de funcionamiento no deben ser abiertos por el usuario para evitar el riesgo de dañar los componentes internos.

**ADVERTENCIA**



**Para evitar daños al equipo y prevenir lesiones al personal operativo, se deben cumplir estrictamente las instrucciones de instalación indicadas en este manual.**

## Transporte y Almacenamiento

Durante el transporte y el almacenamiento del 4UHV no pueden ser superadas las siguientes condiciones ambientales:

- Temperatura: de -20 °C a +70 °C
- Humedad relativa: 0 ÷ 95% (no condensadora)

## Descripción del producto

Este equipo está destinado a uso profesional y deberá ser utilizado por profesionales.

El usuario debe leer atentamente el presente manual de instrucciones y cualquier otra información adicional proporcionada por Agilent antes de utilizar el equipo. Agilent no se responsabilizará por cualquier evento que ocurra debido al incumplimiento de estas instrucciones, por el uso indebido por parte de personas no capacitadas, por interferencia no autorizada con el equipo o por cualquier acción contraria a lo previsto por las normas nacionales específicas.

Los siguientes párrafos contienen toda la información necesaria para garantizar la seguridad del operador al utilizar el equipo.

Puede encontrar información detallada en la sección "Technical Information".

## Instalación

### Preparación para la instalación

El 4UHV se suministra con un embalaje especial de protección; si el embalaje muestra signos de deterioro que podrían haberse verificado durante el transporte, será necesario contactar con el ente de ventas local.

Al desempacar, tenga especial cuidado de no dejar caer el controlador ni someterlo a golpes y no deseche el embalaje en el medio ambiente.

El material de embalaje es completamente reciclable y cumple con la Directiva EEC 94/62 para la protección del medio ambiente.

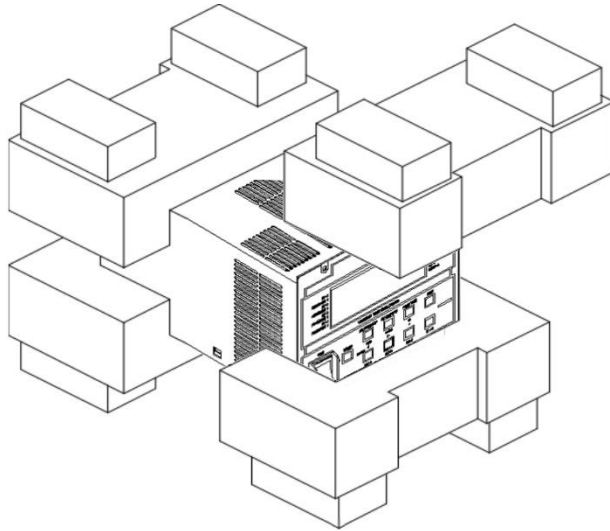


Figura 19 Embalaje de los 4UHV



## Instalación

### ADVERTENCIA



Para la seguridad del operador, el controlador 4UHV (versión 100-240Vac) debe alimentarse con un cable de alimentación de 3 hilos conectado a un enchufe aprobado internacionalmente. Utilice este cable y enchufe junto con una toma de corriente debidamente conectada a tierra para evitar descargas eléctricas y cumplir con los requisitos de las normas CE. Las altas tensiones que se generan en el controlador pueden provocar lesiones graves o la muerte. Después de apagar la unidad, la energía residual estará presente dentro del controlador durante algún tiempo. Espere 1 minuto aproximadamente para estar seguro que la energía residual se ha disipado.

---

### ADVERTENCIA



El controlador debe instalarse de manera que permita una fácil desconexión de la tensión de línea.

Si este equipo se utiliza de una manera no especificada por el fabricante, la protección proporcionada para el equipo podría verse afectada.

---

### ADVERTENCIA



Para la versión 100-240 Vac.

Cable de alimentación: el cable correcto para el cableado eléctrico es un cable de tres hilos (L+N+PE).

La sección del cable debe ser como mínimo AWG18, 0,83 mm<sup>2</sup>.

Cable de alimentación: el cable correcto para el cableado eléctrico es un cable de tres hilos (L+N+PE).

La sección del cable debe ser como mínimo AWG18, 0,83 mm<sup>2</sup>

PIN 1= Conector positivo

PIN 2= Conector Negativo

PIN 3= Puesta a tierra

---

### PRECAUCIÓN

El controlador se puede utilizar como unidad desktop y como módulo rack. En cualquier caso, debe colocarse de forma que el aire pueda circular libremente por las ranuras de ventilación de la tapa.

Si el controlador se utiliza como un módulo rack, DEBE insertarse en un adaptador de tres estantes elevados para evitar que caiga dentro del mismo rack. El panel frontal del controlador no está diseñado para soportar el peso de la unidad.

No instale ni utilice el controlador en un entorno expuesto a agentes atmosféricos (lluvia, nieve, hielo), en presencia de polvo, gases corrosivos o en un entorno altamente inflamable o explosivo.

---

### PRECAUCIÓN

El controlador pertenece a la segunda categoría de instalación (o sobretensión) según lo exige la norma EN 61010: 2010 AMD 1 (2017). Por lo tanto, el dispositivo debe estar conectado a una línea eléctrica que cumpla con los requisitos para esta categoría.

El controlador dispone de conectores para entradas/salidas y para comunicaciones serie que deben conectarse a circuitos externos de forma que no queden accesibles partes alimentadas. Asegúrese que el aislamiento del dispositivo conectado al controlador proporcione un aislamiento adecuado incluso en el caso de una sola condición de falla según lo requerido por EN 61010: 2010 AMD 1 (2017).

---

### NOTA

Si el controlador está instalado en un rack, quite sus cuatro patas y colóquelo dejando al menos 30 mm (1,2 pulgadas) de espacio libre por encima y por debajo.

---

### PRECAUCIÓN

**En raras circunstancias, una falla del controlador podría causar la emisión de humo. Si el cliente utiliza el controlador en un ambiente limpio, debe tomar las medidas adecuadas para evitar que el ambiente se contamine con los humos.**

---

El controlador debe utilizarse en las siguientes condiciones ambientales:

- Temperatura: 0 °C to +40 °C
- Humedad relativa: 0 – 90 % (sin condensación).

## Montaje del 4UHV

Esta sección le proporciona los principales procedimientos operativos.

Antes de usar el controlador, por favor, realice todas las conexiones eléctricas y consulte el manual de la bomba conectada.

### ADVERTENCIA



Encienda el canal de alta tensión solo si está conectado a la bomba de iones por medio de los cables de alta tensión de uso especial equipados con cable interlock.

Se supone que el controlador se utilizará junto con el cable de alta tensión que tiene un enclavamiento de seguridad.

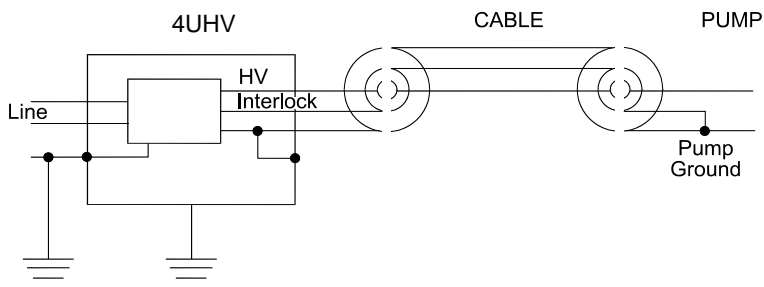


Figura 20 Conexiones a tierra

### NOTA

Si se va a utilizar un cable de alta tensión sin enclavamiento, la bolsa de accesorios contiene un kit específico de cable interlock premontado. Sin embargo, con este tipo de uso, se pierde la capacidad de seguridad proporcionada mediante el enclavamiento.

## Instrucciones de uso

Consulte la siguiente figura para el montaje correcto del cable interlock suministrado en la bolsa de accesorios en el caso de que no se utilice un cable de alta tensión con enclavamiento.

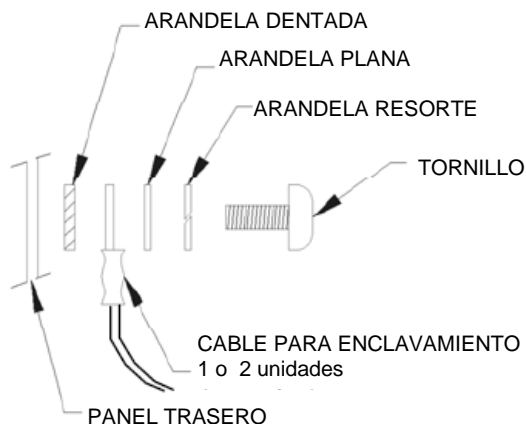


Figura 21

### NOTA

El enclavamiento del cable se cierra con la bomba a tierra. La alta tensión se desactiva si se interrumpe la conexión.

Para conectar el controlador a la bomba, utilice un cable AT con enclavamiento (consulte las piezas que puede solicitar).

La conexión correcta de las masas del cable de alta tensión entre el controlador y la bomba y del cable interlock se ilustra en la figura "Conexiones a tierra".

### PRECAUCIÓN

**Cuando utilice el cable interlock suministrado en la bolsa de accesorios, asegúrese que ninguna pieza caiga accidentalmente dentro del controlador.**

## Puesta en marcha y funcionamiento del Controlador 4UHV desde el Panel Frontal (Modo LOCAL)

### NOTA

Para encender la Alta Tensión (AT), el cable de AT interlock (cable interlock) debe estar cerrado (conector insertado).

---

Proceda de la siguiente manera para alimentar el controlador y aplicar tensión a los conectores de alta tensión (AT):

- Conecte el cable de alimentación al panel trasero.
- Apague el controlador.
- Conecte el cable AT y el cable interlock AT en los conectores correspondientes del panel trasero.
- Compruebe que el modo LOCAL esté habilitado, presionando "MENÚ" y luego "MODE".
- Mantenga presionado el botón HV ON/OFF (2) mientras presiona el botón HV-x (3,4,5,6) donde x es el número del canal a encender o apagar.

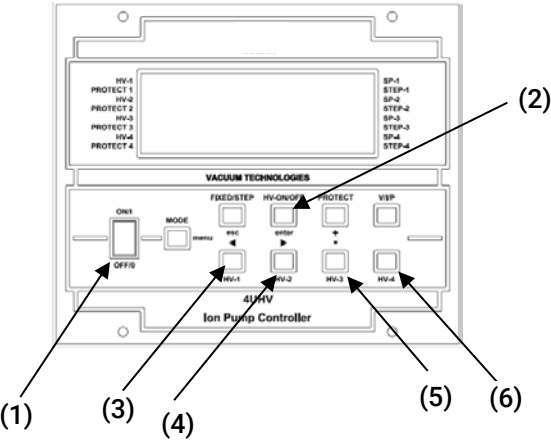


Figura 22 Panel frontal del Controlador de la bomba de iones 4UHV

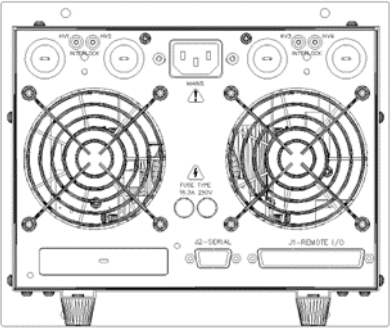


Figura 23 Panel trasero del Controlador de la bomba de iones 4UHV

## Apagado del 4UHV

Para desconectar el canal de AT:

- Mantenga presionado el botón HV ON/OFF (2) mientras presiona el botón HV-x (3,4,5,6) donde x es el número del canal a encender o apagar.

Para obtener más información sobre el uso del controlador y para obtener una descripción de la información que aparece en la pantalla, consulte la sección "Technical Information".

### Parada de emergencia

#### ADVERTENCIA



En condición de emergencia para apagar la unidad y todos los canales altos voltaje, apague el interruptor principal (1) ubicado en el panel frontal.

Cuando el interruptor principal está apagado, la unidad HV está apagada.

## Mantenimiento

El 4UHV no necesita ningún tipo de mantenimiento. Cualquier tipo de intervención sobre el sistema deberá ser realizado por personal autorizado. Antes de efectuar cualquier intervención sobre el sistema, es necesario desconectarlo de la alimentación. En caso de avería, es posible ponerse en contacto con el servicio de reparación Agilent o el servicio "Agilent advance exchange service" que permite obtener un controlador regenerado en sustitución del averiado. En caso de que un sistema debiera ser desguazado, proceder a su eliminación respetando las normas nacionales específicas.

#### ADVERTENCIA



Antes de efectuar cualquier operación en el controler desenchufar el cable de alimentación.



# Limpieza

Por razones de seguridad, antes de limpiar el controlador:

- apague el controlador;
- desconecte el enchufe de alimentación del controlador del toma corriente;
- desconecte todos los cables;
- si la parte externa del controlador se ensucia, utilice un paño seco y suave.

# Compatibilidad electromagnética

## EN55011/CISPR11

**Equipos ISM del grupo 1:** El Grupo 1 contiene todos los equipos ISM en los que se genera y/o utiliza intencionalmente energía de radiofrecuencia acoplada conductivamente que es necesaria para el funcionamiento interno del propio equipo.

**Los equipos de Clase A** son equipos aptos para su uso en todos los establecimientos que no sean domésticos y aquellos conectados directamente a una red de suministro de energía de bajo voltaje que alimenta edificios utilizados para fines domésticos.

Este dispositivo cumple con los requisitos de CISPR11, Grupo 1, Clase A como equipo profesional de radiación. Por lo tanto, puede haber dificultades potenciales para garantizar la compatibilidad electromagnética en otros entornos, debido tanto a las perturbaciones conducidas como a las radiadas.

La operación está sujeta a las siguientes dos condiciones:

- Este dispositivo no puede causar interferencias nocivas.
- Este dispositivo debe aceptar cualquier interferencia recibida, incluida la interferencia que pueda provocar un funcionamiento no deseado.

Si este equipo causa interferencias dañinas en la recepción de radio o televisión, lo cual se puede determinar apagando y encendiendo el equipo, se recomienda al usuario que pruebe una o más de las siguientes medidas:

- Asegúrese de utilizar los cables apropiados para conectar el dispositivo al equipo periférico.
- Los cambios o modificaciones no aprobados expresamente por Agilent Technologies podrían anular la autorización del usuario para operar el equipo.

### **Declaración EMC Clase A de Corea del Sur**

Este equipo es Clase A apto para uso profesional y ha sido diseñado para su uso en entornos electromagnéticos fuera del hogar.

A 급 기기  
( 업무용 방송통신기자재 )

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### **CIEM/NMB-001**

Este dispositivo ISM cumple con la norma ICES-001/NMB-001 de Canadá.

## Eliminación

Significado del logo "WEEE" que se encuentra en las etiquetas.

El siguiente símbolo se aplica de acuerdo con la Directiva WEEE (Residuos de Aparatos Eléctricos y Electrónicos, por sus siglas en inglés) de la CE.

Este símbolo (válido solo en los países de la Comunidad Europea) indica que el producto en el que se aplica NO debe desecharse con la basura doméstica o industrial común, sino que debe enviarse a un sistema de recolección diferenciada. Se invita al usuario final a comunicarse con el proveedor del dispositivo, ya sea directamente con la Casa Matriz o con un revendedor, para iniciar el proceso de recolección y eliminación después de verificar las condiciones contractuales de venta.



**Figura 24** Logo "WEEE"

Para más información, consulte:

<http://www.agilent.com/environment/product/index.shtml>

## Servicio

Si un cliente necesita un servicio de intercambio avanzado o reparación, contacte con un distribuidor local o escriba un correo electrónico directamente a:

[vpt-customer care@agilent.com](mailto:vpt-customer care@agilent.com)

[vpl-customer care@agilent.com](mailto:vpl-customer care@agilent.com)

Es obligatorio completar la "Request for Return" para devolver el producto a Agilent para mantenimiento (proporcionada al final del presente manual).

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## 关于本手册

### 有效性

本手册列出 4UHV 用户说明，特别注意与安全、操作和一级维护有关的注意事项，受用户负责的维护操作限制。

维护操作在特定章节中说明，对于更高等级的维护设有具体规定（接受过维护操作专门培训的人员），用户不得执行此类操作。

要正确安装和启动/停止，请参考“Technical Information”章节。

#### 注意

- 1 本手册包含有用信息，确保所有使用 4UHV 的人员可以安全操作，在设备整个寿命期内发挥完美效率。
  - 2 将本手册和所有相关出版物放置在所有操作员、维护人员方便访问的位置。
-

## 定义与术语

### 小心、警告和注意的定义

本手册的一些重要参考内容用背景色突出显示。

#### 小心

程序开始前，提示小心消息，如果不遵守过程指示，可能导致设备损坏。

---

#### 警告



警告消息提醒操作员注意特定过程或做法，如果执行错误，可能导致人员重伤。

---

#### 注意

注意旨在让人注意重要信息，提供具体步骤的更多详细信息。

---

## 警告符号

以下是在 4UHV 上与警告一起显示的符号列表。还显示了这些符号所指的危险。

三角形符号表示警告。在文档或仪器警告旁边可能出现的符号含义如下：



表示危险电压



一般危险



欧洲符合性声明



生产现场



CSA 认证



废弃电气和电子设备



RoHS中国认证



UK CA 认证



使用说明

以下符号可用作附在仪器上的警告标签。当您看到此符号时，请参阅相关操作或维修手册，了解该警告标签所指的正确操作过程。



以下符号会出现在仪器上以供您参考。

	表示危险电压
	一般危险
	CE认证
	CSA 认证
	RoHS中国认证
	废弃电气和电子设备
	UK CA 认证

## 安全

本节包含机械指令 2014/35/UE 规定的信息，这些信息对于遵守常规安全法规以及机器特定用途相关安全法规至关重要。

不遵守这些说明或本手册的其他说明，将导致设计阶段设想的安全条件无效，操作员可能发生事故。

对于不遵守技术文档中的安全规定而导致的机器损坏或者操作员或第三方人身伤害，Agilent Technologies 不承担任何责任。

## 正确使用

本手册包含机器安全工作需要遵守的重要警告和安全说明。

本手册所述产品仅用于本手册指定的应用领域。手册还规定了产品应用和操作基本要求相关的说明，以及可确保正常运行的安全措施。对于将产品用于非本手册介绍的用途或者产品使用过程中不遵守基本要求和安全措施，Agilent Technologies 不承担任何责任。

必须由能够采取必要安全措施，不会导致损坏或受伤的具备资质人员使用产品。产品的配套配件和设备必须由 Agilent Technologies 提供或授权使用。

必须由了解相关风险的专业技术人员执行任何调整或维护操作。

必须由 Agilent 授权人员执行产品维修。

### 使用不当

对于因不正确使用 4UHV 而造成的任何后果，安捷伦科技公司 (Agilent Technologies) 不承担任何责任。

使用不当将导致所有责任保证和索赔保证失效。使用不当的定义为：

- 使用未指定的安装材料安装设备
- 在冷凝环境中操作
- 在规定范围外的高湿环境中操作
- 在多尘环境中操作
- 在线路电压超出规格的情况下操作
- 与规定范围外的电源电压操作
- 在潜在爆炸区域内操作
- 在类冲击应力和振动或周期性力影响设备的系统中使用设备
- 在温度超出指定范围的环境中运行。

### 防护装备

在控制器上操作的操作员的**保护设备**必须始终适合正在**执行**的操作**类型**。此外，它必须符合使用机器所在国家/地区**现行法律**的安全要求。

一般情况下，操作**人员**在操作控制器和安装**过程**中必须穿防事故鞋。

#### 警告

#### 坠落物体造成伤害的风险



手动运输真空控制器时，存在负载滑落和坠落的危险。



双手携带控制器。

**警告**



**锋利边缘有划伤的风险**



控制器有非常**锋利**的**边缘**。



如有必要，**请按照 EN 420 佩戴防护手套**。

## 离子泵控制器安全指南

用户不应打开以下操作手册中描述的离子泵控制器，以避免损坏内部组件的风险。

**警告**



**为避免损坏设备并防止操作人员受伤，应严格遵守本手册中提供的安装说明！**

## 运输及存储

运输和存储控制器时，应满足以下环境要求：

- 温度：-20 °C 至 +70 °C
- 相对湿度：0 ÷ 95%（无冷凝）

## 产品描述

本设备专为专业用途而设计。在使用该设备之前，用户必须完整地仔细阅读本说明手册以及安捷伦(Agilent) 提供的任何附加信息。对于因全部或部分误用此处提供的说明、未经培训的人员不当使用设备、未经授权的干预或疏忽遵守任何特定国家规则或法规而造成的损害，安捷伦概不负责。

下文包含在使用设备时保证操作员安全所需的所有信息。

详细信息在“Technical information”一章中提供。

从此段开始，术语“控制器”表示 4UHV。

## 安装准备

控制器具有特殊的保护性包装。如果这个包装在运输过程中出现损坏的迹象，请联系当地的销售办事处。打开控制器包装时，请确保不要摔落控制器或使其受到任何形式的撞击。请勿以未经授权的方式处置包装材料。请勿以未经授权的方式处理包装材料。该材料是100%可回收的，符合EEC指令94/62号和随后颁布的修正案。

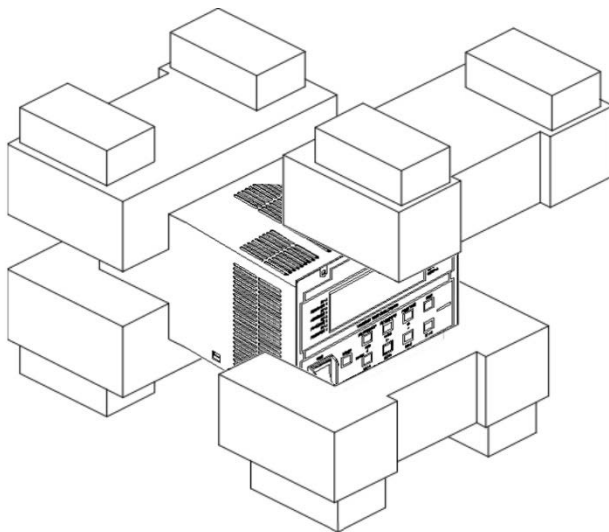


图 25 控制器包装

## 设置

**警告**



为了操作员的安全，4UHV（版本 100-240Vac）控制器必须使用连接到国际认证插头的 3 线电源线供电。将此电缆和插头与充分接地的插座一起使用，以防止触电并满足 EC 规范的要求。控制器中产生的高压可能会导致严重伤害或死亡。关闭设备后，剩余能量会在控制器内存在一段时间。等待大约 1 分钟以确保剩余能量已消散。

---

**警告**



控制器的安装方式必须保证能够轻松中断线路电压。

如果以制造商未指定的方式使用此设备，则设备提供的保护可能会受损。

---

**警告**



适用于 100-240 Vac 版本。

电源线：正确的电线电缆是三芯 (L+N+PE) 电缆。

电线截面必须至少为 AWG18, 0.83 mm<sup>2</sup>。

电源线：正确的电气接线电缆是三芯 (L+N+PE) 电缆。电线截面必须至少为 AWG18, 0.83 mm<sup>2</sup>

PIN 1= 正极连接器

PIN 2= 负极连接器

PIN 3= 接地保护

---

**小心**

该控制器既可以用作桌面单元，也可以用作机架模块。在任何情况下，它的放置方式都必须使空气可以通过盖子上的通风槽自由流通。

如果将控制器用作机架模块，则必须将其插入三机架高的适配器中，以防止其掉入机架本身。控制器前面板的设计无法支撑设备的重量。

请勿在暴露于大气因素（雨、雪、冰）、灰尘、腐蚀性气体或高度易燃易爆环境中安装或使用控制器。

---

**小心**

控制器属于标准 **EN 61010: 2010 AMD 1 (2017)** 中规定的第二安装类别（或过电压）。因此，设备必须连接到满足此类要求的电源线。

控制器具有用于输入/输出和串行通信的连接器，这些连接器必须以无法接触受电部件的方式连接到外部电路。确保即使在 **EN 61010: 2010 AMD 1 (2017)** 规范中规定的单一故障情况下，连接到控制器的设备的绝缘部分也能提供足够的绝缘性。

---



**注意**

如果控制器安装在机架中，**请**卸下其四个支脚并将其放置，上下至少留出 30 毫米（1.2 英寸）的自由空间。

---

**小心**

只有在极少数情况下，控制器故障可能会导致冒烟。如果客户在干净的环境中使用控制器，他们**应该**采取适当的措施避免环境被任何可能出现的烟雾污染。

---

控制器**必须**在以下环境条件下使用：

- 温度: 0 °C 至 +40 °C
- 相对湿度: 0 – 90 % (非冷凝)

## 修复 4UHV

本节为您提供主要操作步骤。

在使用控制器之前，进行所有电气连接并 请参阅所连接泵的手册。

### 警告



仅当高压通道通过配备联锁电缆的专用高压电缆连接到离子泵时才能打开高压通道。

假定控制器将与具有安全联锁装置的高压电缆一起使用。

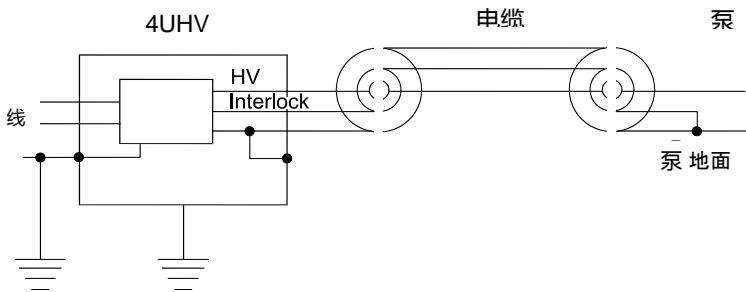


图 26 接地连接

### 注意

如果要使用不带联锁装置的高压电缆，附件包中需要包含一套特定的预装联锁装置导线。然而，在这种类型的使用中，使用联锁装置提供的安全能力就丧失了。

## 使用说明

在不使用带互锁的高压电缆的情况下，请参考下图正确组装附件包中提供的互锁电缆。

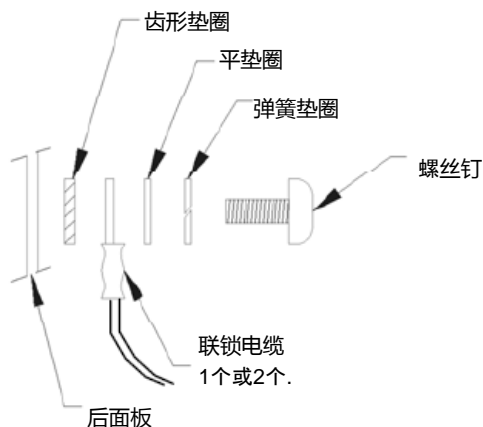


图 27

### 注意

电缆互锁在泵接地时关闭。如果连接中断，高压将被禁用。

如要将控制器连接到泵，请使用带互锁装置的高压电缆（参见可订购的部件）。

“接地连接”图中说明了质量、控制器和泵之间的高压电缆以及联锁电缆的正确连接。

### 小心

使用附件包中提供的联锁电缆时，确保没有部件意外掉落到控制器内。

## 从前面板启动和操作 4UHV 控制器（本地模式）

### 注意

确保即使在 EN 61010-1 规范中规定的单一故障情况下，连接到控制器的设备的绝缘部分也能提供足够的绝缘性。

---

按照以下步骤为控制器供电并向高压 (HV) 连接器施加电压：

- 将电源线连接到后面板。
- 关闭控制器。
- 将高压电缆和高压电缆的互锁装置连接到后面板上的相关连接器中。
- 按“MENU”，然后按“MODE”，确认 LOCAL 模式已启用 按顺序按下按钮。
- 按住 HV ON/OFF 按钮 (2) 的同时按下 HV-x (3,4,5,6) 按钮 其中 x 是要打开/关闭的通道号。

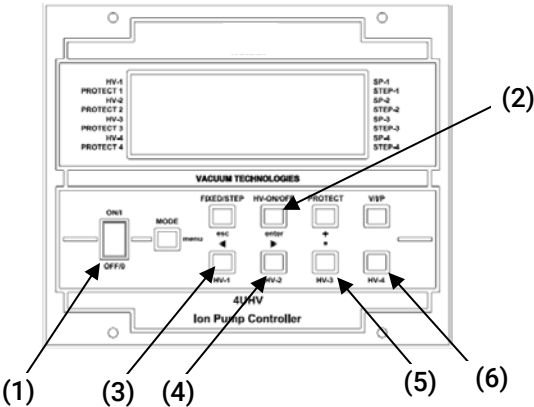


图 28 4UHV 离子泵控制器的前面板

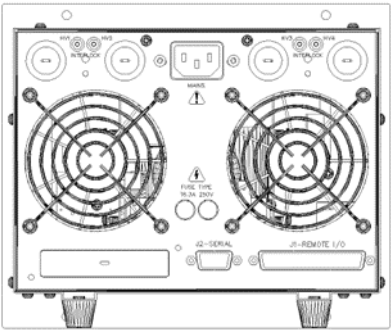


图 29 4UHV 离子泵控制器的后面板

## 4UHV 关机

关闭高压通道:

- 按住 HV ON/OFF 按钮 (2) 的同时按下 HV-x (3,4,5,6) 按钮 其中 x 是要打开/关闭的通道号。

有关使用控制器的更多详细信息以及显示屏上出现的信息的说明, 请参阅“技术信息”部分。

### 紧急停止

#### 警告



在紧急情况下, 关闭机组和所有高压 通道, 关闭位于前面板上的主电源开关 (1)

当主开关关闭时, HV 单元关闭

## 维护

4UHV 板载控制器不需要任何维护。在系统上执行的任何工作都必须由授权人员执行。在系统上进行任何操作之前, 必须将其与电源断开连接。如果发生故障, 可以使用安捷伦维修服务。可通过安捷伦预先更换服务来替换控制器。控制器报废时, 必须按照国家具体标准进行处理。

#### 警告



在控制器上进行任何操作之前, 请先断开其电源。

## 清洁

出于安全原因，在清洁控制器之前。

- 关闭控制器。
- 从电源插座上拔下控制器电源插头。
- 断开所有电缆。
- 如果控制器外部变脏，请使用干燥的软布。

## 电磁兼容

### EN55011/CISPR11

**第1组 ISM 设备：**第1组包含所有 ISM 设备，其中包含有意生成和/或使用设备本身内部功能所必需的传导耦合射频能量。

**A类设备**是适用于除住宅和直接连接到为民用建筑物供电的低压供电网络的场所之外的所有场所的设备。

本设备符合 CISPR11第 1 组 A类辐射专业设备的要求。因此，由于传导干扰和辐射干扰，在其他环境中确保电磁兼容性可能存在潜在困难。

操作需满足以下两个条件：

- 该设备不会造成有害干扰。
- 该设备必须能够接受任何收到的干扰，其中包括可能导致意外操作的干扰。

如果此设备确实对无线电或电视接收造成有害干扰（可以通过关闭和打开设备来确定），建议用户尝试以下一种或多种措施：

- 确保使用合适的电缆将设备连接到外围设备。
- 未经 Agilent Technologies 明确批准的更改或修改可能会使用户操作该设备的授权无效。

### 韩国 A 类 EMC 声明

本设备为适合专业用途的 A 类设备，适用于家庭以外的电磁环境。

A 급 기기  
( 업무용 방송통신기자재 )

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### ICES/NMB-001

此 ISM 设备符合加拿大 ICES-001/NMB-001标准。



## 处置

标签中的“WEEE”徽标含义。

按照 EC WEEE（废电子电气设备）指令应用以下符号。

此符号（仅在欧盟国家有效）表示所适用产品不得与家庭或工业垃圾一起处置，必须送至专门废弃物回收系统。因此，欢迎最终用户联系设备供应商（无论是母公司还是零售商），在检查销售合同条款后启动回收和处置流程。



图 30 Logo "WEEE"

有关更多信息，请参考：

<http://www.agilent.com/environment/product/index.shtml>

## 服务

客户如需要后期的更换或维修服务，敬请联系当地经销商，或直接发送电子邮件至：

[vpt-customer@agilent.com](mailto:vpt-customer@agilent.com)

[vpl-customer@agilent.com](mailto:vpl-customer@agilent.com)

需要填写 "Request for Return" 表才能将泵退回到 Agilent 维修部门（在本手册末尾会提供）。

## 6

## 取扱説明書

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## この説明書について

### 有効期

本説明書には、特に安全、操作手順およびユーザーに必要なメンテナンス手順のみの簡易メンテナンスに関連する考え方を参考に、4UHV の使用方法をユーザーに説明します。

高度なメンテナンス（メンテナンス手順の個別訓練を受けた人員）に関連した各条項とあわせて、各セクションで説明するメンテナンス手順は、ユーザーは行わないでください。

正しい取付および始動/停止については、「Technical Information」セクションを参照してください。

#### 注

- 1 本説明書には、4UHV を使用する人員がすべて安全に使用でき、また機器使用寿命中に効率よく使用できるのに、役立つ情報が記載されています。
  - 2 本説明書は、関連するすべての刊行物とあわせて、オペレータ/メンテナンス要員に分かりやすい、取り扱いしやすい場所に保管してください。
-

## 定義と用語

### 警告・注意・注の定義

このマニュアルのいくつかの重要な参照部は、対比色でハイライトされ枠で囲ってあります。

#### 注意

「注意」のメッセージは、もし監視されていない場合に装置に損害が生じる可能性を示しています。

#### 警告



「警告」のメッセージは、もし正しく操作されない場合に、重大な人身障害につながる可能性がある特定の操作や実行への操作者の注意の必要性を示しています。

#### 注

「注」は、重要な情報への注意喚起と特定の工程に関してのより詳細な情報を提供しています。

## 警告の記号

下記は、4UHV 上の警告と併せて表示される記号のリストです。危険性の説明も記載されています。

三角の記号は警告を示しています。説明書内または装置上の警告記号と併に示される記号の意味は下記の通りです：



危険な電圧



包括的な危険



CE適合宣言書



製造所



CSA 認証



廃電気・電子製品に関するEU WEEE指令



中国RoHS 指令認証










UK CA 認証

取扱説明書

下記の記号は、装置に貼り付けられた警告ラベル上に使用されることがあります。もしこの記号を目視した場合、その警告ラベルに関する正しい工程のために、関連する操作またはサービスマニュアルを参照してください。



参考情報として、下記の記号は装置上に示されます。

	危険な電圧
	包括的な危険
	CE認証
	CSA 認証
	EU RoHS指令認証
	中国RoHS 指令認証
	廃電気・電子製品に関するEU WEEE指令
	UK CA 認証

## 安全性

このセクションは、一般的、かつ機械の特定の使用に関する安全規定の遵守と監督に必須である機械指令（Machinery Directive 2014/35/UE）の情報を含みます。

これらの指示とこのマニュアル内のその他の指示に従わなかった場合、設計時に予測された安全状態が非効率に損なわれ、機械を操作する者へ事故が生じる可能性があります。

アジレント・テクノロジー株式会社は、技術的な参照書に示された安全規定の不順守により派生した、機械または操作者もしくは第三者の身体的安全への損害・損傷の責任を全て拒否します。

### 適切な使用

このマニュアルは、装置一式が安全に機能するために遵守されるべき重要な警告と安全の手引きを含みます。

このマニュアルに説明されている製品は、説明書に特記されている分野への活用に限定した目的のものです。マニュアルはまた、製品の活用と操作に必須の要件に関する指示と標準の操作を保証するために適用される安全対策を提供します。アジレント・テクノロジー株式会社は、このマニュアル内説明されているもの以外の適用、または必須の要件や安全対策に注意が払われていない場合にいかなる保証も提供せず、またはいかなる責任も負いません。

製品は、損傷や怪我を生じさせない状況下において必要な安全対策を講じることができる有資格者のみ使用することができます。製品と供に使用されたいかなる付属品や機器も、アジレント・テクノロジー株式会社により共有もしくは承認されたものでなければなりません。

いかなる調整またはメンテナンスの操作は、リスクについて承知している専門家の技術者により実行されなければいけません。

製品の修理は、専らアジレント・テクノロジー株式会社により行われなければなりません。



## 不適切な使用

アジレント・テクノロジー株式会社は、4UHV の不適切な使用により派生した全ての責任を拒否します。

不適切な使用は、責任と保証への全ての請求権が喪失します。不適切な使用は下記の通り定義されます：

- 指定されていない取り付け器具を使用した装置の設置
- 凝縮環境での操作
- 指定範囲外の高湿度環境での操作
- ほこりの多い環境での操作
- 指定範囲外の供給電圧での動作
- 電離放射線がある場所での装置の操作
- 爆発の可能性がある場所での操作
- 衝撃のような圧力や振動、または断続的な力がデバイスに影響を与えるシステム下での装置の使用。
- 指定された範囲外の温度の環境での操作。

## 保護装具

コントローラを操作するオペレータの保護具は、実行する操作の種類に常に適している必要があります。さらに、機械が使用される国で施行されている法律の安全要件に準拠している必要があります。

コントローラの取り扱い中および設置中は、通常、オペレータは事故防止用の靴を着用する必要があります

### 警告

落下物による怪我の危険性。



真空コントローラーを手で運ぶ際に、荷物が滑って落下する危険性があります。

- コントローラーは両手で持ち運んでください。

**警告**



鋭い縁による損傷のリスク



コントローラーには非常に鋭いエッジがあります。



必要に応じて、指令 EN 420 に従った保護手袋を着用してください。

### イオンポンプコントローラーの安全ガイドライン

次の操作マニュアルに記載されているイオンポンプコントローラーは、内部コンポーネントの損傷のリスクを回避するために、ユーザーが開けないでください。

**警告**



装置の損傷と操作者の怪我を避けるために、このマニュアルに記載された取り付けの指示に厳密に従ってください！

## 运输及存储

コントローラーを輸送、保存する時は、下記の環境仕様を超過してはいけません：

- 温度範囲： -20 ° C から +70 ° C まで
- 相対湿度範囲： 0 から 95 % まで（結露なし）

## 製品説明

本装置は、業務用として使用することを目的としています。この装置を使用する前に、ユーザーはこの取扱説明書全部とAgilentから提供される追加情報を注意深く読む必要があります。Agilentは、ここに記載された全部または一部の使用説明の誤用や、訓練を受けていない者による装置の不適切な使用、許可されていない介入、特定の国の規則や規定に従わないことにより生じた損害について、一切の責任を負わないものとします。

以下の段落には、機器を使用する際に操作者の安全を保証するために必要なすべての情報が含まれています。

詳細については、「Technical information」の章を参照してください。

これ以降、「コントローラー」とは4UHVを指します。

## 取り付け

### 取り付けの準備

コントローラーは、特殊な保護梱包で提供されます。もしこの梱包に移送の間に生じた可能性のある破損が見受けられる場合、現地販売事務所に問い合わせてください。コントローラーの梱包を開ける際には、落とさない、またはいかなる形で衝撃を与えないようにしてください。不適切な方法で梱包材料を破棄しないでください。EEC指令94/62とそれに準ずる改正を遵守しています。

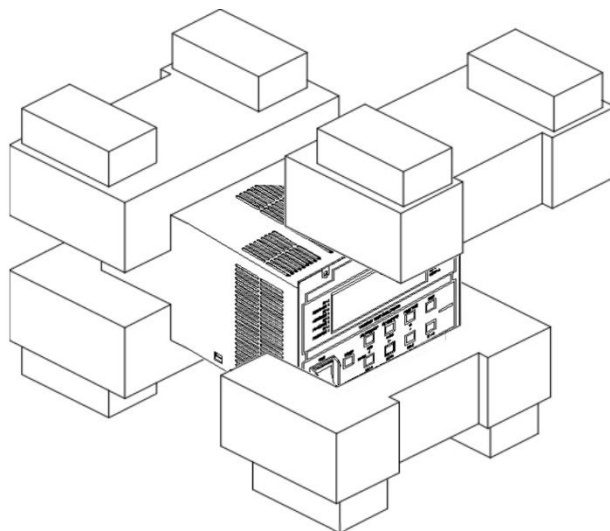


図 31 コントローラーの梱包

## セットアップ

### 警告



操作者の安全のため、**4UHV**（バージョン **100-240Vac**）コントローラーには、国際基準で承認されたプラグに接続された **3 線式電源ケーブル**を使用する必要があります。このケーブルとプラグは、電気ショックを防止し、**EC**規格の要件を満たすように、適切にアースされたソケットと一緒に使用してください。コントローラー内で発生する高電圧は、重傷または死亡を引き起こす可能性があります。本装置の電源を切った後、しばらくはコントローラー内に残留エネルギーが存在します。残留エネルギーが放散されたことを確認するため、約 **1 分間**お待ちください。

---

### 警告



コントローラーは、ライン電圧を簡単に遮断できるように設置する必要があります。

この装置をメーカーが指定していない方法で使用すると、装置が提供する保護機能が損なわれる可能性があります。

---

### 警告



**100-240 Vac** バージョンに関して。

電源コード: 電気配線用の正しいケーブルは、**3 線 (L+N+PE)** ケーブルです。

電線部は、少なくとも **AWG18, 0.83 mm<sup>2</sup>** である必要があります。

電源コード: 電気配線用の正しいケーブルは **3 線 (L+N+PE)** ケーブルです。

電線部は、少なくとも **AWG18, 0.83 mm<sup>2</sup>** である必要があります。

**PIN 1=** プラス コネクター

**PIN 2=** マイナス コネクター

**PIN 3=** 保護アース

---

注意

コントローラーは、デスクトップユニットまたはラックモジュールとして使用できます。いずれの場合においても、空気がカバーの換気スロットを通して自由に循環できるように配置する必要があります。

コントローラーをラックモジュールとして使用する場合は、ラック自体の中に落下しないように、**3** ラックの高さのアダプターに挿入する必要があります。コントローラの前面パネルは、ユニットの重さを支えるようには設計されていません。

空気中の物質（雨、雪、氷）にさらされる環境、ほこり、腐食性ガスの存在する環境、または引火性または爆発性の高い環境でコントローラーを設置または使用しないでください。

---

注意

コントローラーは、**EN 61010: 2010 AMD 1 (2017)** 規格で規定されている **2** 番目の設置カテゴリー（または過電圧）に属します。したがって、本装置は、このカテゴリーの要件を満たす電源ラインに接続する必要があります。

コントローラーには、入力/出力用およびシリアル通信用のコネクターがあり、電源が入っている部分にアクセスできないように外部回路に接続する必要があります。**EN 61010: 2010 AMD 1 (2017)** 規格で規定されているように、単一の障害状態の場合でも、コントローラーに接続された装置の絶縁が十分な絶縁を提供することを確認してください。

---

注

コントローラーをラックに取り付ける場合は、4つの脚を取り外して、上下に少なくとも 30 mm (1.2 インチ) の空間を確保して配置します。

---

注意

まれに、コントローラーの故障により煙が発生する場合があります。使用者がクリーンな環境でコントローラーを使用している場合は、最終的に発生する煙によって環境が汚染されないように、適切な対策を講じる必要があります。

---

コントローラーは、以下の環境条件で使用する必要があります：

- 温度： 0 °C ~ +40 °C
- 相対湿度： 0 – 90 % (結論なし)

## 4UHV の固定

このセクションでは、主要な操作手順について説明しています。

コントローラーを使用する前に、すべての電気接続を行い、接続されたポンプのマニュアルを参照してください。

### 警告



インターロックケーブルを備えた専用の高電圧ケーブルによってイオンポンプに接続されている場合にのみ、高電圧チャンネルをオンにします。

コントローラーは安全インターロック付きの高圧ケーブルと一緒に使用することを想定しています。

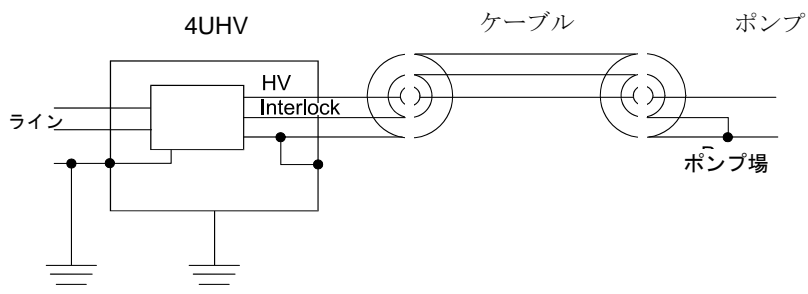


図 32 アース接続

### 注

インターロックなしの HV ケーブルを使用する場合、付属品バッグには、事前に組み立てられたインターロックリードの専用のキットが含まれています。ただし、このような使用方法では、インターロックによる安全機能が失われます。



インターロック付きHV ケーブルを使用しない場合における付属品バッグに含まれているインターロックケーブルの正しい組み立てについては、以下の図を参照してください。

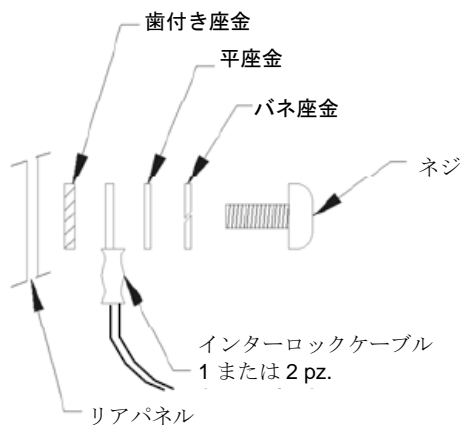


図 33

注

ケーブルインターロックはポンプのアースで閉じます。接続が中断されると、高電圧は無効になります。

コントローラーをポンプに接続するには、インターロック付きのHV ケーブルを使用します (注文可能な部品を参照してください)。

質量、コントローラーとポンプ間のHVケーブル、およびインターロックケーブルの正しい接続は、「アース接続」の図に示されています。

注意

付属品バッグに同梱されているインターロックケーブルを使用する場合は、コントローラー内部に部品が落下しないように注意してください。

## フロントパネルからの 4UHV コントローラの起動と操作 (LOCAL モード)

注

高電圧 (HV) をオンにするには、HV ケーブルのインターロック (ケーブルインターロック) を閉じる (コネクタが挿入される) 必要があります。

---

コントローラーに電力を供給し、高電圧 (HV) コネクタに電圧を印加するには、以下の手順に従います:

- 電源コードをリアパネルに接続します。
- コントローラーをオフにします。
- HVケーブルとHVケーブルのインターロックをリアパネルの関連するコネクタに接続します。
- 「MENU」から「MODE」を押して、「LOCAL」モードが有効になっていることを確認します。ボタンを順番に押します。
- HV-x (3, 4, 5, 6) ボタンを押しながら HV ON/OFF (2) ボタンを押したままにします。ここで、x はオン/オフを切り替えるチャンネルの番号です。

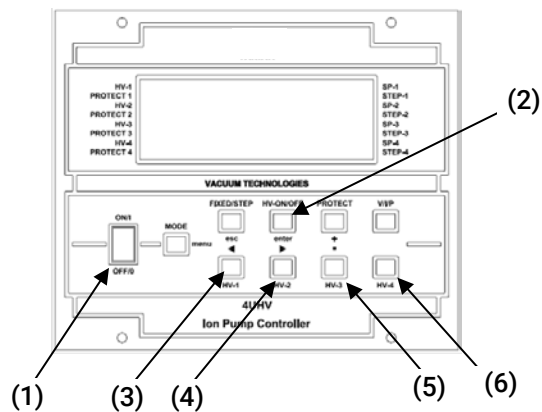


図 34 前面パネル 4UHV イオンポンプコントローラー

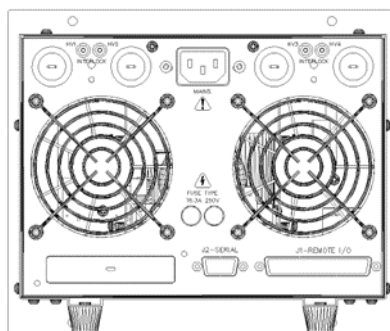


図 35 リアパネル 4UHV イオンポンプコントローラー

## 4UHV 操作停止

HVチャンネルをオフにするには：

- HV-x (3, 4, 5, 6) ボタンを押しながら HV ON/OFF (2) ボタンを押したままにします。ここで、x はオン/オフを切り替えるチャンネルの番号です。

コントローラーの使用方法与ディスプレイに表示される情報の説明については、「Technical Information - 技術情報」のセクションを参照してください。

### 緊急停止

#### 警告



緊急時にユニットとすべての高電圧チャンネルをオフにするには、フロントパネルにある主電源スイッチ (1) をオフにします。

メインスイッチをオフにすると、HV ユニットがオフになります。

## メンテナンス

4UHV オンボードはいかなるメンテナンスも必要としません。システムになされるいかなる作業も、認可された担当者により実行されなければなりません。

システムにいかなる操作を実行する前には、必ず電源を切断してください。もし故障が発生した場合は、Agilentの修理サービスを利用することもできます。交換用コントローラーは、Agilentを通じてアドバンスエクスチェンジをもとに入手できます。

もしポンプを廃棄する場合には、特定の国の規定に基づき廃棄されなければなりません。

#### 警告



コントローラー上にいかなる作業を実行する前には、電源から接続を断ってください。

## クリーニング

安全上の理由から、コントローラを掃除する前には：

- コントローラをオフにします。
- コントローラの電源プラグをコンセントから外します。
- すべてのケーブルから取り外します。
- コントローラの外側が汚れた場合は、乾いた柔らかい布を使用してください。

## 電磁両立性

### EN55011/CISPR11

**グループ 1 ISM 装置：**グループ 1 には、装置自体の内部機能に必要な伝導結合無線周波数エネルギーが意図的に生成および/または使用されるすべての ISM 装置が含まれます。

**クラスAの装置は、**家庭用以外のすべての施設、および家庭用の建物に供給する低電圧電源網に直接接続されている装置の使用に適している装置です。

この機器は、放射線業務用機器としてCISPR11、グループ1、クラスAの要件に適合しています。したがって、伝導および放射妨害により、他の環境での電磁両立性を確保することが困難な場合があります。

操作は以下2つの条件に従います：

- この機器は、有害な干渉を引き起こすことはありません。
- この機器は、望ましくない動作を引き起こす可能性のある干渉を含め、受信したすべての干渉を受け入れる必要があります。

この装置がラジオやテレビの受信に有害な干渉を引き起こす場合には（装置の電源を切ったり入れたりすることで判断できます）、使用者は以下の対策を1つ以上試すことを推奨します：

- 周辺機器との接続には、必ず適切なケーブルを使用してください。
- Agilent Technologies によって明示的に承認されていない変更または修正は、装置を操作する使用者の権限を無効にする可能性があります。

## 韓国クラス A EMC 宣言

この装置は、業務使用に適したクラス A であり、家庭外の電磁環境での使用を目的としています。

A 급 기기  
(업무용 방송통신기자재)

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

## ICES/NMB-001

この ISM 機器は、カナダの ICES-001/NMB-001に準拠しています。

## 処分

ラベルに記載の“WEEE” ロゴの意味。

下記の記号は、EC WEEE（電気電子機器廃棄物）指令にしたがって適用されます。

この記号（EC 諸国内のみで有効）は、この記号が適用される製品は、通常の家  
庭ゴミとあわせて処分してはいけないこと、また個別廃棄物回収システムに送付  
しなければならないことを表します。そのため、エンドユーザーは、親会社か小  
売業者かに関係なく、当該機器のサプライヤに連絡の上、契約上の販売条件の確  
認後、回収および処分プロセスを開始することが求められます。



図 36 Logo “WEEE”

詳細は、下記サイトを参照してください。

<http://www.agilent.com/environment/product/index.shtml>

## サービス

お客様が最新交換サービスまたは修理サービスが必要な場合は、現地代理店もしくは下記まで直接ご連絡ください：

[vpt-customer care@agilent.com](mailto:vpt-customer care@agilent.com)

[vpl-customer care@agilent.com](mailto:vpl-customer care@agilent.com)

サービスのために製品を Agilent に返送するには、「Request for Return」フォームに必要事項を記入する必要があります (このマニュアルの最後に記載されています)。



# 7

## Instructions for Use

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## About this manual

### Validity

This manual lists the instructions for the users of the 4UHV Ion Pump Controller, with particular reference to the notions relating to safety, operation and first level maintenance, limited to maintenance operations for which the user is responsible.

The maintenance operations, illustrated in the specific sections, with specific provisions relating to the higher level of maintenance (personnel specifically trained for maintenance operations) must not be carried out by the user.

For a correct installation and start/stop, please refer to "Technical Information" section.

#### NOTE

- 1 This manual contains useful information so that all personnel using the 4UHV can operate it safely and guarantee perfect efficiency, for its entire life span.
  - 2 Keep this manual, together with all the related publications, in an accessible place known to all operators/maintenance personnel.
-

## Definitions and terminology

### Definition of Caution, Warning and Note

Some important references of this manual are highlighted and framed in contrasting color.

---

#### CAUTION

Caution messages are displayed before procedures which, if not observed, could cause damage to the equipment.

---

#### WARNING



Warning messages draw the operator's attention to a specific procedure or practice which, if not performed correctly, could result in serious personal injury.

---

#### NOTE

Notes are intended to call attention to important information and provide more detail regarding specific steps.

---

## Warning Symbols

The following is a list of symbols that appear in conjunction with warnings on the 4UHV. The hazard they describe is also shown.

A triangular symbol indicates a warning. The meanings of the symbols that may appear alongside warnings in the documentation are as follows:



Dangerous voltages



Generic hazard



European Declaration  
of Conformity



Manufacturing Site



CSA certification



Waste Electrical and  
Electronic Equipment



RoHS China certification









UK CA certification

Instructions for Use

The following symbol may be used on warning labels attached to the instrument. When you see this symbol, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.



The following symbols appear on the instrument for your information.

	Dangerous voltages
	Generic hazard
	CE certification
	CSA certification
	RoHS China certification
	Waste Electrical and Electronic Equipment
	UK CA certification

# Safety

This section contains the information, prescribed by the Low voltage Directive 2014/35/UE, which is essential for the compliance and observance of the safety regulations both generally and in relation to the specific use of the product.

Failure to comply with these instructions and the other instructions contained in this manual may render the safety conditions envisaged in the design phase inefficient and cause accidents to those operating the product.

Agilent Technologies declines all responsibility for damage to the product or for the physical safety of the operator or third parties deriving from the non-observance of the safety rules indicated in the technical documentation.

## Proper use

This manual contains important warnings and safety instructions to be observed in order for the unit to work safely.

The product described in this manual is intended exclusively for the area of application specified in the instructions. The manual also provides indications regarding the essential requirements for the application and operation of the product as well as the safety measures that can be adopted to guarantee regular operation. Agilent Technologies does not provide any guarantee or assume any responsibility for applications other than those described in this manual or in which the essential requirements and safety measures are not respected.

The product must only be used by qualified personnel who are able to take the necessary safety measures under conditions that do not cause damage or injury. Any accessories and equipment used with the product must be supplied or approved by Agilent Technologies.

Any adjustment or maintenance operation must be performed by a professional technician informed about the risks.

Repairs on the product must be carried out exclusively by Agilent authorized personnel.

### Improper use

Agilent Technologies declines all responsibility, deriving from the improper use of the 4UHV.

Improper use will cause all claims for liability and warranties to be forfeited.

Improper use is defined as:

- installation of the device with unspecified mounting material
- operation in condensing environment
- operation in high humidity environment out of the specified range
- operation in dusty environment
- operation with supply voltages outside the specified range
- operation of the device in areas with ionizing radiation
- operation in potentially explosive areas
- use of the device in systems in which impact-like stress and vibrations or periodic forces affect the device.
- operation in environments with temperatures outside of the specified range.

### Protective equipment

The protective equipment of the operators who are operating on the controller must always be adequate for the type of operation being executed. Furthermore, it must comply with the safety requirements of the legislation in force in the country in which the machine is used.

In general, the operator must wear accident-prevention shoes while handling the controller and during installation.

#### **WARNING**

#### **Risk of injury through falling objects**



**When transporting vacuum controllers by hand, there is a danger through loads slipping and falling down.**

- Carry controllers two-handed.

### WARNING



Risk of injury through sharp edges



Controllers have very sharp edges.



- If necessary, wear protective gloves according to EN 420.
- 

### Ion pump controller safety guidelines

The Ion pump controllers as described in the following operating manual should not be opened by the user to avoid the risk of damaging internal components.

### WARNING



To avoid damage to equipment and to prevent injuries to operating personnel the installation instructions as given in this manual should be strictly followed!

---



### Transport & Storage

When transporting and storing the pump, the following environmental requirements should not be exceeded:

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

### Product Description

This equipment is intended for professional use. Prior to using this equipment the user must carefully read this Instruction Manual in its entirety and any additional information provided by Agilent. Agilent declines all responsibility for damage caused by the total or partial misuse of the instructions provided herein, by the improper use of the equipment by untrained personnel, by unauthorized interventions or by negligence in complying with any specific national rule or regulation.

The following sections provide you with all the information needed to guarantee the operator's safety when using the equipment.

Detailed information is provided in the appendix entitled "Technical Information".

## Installation

### Preparation for Installation

The controller comes in a special protective packaging; if there is any sign of damage that could have been caused during transportation, contact your local sales office immediately.

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

The packaging material is totally recyclable and complies with EEC directives 94/62 for the safeguard of the environment.

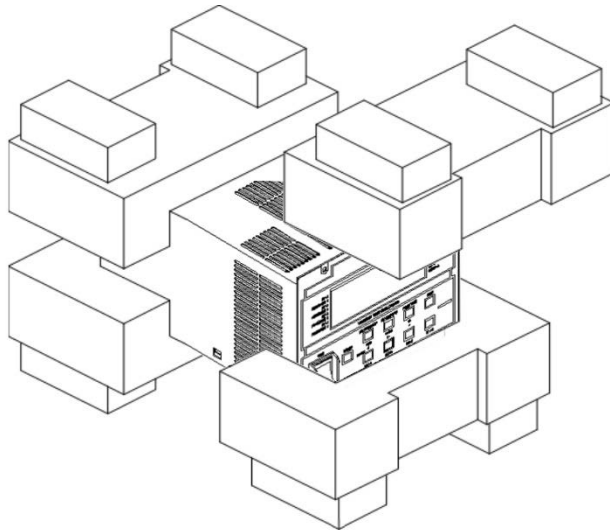


Figure 37 Controller Packaging

## Set-up

### WARNING



For the safety of the operator, the 4UHV (version 100-240Vac) controller must be powered with a 3-wire power cable connected to a plug approved at international level. Use this cable and plug together with an adequately earthed socket so as to prevent electrical shocks and satisfy the requirements of EC norms. The high voltages that develop in the controller can provoke serious injuries or death. After switching off the unit, residual energy is present inside the controller for some time. Wait approx. 1 minute to be sure that the residual energy has been dissipated.

---

### WARNING



The controller must be installed in a way that allows an easy interruption of the line voltage.  
If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

---

### WARNING



For 100-240 Vac version.  
Power supply cord: the correct cable for electrical wiring is a three wires cable (L+N+PE).  
Power supply cord: the correct cable for electrical wiring is three wires cable (L+N+PE).  
The Wire section has to be at least AWG18, 0.83 mm<sup>2</sup>  
PIN 1= Positive connector  
PIN 2= Negative Connector  
PIN 3= Protective Earth

---

### CAUTION

The controller can be used either as a desktop unit or as a rack module. In any case it must be positioned in a way that the air can circulate freely through the ventilation slots on the cover.

If the controller is used as a rack module, it **MUST** be inserted into a three-rack high adapter to prevent it from falling inside the rack itself. The controller front panel is not designed to support the weight of the unit.

Do not install or use the controller in an environment exposed to atmospheric agents (rain, snow, ice), in the presence of dust, corrosive gases or in a highly flammable or explosive environment.

---

### CAUTION

The controller belongs to the second installation category (or overvoltage) as provided for in normative EN 61010: 2010 AMD 1 (2017). Therefore, the device must be connected to a power supply line satisfying the requirements for this category.

The controller has connectors for inputs/outputs and for serial communications that must be connected to the external circuits in such a way that no powered part is accessible. Make sure that the insulation of the device connected to the controller provides an adequate insulation even in the case of a single fault condition as stipulated in the EN 61010: 2010 AMD 1 (2017) normative.

---

### NOTE

If the controller is installed in a rack, remove its four feet and place it leaving at least 30 mm (1.2 inches) of free space above and below.

---

### CAUTION

In rare circumstances, a controller fault could result in the emission of smoke. If the customer is using the controller in clean environments, they should take adequate measures to avoid the environment being contaminated by any eventual smoke.

---

The controller must be used in the following environmental conditions:

- Temperature: 0 °C to +40 °C
- Relative humidity: 0 – 90 % (non-condensing).

## Fixing the 4UHV Ion Pump Controller

This section provides you with the major operating procedures.

Before using the controller, perform all electrical connections and refer to the manual of the connected pump.

### WARNING



Switch on the high voltage channel only if it is connected to the Ion pump by means of the special purpose high voltage cables equipped with interlock cable.

It is assumed that the controller will be used together with the high voltage cable having a safety interlock.

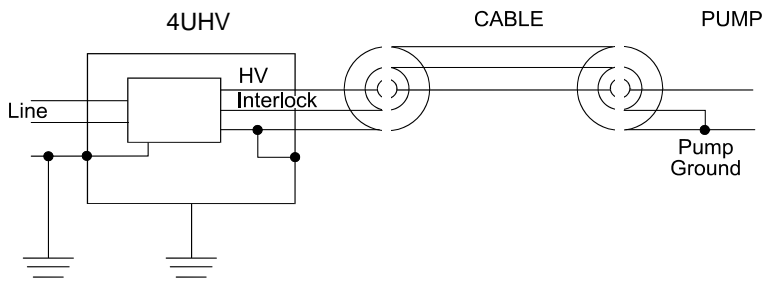


Figure 38 Ground Connections

### NOTE

If an HV cable without interlock is to be used, the accessories bag contains a specific kit of preassembled interlock lead. However, with this type of use, the safety capability furnished using the interlock is lost.

Refer to the figure below for correct assembly of the interlock cable furnished in the accessories bag in the case in which an HV cable with interlock is not used.

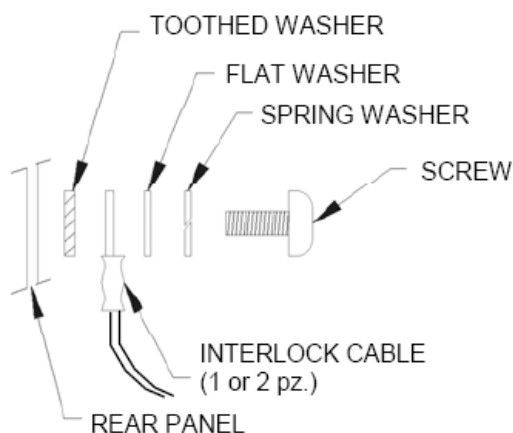


Figure 39

### NOTE

The cable interlock closes on pump ground. The high voltage is disabled if the connection is interrupted.

To connect the controller to the pump, use a HV cable with interlock (see parts that can be ordered).

Correct connection of masses, of the HV cable between the controller and pump and of the interlock cable is illustrated in the "Ground Connections" figure.

### CAUTION

**When using the interlock cable furnished in the accessories bag, make sure that no parts drop accidentally inside the controller.**

## Startup and Operation of the 4UHV Ion Pump Controller from the Front Panel (LOCAL Mode)

**NOTE**

To switch on the High Voltage (HV), the interlock of the HV cable (cable interlock) must be closed (connector inserted).

---

Proceed as follows to power the controller and apply voltage to the high voltage (HV) connectors:

- Connect the power cord to the rear panel
- Switch off the controller.
- Connect the HV cable and the interlock of the HV cable in the related connectors on the rear panel.
- Verify that the LOCAL mode is enabled, by pressing "MENU" then "MODE" push button in sequence.
- Hold down the HV ON/OFF button (2) while pressing the HV-x (3,4,5,6) button where x is the number of the channel to be switched on/off.

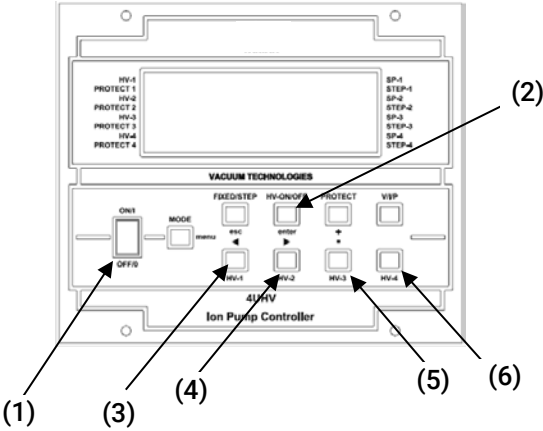


Figure 40 Front Panel 4UHV Ion Pump Controller

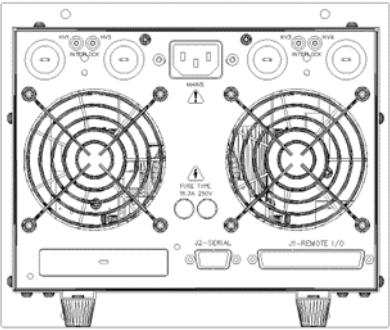


Figure 41 Rear Panel 4UHV Ion Pump Controller



## 4UHV Ion Pump Controller Shutdown

To switch off the HV channels:

- Hold down the HV ON/OFF (2) button while pressing the HV-x (3, 4, 5, 6) button where x is the number of the channel to be switched on/off.

For further details on using the controller and for a description of the information appearing on the display, refer to the section “Technical Information”.

### Emergency Stop

#### WARNING



**In situations of emergency, to switch off the unit and all the high voltage channels, turn off the main power switch (1) situated on the front panel.**

**When the main switch is turned off, the HV unit is switched off.**

---

## Maintenance

The 4UHV Ion Pump Controller does not require any maintenance. Any form of servicing on the unit must be performed by authorized personnel.

If servicing is needed, contact Agilent Technical Support or subscribe to the “Agilent Advanced Exchange Service” where the faulty controller is replaced by a refurbished one.

If the controller needs to be scrapped, proceed to do so in compliance with the specific national norms.

#### WARNING



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

---

## Cleaning

For safety reasons, before cleaning the controller:

- turn the controller off;
- disconnect the controller power plug from the electrical outlet
- disconnect all cables.
- if the exterior of the controller becomes dirty, use a dry soft cloth.

## Electromagnetic Compatibility

### EN55011/CISPR11

**Group 1 ISM equipment:** Group 1 contains all ISM equipment in which there is intentionally generated and/or used conductively coupled radio-frequency energy which is necessary for the internal functioning of the equipment itself.

**Class A equipment** is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

This device complies with the requirements of CISPR11, Group 1, Class A as radiation professional equipment. Therefore, there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbance.

Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

- Make sure that appropriate cables are used to connect the device to peripheral equipment.
- Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

### South Korean Class A EMC declaration

This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

A 급 기기  
( 업무용 방송통신기자재 )

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### ICES/NMB-001

This ISM device complies with Canadian ICES-001/NMB-001.

## 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.



**Figure 42 Logo "WEEE"**

For more information refer to:

<http://www.agilent.com/environment/product/index.shtml>

## Service

Should a customer need an advanced exchange or repair service, please contact local distributor or directly e-mail to:

[vpt-customer care@agilent.com](mailto:vpt-customer care@agilent.com)

[vpl-customer care@agilent.com](mailto:vpl-customer care@agilent.com)

Completion of the "Request for Return" form is required to return your product to Agilent for service (provided at the end of this manual).

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## 4UHV Ion Pump Controller Description

The 4UHV Ion Pump Controller is a power supply for Ion pumps. It supplies a high voltage on output, selectable as 3 kV, 5 kV or 7 kV, and measures the output current.

The 4UHV Ion Pump Controller models are:

8299010	4UHV with 1 channel 200 W Negative with profibus interface
8299011	4UHV with 1 channel 200 W Positive with profibus interface
8299020	4UHV with 2 channels 200 W Negative with profibus interface
8299021	4UHV with 2 channels 200 W Positive with profibus interface
8299100	4UHV with 1 channel 120 W Negative with profibus interface
8299101	4UHV with 1 channel 120 W Positive with profibus interface
8299200	4UHV with 2 channels 80 W Negative with profibus interface
8299201	4UHV with 2 channels 80 W Positive with profibus interface
8299400	4UHV with 4 channels 80 W Negative with profibus interface
8299401	4UHV with 4 channels 80 W Positive with profibus interface
8299210	4UHV with 2 channels 80 W Negative + 1 channel 200 W Negative with profibus interface
8299211	4UHV with 2 channels 80W Positive + 1 channel 200 W Positive with profibus interface
8299022	4UHV with 1 channel 200 W Positive + 1 channel 200 W Negative with profibus interface
8299402	4UHV with 2 channels 80 W Positive + 2 channels 80 W Negative with profibus interface
8299212	4UHV with 2 channels 80 W Positive + 1 channel 200 W Negative with profibus interface
8299213	4UHV with 2 channels 80 W Negative + 1 channel 200 W Positive with profibus interface
9299010	4UHV with 1 channel 200 W Negative
9299011	4UHV with 1 channel 200 W Positive
9299020	4UHV with 2 channels 200 W Negative
9299021	4UHV with 2 channels 200 W Positive
9299100	4UHV with 1 channel 120 W Negative
9299101	4UHV with 1 channel 120 W Positive



## Technical Information

9299200	4UHV with 2 channels 80 W Negative
9299201	4UHV with 2 channels 80 W Positive
9299400	4UHV with 4 channels 80 W Negative
9299401	4UHV with 4 channels 80 W Positive
9299210	4UHV with 2 channels 80 W Negative + 1 channel 200 W Negative
9299211	4UHV with 2 channels 80W Positive + 1 channel 200 W Positive
9299022	4UHV with 1 channel 200 W Positive + 1 channel 200 W Negative
9299402	4UHV with 2 channels 80 W Positive + 2 channels 80 W Negative
9299212	4UHV with 2 channels 80 W Positive + 1 channel 200 W Negative
9299213	4UHV with 2 channels 80 W Negative + 1 channel 200 W Positive

The controller has the following features:

- Front panel with keypad and a 4-row display (4x20, 146 x 62 mm) for displaying the operating values (voltage, current, pressure)
- Remote I/O card with DB37 connector
- RS232 and RS485 serial communication or profibus option.

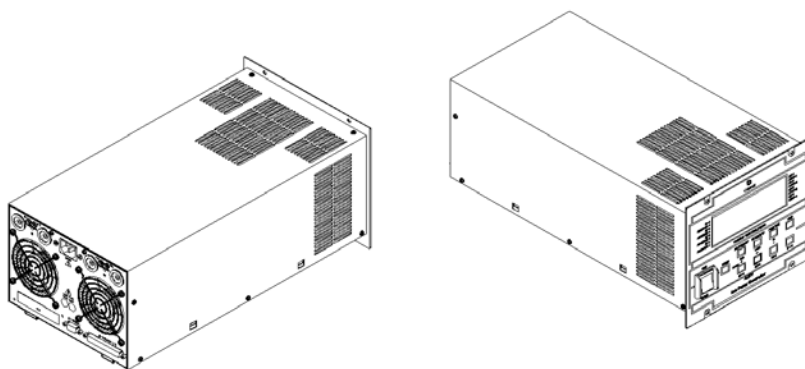


Figure 43 4UHV Ion Pump Controller

## Technical Information

The controller contains one or two high voltage modules.

Each high voltage module can have one 200 W channel or one 120 W channel or two 80 W channels.

Some examples of how HV channels can be configured are given below (for details see the following table):

- Four independent channels with a maximum of 80 W power per channel
- Two independent channels with a maximum of 200 W power per channel
- One 200 W channel and two 80 W channels.
- One 120 W channel.

The 4UHV Ion Pump Controller can be operated in the modes: LOCAL, SERIAL or REMOTE.

## Technical Specifications

The 4UHV Controller is for internal use only.

**Table 1 Technical Specifications**

Component	Description
Input Voltage	100 - 240 Vac (+/-10 %)
Input Frequency	50/60 Hz
Input Power	600 VA
Output HV Voltage	+/- 7000 Vdc +/- 5 %
Output HV Short circuit current	40 mA (for 80 W channels) 100 mA (for 200 W channels)
Output HV Power max	200 W or 80 W each channel
Operating temperature	0 °C to 40 °C
Storage temperature	-20 °C to +70 °C
Fuse	5x20 T6.3A 250 V
Voltage measurement	Resolution 100 V
Current measurement	Measurement range: 10 nA to 100 mA, logarithmic scale Resolution : 2 digit of the mantissa (maximum 10 nA) Accuracy: +/- 6 %
Weight	6.5 kg
Compliance with:	EN 61010: 2010 AMD 1 (2017): Safety requirements for electrical equipment for measurement control and laboratory use. EN 61326-1 2013: Electrical equipment for measurement control and laboratory use EMC requirements
Installation category	II
Max altitude	2000 m
Pollution degree	2
Internal use only	

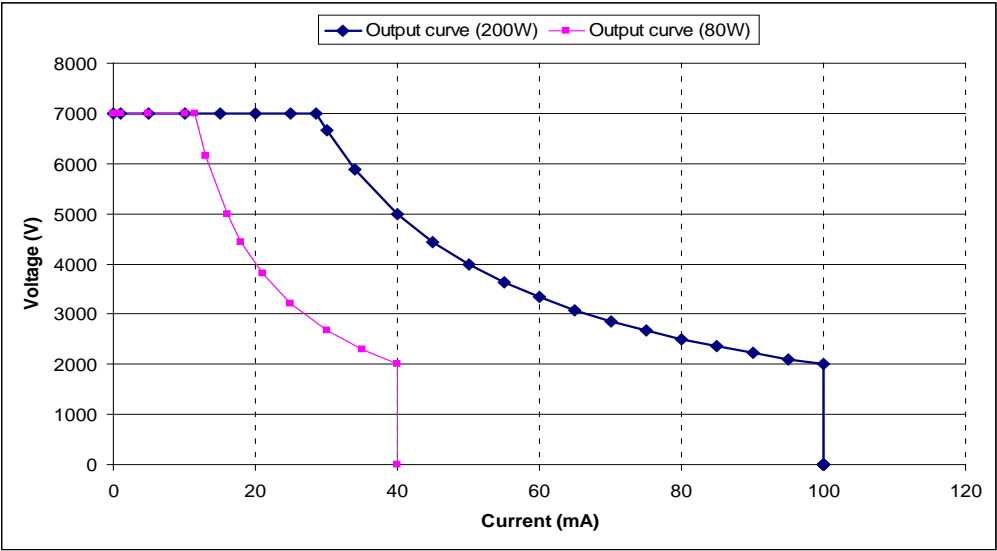


Figure 44 Output voltage vs Output current

## Controller Outline

The outline dimensions for the 4UHV Ion Pump Controller are shown in the following figures:

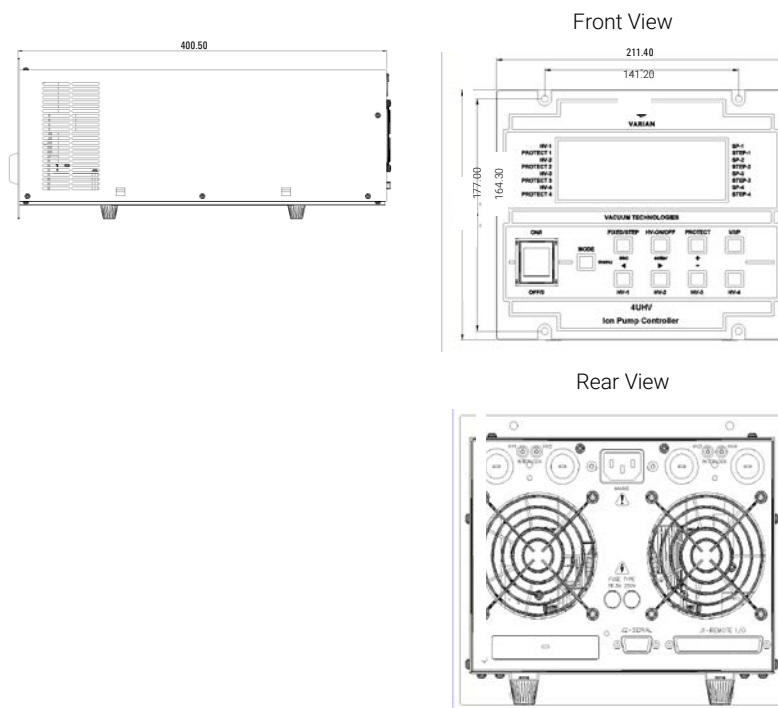


Figure 45 Controller Model Dimensions

Front Panel Description

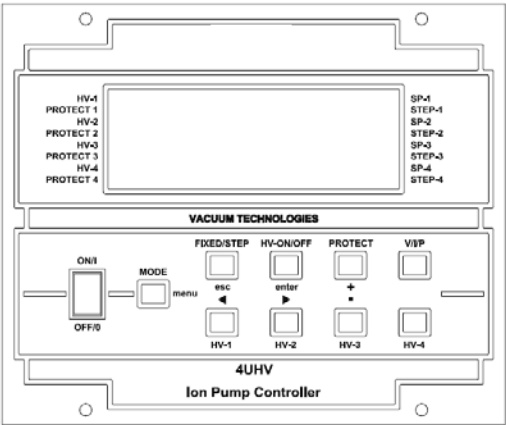


Figure 46 Front Panel

Keys

Table 2 Keys

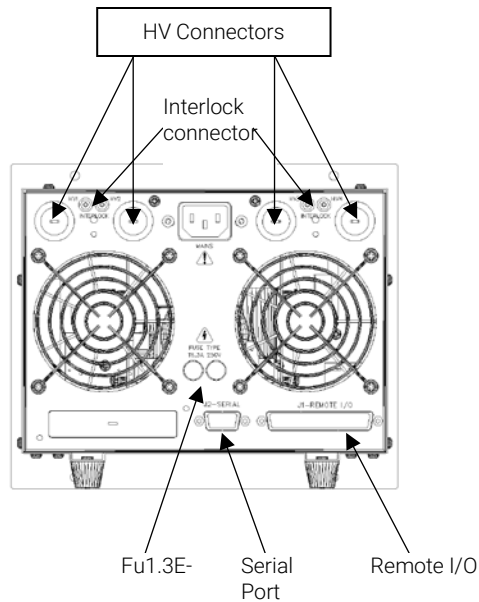
Key	Description
Main Power	This is the main switch for switching on and off the controller.
HV-ON/OFF	To switch a high voltage channel on or off, keep the HV-ON/OFF key pressed while you press the HV-x key, where x is the number of the channel you want to switch on or off.
Fixed/Step	To change the output voltage choosing between: 7 kV, 5 kV, 3 kV, Step-Mode and Fixed-Mode, keep the Fixed/Step key pressed while you press the HV-x key, where x is the number of the channel for which you want to change the output voltage. The output voltage will change cyclically between "STEP, 7 kV, 5 kV, 3 kV".
Protect	To activate or disactivate Protect mode, keep the Protect key pressed while you press the HV-x key, where x is the number of channel for which you want to activate or disactivate the "Protect" functionality.
Mode	By pressing this key briefly (< 2 sec), the "operating mode" changes cyclically between: Serial, Front, Remote. You exit from this display automatically after 5 seconds. By keeping this key pressed for a long time (> 2 sec), you enter the menu. To exit from the menu, press the Mode key again for a long time.

### Graphic Signals

Four black squares are present for each channel indicating, respectively, the 4 states of the channel. The meaning of the 4 indicators is the following:

- 1. HV-x
  - Solid mark = HV on
  - Without mark = HV off
  - Blinking mark = Error
- 2. Protect-x
  - Solid mark = Protect on
  - Without mark = Protect off
  - Blinking mark = Protect error
- 3. SP-x
  - Solid mark = Set Point activate
  - Without mark = Set Point not active
- 4. Step-x
  - Solid mark = Step
  - Without mark = Fixed

## Rear Panel Description



**Figure 47 Rear Panel**

The following are present on the rear panel:

- The HV connectors (1, 2, 3 or 4 according to model)
- The interlock connectors associated to each channel
- The fuses
- The DB9 connector for RS232 and RS485 serial communication
- The DB37 connector for Remote I/O signals.



## Technical Information

### Fuse Holder

The following figure shows the location of this assembly.

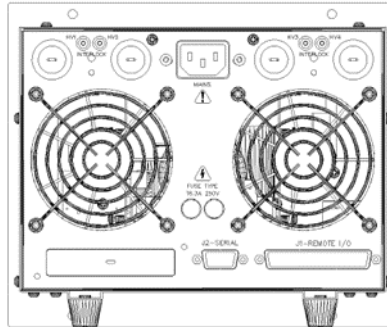


Figure 48

Proceed as follows to replace one or both fuses:

- 1 Disconnect the mains cable.
- 2 Waiting for 15 second.
- 3 Remove the fuse with a small screwdriver.
- 4 Replace the fuse.
- 5 Use only 5x20 T6.3 A 250 V fuses.

### Interlock connection

In order to guarantee a proper working of the interlock connection, the user must take care that the total resistance between the ground controller and the input of the interlock cable (connected to the ion pump) is less than 400 Ohm.

## Procedure to Connect the Serial and I/O ports to an External Cable

In the following picture, it has showed the right procedure to connect a cable to the I/O or to the serial port. A shielded cable of 30 m maximum length has to be utilized for both serial and I/O port connection.

**NOTE**

Take care to have a good contact between the metallic case and the external shield of the wire. Moreover, this operation should be done at least on the controller side.

The I/O and communication terminal provided at the equipment are only required to be connected with external circuits which are separated from hazardous live voltages by reinforced or double insulation.

In this way, you will be sure to reduce the influence of the external noise and to accomplish the EMC requests. In picture d is showed the cable assembled.

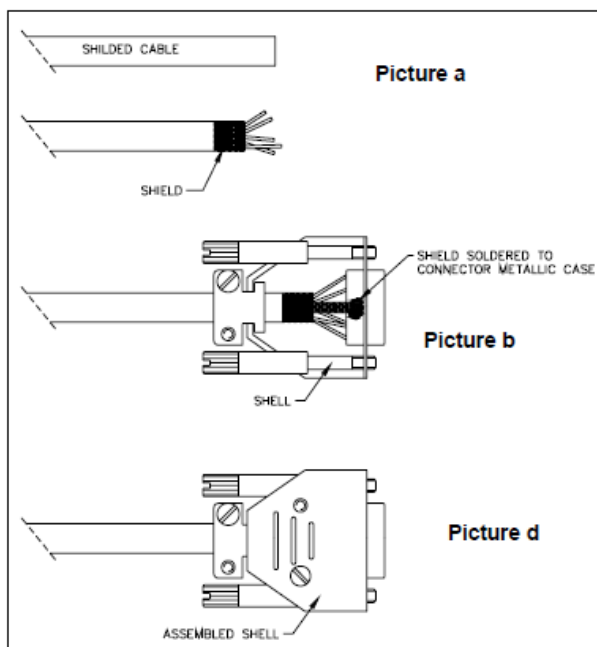


Figure 49

## Operating Mode

The controller 4UHV for Ion pumps can be operated in three different modes:

- Local
- Serial
- Remote.

The commands sent to the controller (for example, HVON/OFF, Target voltage etc.) can only be given in the mode chosen, while the data (for example, current, pressure, voltage etc.) can be read in all the modes.

E.g.: If you select Local mode, the HV channels can only be switched on via the keys on the Front Panel, but the current supplied can be read via the Front Panel, Serial and Remote.

Change from one mode to the next can be done either via the Front Panel or a serial command.

### NOTE

Change from one mode to another can be done with the high voltage switched on. However, the channels switch off if Remote mode is selected but no commands for switching on are present on the remote connector.

---

## Start-Up

This chapter explains how to switch on and off the unit and the high voltage channels. In the following chapters, all the functions of the controller are explained in detail.

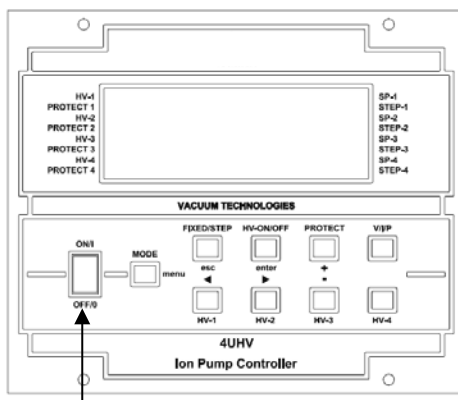
- 1 Make sure that the main power switch on the front panel is in OFF position.
- 2 Insert the power cord into its socket.
- 3 Connect the HV cable to the controller rear panel and to the Ion pump.
- 4 Make sure that the “interlock” of the HV cable is connected; in case a HV cable is used, please refer to the warning at the “usage” paragraph.
- 5 To switch on the unit, put the main power switch to ON position.
- 6 Press MODE key on the front panel to select the mode of operation FRONT/SERIAL/REMOTE.
- 7 To enable the high voltage: while pressing the key HV-x, where x corresponds to the HV channel, press the key HV-ON/OFF.

### Selecting “Operating Mode” from Front Panel

To display the current mode, press the Mode key briefly (less than 2 seconds).

To change mode, press the Mode key again. The three modes will be displayed in a cyclic fashion: Local, Serial, Remote.

After selecting the required mode, wait approximately 5 seconds to return to the previous screen.



Main power switch

Figure 50

## Functions

### Step-mode / Fixed mode

The high voltage provided to an Ion pump can change from 3kV up to 7kV.

The user can set the Fixed mode with the voltage of 3kV or 5kV or 7kV using the front panel or through the serial commands or through the remote I/O.

In order to optimize the pumping speed of the Ion pump and to minimize the influence of the leakage current, the controller implements the Step-mode function. With this function the controller provides 7kV for about 5 seconds, then it changes the voltage among 3 – 5 – 7 kV depending on the current drawn by the ion pump and on the ion pump type.

To change from step to fixed voltage and viceversa: while pressing the key FIXED/STEP, press the HV-x, where x corresponds to the HV channel, and select 3 – 5 – 7 KV.

When the STEP I active, a square is visible on the display, corresponding to the relative HV channel.

**Table 3**

Pump Type	Current for switching from 7kV to 5kV	Current for switching from 5kV to 3kV
1000 Diode	7.3E-4	2.0E-5A
500 diode	1.4E-3 A	3.9E-5 A
300 diode	7.2E-4 A	2.1E-5 A
150 diode	3.6E-4 A	9.5E-6 A
75-55-40 diode	2.2E-4 A	6.7E-6 A
20 diode	2.0E-4 A	2.7E-6 A
10 diode	2.0E-5 A	6.0E-6 A
1000 Starcell	3.6E-3A	9.8E-5A
800 StarCel	2.0E-3A	5.0E-5A
500 StarCell	9.0E-4 A	2.5E-5 A
300 StarCell	5.5E-4 A	1.6E-5 A
150 StarCell	3.0E-4 A	8.5E-6 A
75-55-40 StarCell	1.3E-4 A	3.8E-6 A
20 StarCell	6.5E-5 A	1.9E-6 A

### Protect

The protect function is useful to avoid damages in the Ion pump due to the overcurrent.

If this function is enabled, the controller waits 60 seconds from the HV ON, then it begins to check the current provided. If the current exceeds the threshold in the following table, the HV channel turns off and the controller gives the "Protect Error".

This kind of error is not a controller error but it is only a warning, informing that the HV channel is turned off because the protect current threshold was exceeded.

To enable/disable the protect function: while pressing the key HV-x, where x corresponds to the HV channel, press the key PROTECT.

When the function is enabled, a square is visible on the display, corresponding to the relative HV channel.

**Table 4**

Pump type	Protect current
1000 Diode	100
500 Diode	100
300 Diode	50
200 Diode	50
150 Diode	30
75-55-10 Diode	10
20 Diode	5
10 Diode	5
2 Diode	0.2
0.2 Diode	0.1
75-55-45 SEM	10
35-25 SEM	5
10 SEM	5
1000 StarCell	100
800 StarCell	100
500 StarCell	100
300 StarCell	50
200 StarCell	50
150 StarCell	30
75-55-40 StarCell	10
20 StarCell	5

## Device Number

**Table 5** Pump type Device number

Pump type	Device number
Spare	0
<b>Negative Pumps</b>	
1000 StarCell	18
800 Starcell	17
500 StarCell	1
300 StarCell	2
200 StarCell	16
150 StarCell	3
75-55-40 StarCell	4
20 StarCell	5
<b>Positive Pumps</b>	
1000 Diode	19
500 diode	6
300 diode	7
200 diode	15
150 diode	8
75-55-40 diode	9
20 diode	10
10 diode	11
75 Sem	12
25 Sem	13
10 Sem	14

## Spare Pump

### How to select the Ion pump

- 1 Press MODE for at least 3 seconds to enter the programming menu.
- 2 Press the key " – " to select HVx, where x corresponds to the HV channel.
- 3 Press the key ENTER.
- 4 Press the key " – " to select the pump.
- 5 Press the key ENTER.
- 6 Press the key ESC to exit.
- 7 Press the key MODE for 3 seconds to exit the programming menu, otherwise after 5 seconds of inactivity, the unit exits form programming menu automatically.

### How to work with non Agilent pump

Select the pump SPARE, in pump selection menu (see above).

- 1 Press MODE for at least 3 seconds to enter the programming menu.
- 2 Press the key " – " to select HVx, where x corresponds to the HV channel.
- 3 Press the key ENTER.
- 4 Press the key " – " to select the pump SPARE.
- 5 Pressure values are required, at 100 nA, 10  $\mu$ A, 10 mA and 400 mA.
- 6 Press the key MODE for 3 seconds to exit the programming menu, otherwise after 5 seconds of inactivity, the unit exits form programming menu automatically.
- 7 Make sure that the interlock is connected; refer to to the warning at the "Fixing the 4UHV Ion Pump Controller" paragraph.



## Set Point

The controller has 4 relays (relay A, relay B, relay C, relay D) and they can be configured as Set Points.

### Set Point configuration

You can configure the four relays to operate with any channels.

Example 1 (default configuration): one relay for each channel.

Relay A  $\square$  channel 1; Relay B  $\square$  channel 2; Relay C  $\square$  channel 3; Relay D  $\square$  channel 4.

Example 2: two relays for one channel.

Relay A  $\square$  channel 1; Relay B  $\square$  channel 1 ; Relay C  $\square$  channel 3; Relay D  $\square$  channel 3.

Example 3: all relays for only one channel (e.g. channel 2).

Relay A  $\square$  channel 2; Relay B  $\square$  channel 2; Relay C  $\square$  channel 2; Relay D  $\square$  channel 2.

All these configurations can be set by front panel menu.

To access the Set Point configuration:

- 1** Press MODE for at least 3 seconds to enter the programming menu.
- 2** Press ENTER to access the GENERAL CONFIGURATION menu.
- 3** The arrow key to scroll the menu until Set Point, press ENTER.
- 4** Use the “ – ” key to increase/decrease the Set Point value; press the arrow to move the square through the line.
- 5** It's possible to set the Set Point either related to current or to pressure.
- 6** Press the key MODE for 3 seconds to exit the programming menu, otherwise after 5 seconds of inactivity, the unit exits form programming menu automatically.

### Description

The microprocessor begins to drive the relays about 10 seconds after reaching the target voltage (this behaviour is in order to avoid wrong activations due to voltage ramping).

The threshold of the Set Point has a hysteresis of 5%.

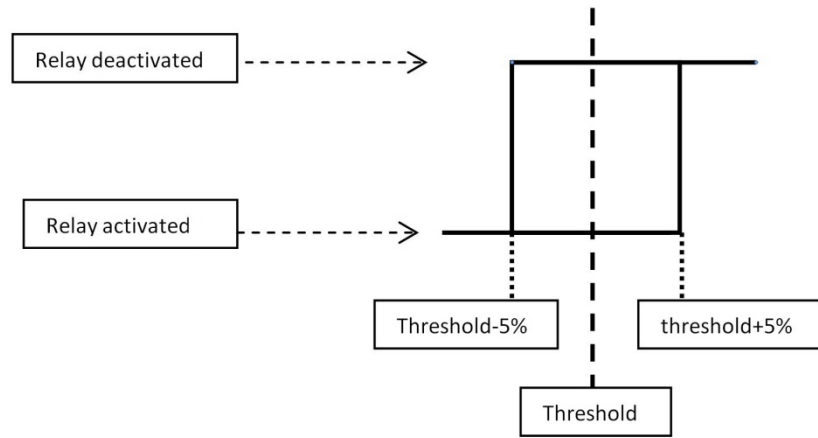


Figure 51

### Autostart

This function allows to restore the high voltage output when the main power supply is restored after a fail.

If the Autostart is enabled:

- If the HV channel is in ON status and the main power supply fails, when the supply is restored the HV channel automatically turns on.
- If the HV channel is in OFF status and the main power supply fails, when the supply is restored the HV channel stays in OFF.

If the Autostart is disabled:

- The HV channel returns always OFF after that the main power fails.

## Technical Information

### Fan configuration

If you select “Always ON” in the menu configuration (configure – general – fan ), the two cooling fan in the rear panel are always switched ON.

If you select “Threshold” the two cooling fan are switched OFF if the output current of each HV channel is below of the 1mA.

### Reset standard settings

If “yes” is selected, the settings are restored to the standard unit configuration.

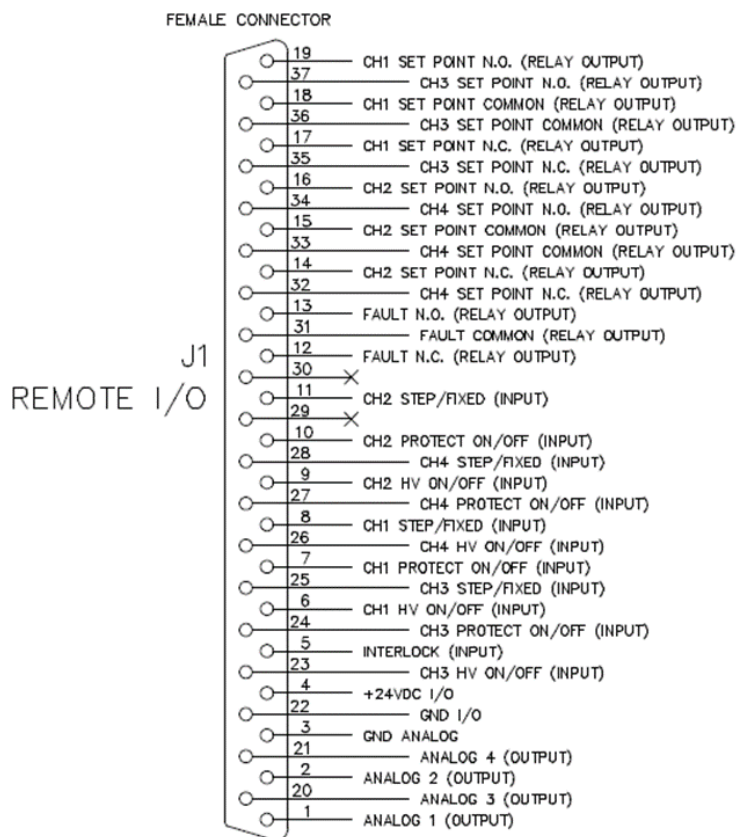


Figure 52 I/O Pin out

## Technical Information

**Table 6**

Component	Description
<b>Remote I/O Signal Listing</b>	
Pin 4	Not used
Pin 5	Not used
<b>Fault</b>	A unique fault relay for all channels and for all errors.
Pin 12	NC Fault Relay
Pin 13	NO Fault Relay
Pin 31	Common Fault Relay
<b>Channel 1</b>	
Input	
Pin 6	CH1 on/off
Pin 7	CH1 protect
Pin 8	CH1 step
Pin 22	Digital Gnd
Analog Output	
Pin 1	Analog 1
Pin 3	Analog Gnd
Digital Output	
Pin 17	CH1 NC Set Point Relay
Pin 18	CH1 (Common) Relay
Pin 19	CH1 NO Set Point Relay
<b>Channel 2</b>	
Input	
Pin 9	CH2 on/off
Pin 10	CH2 protect
Pin 11	CH2 step
Pin 22	Digital Gnd
Analog Output	
Pin 2	Analog 2
Pin 3	Analog Gnd
Digital Output	

## Technical Information

Component	Description
Pin 14	CH2 NC Set Point Relay
Pin 15	CH2 (Common) Relay
Pin 16	CH2 NO Set Point Relay
<b>Channel 3</b>	
Input	
Pin 23	CH3 on/off
Pin 24	CH3 protect
Pin 25	CH3 step
Pin 22	Digital Gnd
Analog Output	
Pin 20	Analog 3
Pin 3	Analog Gnd
Digital Output	
Pin 35	CH3 NC Set Point Relay
Pin 36	CH3 (Common) Relay
Pin 37	CH3 NO Set Point Relay
<b>Channel 4</b>	
Input	
Pin 26	CH4 on/off
Pin 27	CH4 protect
Pin 28	CH4 step
Pin 22	Digital Gnd
Analog Output	
Pin 21	Analog 4
Pin 3	Analog Gnd
Digital Output	
Pin 32	CH4 NC Set Point Relay
Pin 33	CH4 (Common) Relay
Pin 34	CH4 NO Set Point Relay

Technical Information

Table 7 Input/Output Electrical Specification

I/O Ratings				
I/O Type	ON	OFF	Max Load	Note
Input Digital	V < 12V I > 2.25mA	Input Digital		
Analog Output range			1mA	0-5V when proportional to pressure 0-10V when proportional to current
Output Relay				24V , 1A max
+24 Vdc				24V +/- 10% - 60mA max

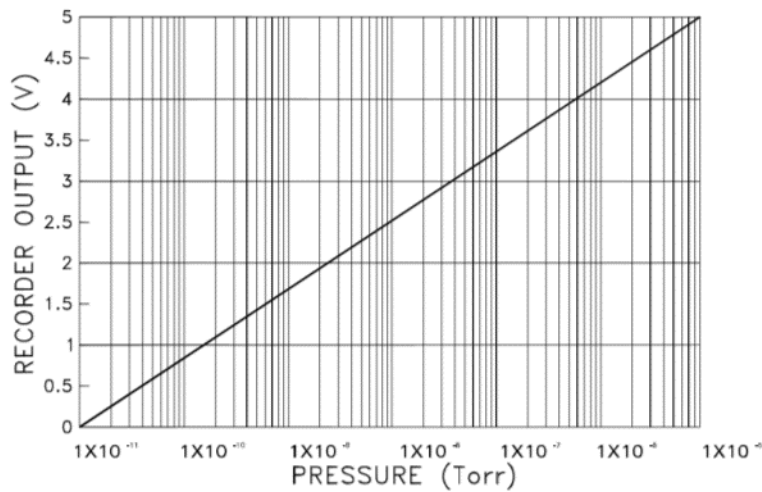


Figure 53 Recorder Output Pressure

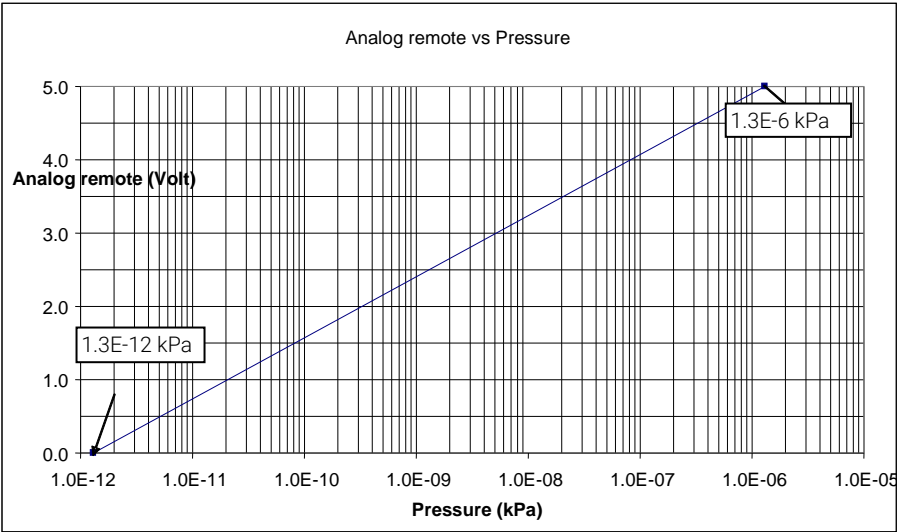


Figure 54 Analog remote vs Pressure (kPa)

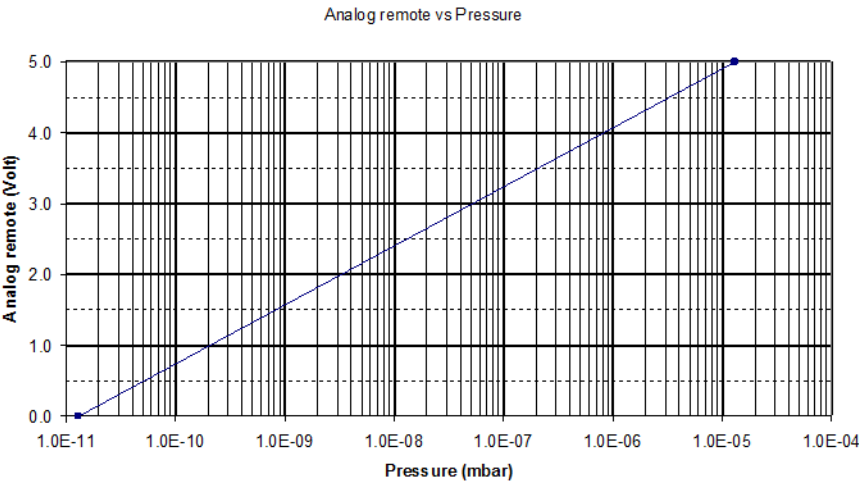


Figure 55 Analog remote vs Pressure (mbar)

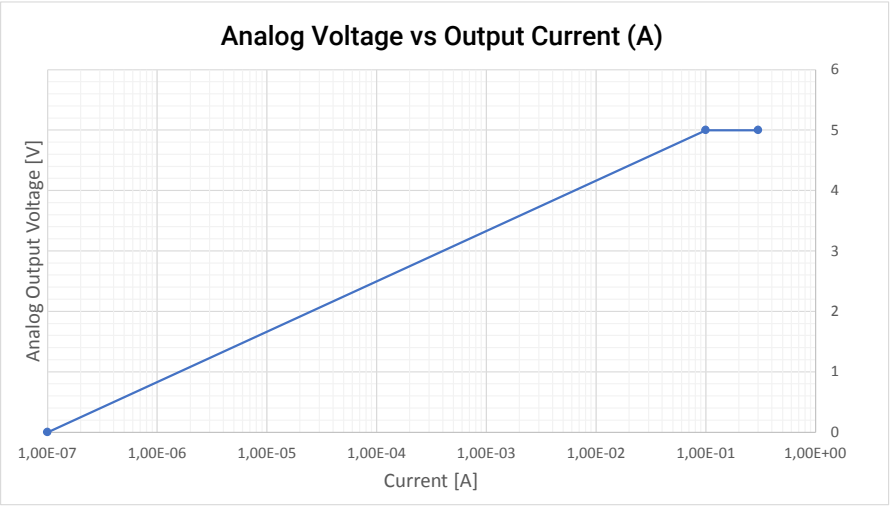


Figure 56 Analog Voltage vs Output Current (A)



## How to set the Analog signal

- 1 Press MODE for at least 3 seconds to enter the programming menu.
- 2 Press ENTER to enter the GENERAL configuration menu.
- 3 Use the arrow to scroll through the menu.
- 4 Press ENTER to make changes.
- 5 Use the key " + " or " - " to change the value; use the arrow to move the square through the line; it's possible to set the analog signal either proportional to current or to pressure.
- 6 Press the key MODE for 3 seconds to exit the programming menu, otherwise after 5 seconds of inactivity, the unit exits form programming menu automatically.

## Connection of Input Remote

In order to activate the inputs remote (CH on/off, Ch protect, CH Step) connect the pins as following.

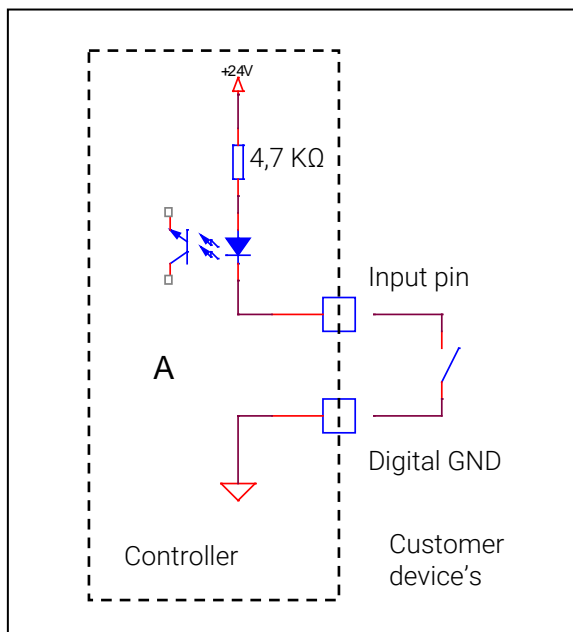
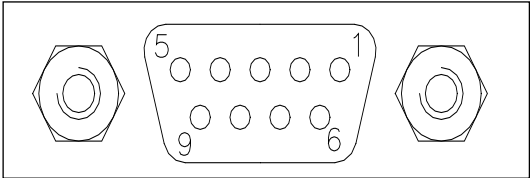


Figure 57 Input

# Serial

The following figure shows the 4UHV interconnections:



**Figure 58** 4UHV interconnections

This is a 9-pin D-type serial input/output connector that allows the 4UHV to be controlled via an RS232/485 or profibus (optional).

**Table 8**

PIN No.	Signal Name
1	+5 V (OUT)
2	TX (RS232)
3	RX (RS232)
4	Reserved
5	GND
6	A + (RS485)
7	Reserved
8	B - (RS485)
9	Reserved

# Connector Examples

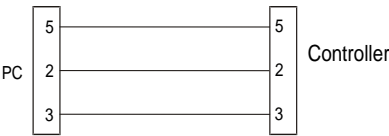


Figure 59 RS-232 Connection

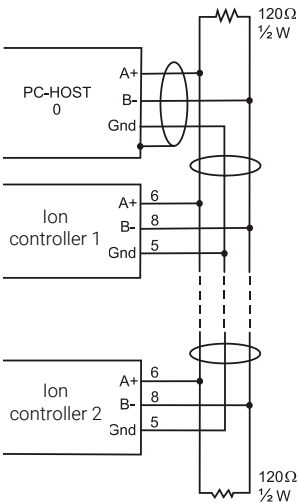


Figure 60 RS-485 Connection

## Window Protocol

Both RS232 and the RS485 interfaces are available on the 9-pin D-type serial input/output connector. The communications protocol is the same (see the structure below), but only the RS485 handles the address field. Therefore, to enable the RS485, you need to select both the type of communication and the device address using the front panel menu or the Navigator software.

### Communications Format

- 8 data bit
- No parity
- 1 stop bit
- Baud rate: 9600

### Communications Protocol

The communications protocol is of MASTER/ SLAVE type, where:

- Host = MASTER
- Controller = SLAVE

The communication takes place as follows:

- 6** The host (MASTER) sends a MESSAGE + CRC to the controller (SLAVE).
- 7** The controller answers with an ANSWER + CRC to the host.
- 8** The MESSAGE is a string in the following format:
- 9** <STX>+<ADDR>+<WIN>+<COM>+<DATA>+<ETX>+<CRC>

#### NOTE

When data is indicated between two quotes ('...'), it implies that the data indicated is the corresponding ASCII character.

---

Technical Information

Where:

- <STX> (Start of transmission) = 0x02
- <ADDR> (Unit address) = when you select the RS232 communication, this field is not handled and the controller always answers with its address stored in EEPROM  
<ADDR> (Unit address) = 0x80 + device number (0 to 31) (for RS485)
- <WIN> (Window) = a string of 3 numeric indicating the window number (from '000' to '999'); for the meaning of each window, see the relevant paragraph.
- <COM> (Command) = 0x30 to read the window, 0x31 to write in the window
- <DATA> = an alphanumeric ASCII string with the data to be written in the window. In the case of a read command, this field is not present.  
The field length varies according to the data type, as shown in the following table:

Table 9

Data Type	Field Length Max	Valid Characters
Logic (L)	1	'0' = OFF '1' = ON
Numeric (N)	6	',' ','0' ... '9' right justified with '0'
Alphanumeric (A)	48	From blank to '_' (ASCII)

- <ETX> (End of transmission) = 0x03;
- <CRC> = XOR of all characters following <STX> and including the <ETX> terminator. The value is hexadecimal coded and represented by two ASCII characters.

The SLAVE addressed responds with an ANSWER whose structure depends on the MESSAGE type.

When the MESSAGE is a read command, the SLAVE responds transmitting a string with the same structure as the MESSAGE.

NOTE

Using the RS485 interface, the message structure is identical to that used for the RS232 interface, the only difference being the value assigned to the ADDRESS <ADDR>.

## Technical Information

The controller can reply with the following types of response:

**Table 10**

Type	Length max	Value	Description
Logic		-	After a read instruction of a logic window.
Numeric	6 bytes	-	After a read instruction of a numeric window.
Alphanumeric	48 bytes	-	After a read instruction of a alphanumeric window.
ACK	1 byte	(0x6)	Execution of the command has been successful.
NACK	1 byte	(0x15)	Execution of the command has failed.
Unknown Window	1 byte	(0x32)	The window specified in the command is not a valid window.
Data Type Error	1 byte	(0x33)	The data type specified in the command (Logic, Numeric or Alphanumeric) is not in agreement with the Window specified.
Out of Range			The value expressed during a write command is not within the range value for the specified window.
Win Disabled	1 byte	(0x35)	The window specified is Read Only or is temporarily disabled.

## Technical Information

**Table 11 Windows Description**

WIN	R/W	Type	Description	Range
11	R/W	L	HV ON/OFF CH1	0 = OFF(def) ; 1=ON
12	R/W	L	HV ON/OFF CH2	0 = OFF(def) ; 1=ON
13	R/W	L	HV ON/OFF CH3	0 = OFF(def) ; 1=ON
14	R/W	L	HV ON/OFF CH4	0 = OFF(def) ; 1=ON
108	R/W	N	Baud rate	(1-4) [1200-2400-4800-9600]
205	R	N	Status	
206	R	N	Error code	
319	R/W		Controller Model	
323	R/W		Controller Serial number	
503	R/W	N	RS485 Serial Address	[0-31]; 1=def
504	R/W	L	Serial Type Select	0= RS232(def) ; 1= RS485
505	R/W	N	Channel Selection	(see below)
600	R/W	N	Unit pressure	0 = Torr ; 1=mBar (def) ; 2=Pa
602	R/W	A	Protect	(see Protect section)
603	R/W	A	Fixed/Step	(see Step-mode/Fixed mode section)
610	R/W	N	Device Number CH1	(see Device section)
612	R/W	N	Power max CH1	20 W – 80 W
613	R/W	N	V target CH1	[3000,7000] V step 1000; def=7000
614	R/W	N	I protect CH1	[1,100] step 1 mA
615	R/W	A	Set Point CH1	[X.XE-XX]
620	R/W	N	Device Number CH2	(see Device section)
622	R/W	N	Power max CH2	20 W – 80 W
623	R/W	N	V target CH2	[3000,7000] V step 1000; def=7000

## Technical Information

WIN	R/W	Type	Description	Range
624	R/W	N	I protect CH2	[1,100] step 1 mA
625	R/W	A	Set Point CH2	[X.XE-XX]
630	R/W	N	Device Number CH3	(see Device section)
632	R/W	N	Power max CH3	20 W – 80 W
633	R/W	N	V target CH3	[3000,7000] V step 1000; def=7000
634	R/W	N	I protect CH3	[1,100] step 1 mA
635	R/W	A	Set Point CH3	[X.XE-XX]
640	R/W	N	Device Number CH4	(see Device section)
642	R/W	N	Power max CH4	20 W – 80 W
643	R/W	N	V target CH4	[3000,7000] V step 1000; def=7000
644	R/W	N	I protect CH4	[1,100] step 1 mA
645	R/W	A	Set Point CH4	[X.XE-XX]
800	R	N	Temperature FAN	[0, 200] °C
801	R	N	Temperature HV1	[0, 200] °C
802	R	N	Temperature HV2	[0, 200] °C
803	R	A	Interlock Status	(see Interlock Status section)
804	R	A	Status Set Point	[0, 1]
808	R	N	Temperature HV3	[0, 200] °C
809	R	N	Temperature HV4	[0, 200] °C
810	R	N	V measured CH1	[0, 7000] V ; step 100 V
811	R	A	I measured CH1	[1E-10, 9E-1] A
812	R	A	Pressure CH1	[X.XE-XX]
820	R	N	V measured CH2	[0, 10000] V ; step 100 V



## Technical Information

WIN	R/W	Type	Description	Range
821	R	A	I measured CH2	[1E-10, 9E-1] A
822	R	A	Pressure CH2	[X.XE-XX]
830	R	N	V measured CH3	[0, 10000] V ; step 100 V
831	R	A	I measured CH3	[1E-10, 9E-1] A
832	R	A	Pressure CH3	[X.XE-XX]
840	R	N	V measured CH4	[0, 10000] V ; step 100 V
841	R	A	I measured CH4	[1E-10, 9E-1] A
842	R	A	Pressure CH4	[X.XE-XX]

## Technical Information

**Example:**

### Turn ON Channel 1

#### PC → Controller

02		80	30	31	31	31	31	03	42	33
STX		ADDR	WINDOW		WR	DATA	ETX	CRC		

#### Controller → PC

02	80		06	03	38	33
STX	ADDR		ACK	ETX	CRC	

### Turn OFF Channel 1

#### PC → Controller

02	80	30	31	31	31	30	03	42	32
STX	ADDR	WINDOW		WR	DATA	ETX	CRC		

#### Controller → PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

### Read Pressure (win 812) Channel 1

#### PC → Controller

02	80	38	31	32	30	03	38	38
STX	ADDR	WINDOW		RD	ETX	CRC		

#### Controller → PC

02	80	38	31	32	30	20	20	20	31	2E	35	45	2D	30	38	03	45	32
STX	ADDR	WINDOW		WR	DATA										ETX	CRC		

Data=1.5E-8

### Read Voltage (win 810) Channel 1

#### PC → Controller

02	80	38	31	30	30	03	38	41
STX	ADDR	WINDOW		RD	ETX	CRC		

#### Controller → PC

02	80	38	31	32	30	30	30	33	30	30	30	03	38	39
STX	ADDR	WINDOW		WR	DATA							ETX	CRC	

Data=3000

## Technical Information

### Read Current (win 811) Channel 1

#### PC → Controller

02	80	38	31	31	30	03	38	42
STX	ADDR	WINDOW			RD	ETX	CRC	

#### Controller → PC

02	80	38	31	31	30	20	20	20	32	2E	39	45	2D	30	35	03	45	33
STX	ADDR	WINDOW			WR	DATA										ETX	CRC	

Data=2.9E-5

### Operating mode (Win 601)

#### Autostart ON

#### PC → Controller

02	80	36	30		31	30	30	30	30	30	30	30	30	30	30	31	03	38	34
STX	ADDR		WINDOW			WR	DATA									ETX	CRC		

#### Controller → PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

#### Autostart OFF

#### PC → Controller

02	80	36	30	31	31	30	30	30	30	30	30	30	30	30	30	03	38	35
STX	ADDR	WINDOW			WR	DATA										ETX	CRC	

#### Controller → PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

### Protect (Win 602)

#### PC → Controller

02	80	36	30		32	30	03	38	37
STX	ADDR		WINDOW			RD	ETX	CRC	

#### Controller → PC

02	80	36	30	32	30	30	30	30	30	30	30	30	31	30	30	03	38	36
STX	ADDR	WINDOW			WR	DATA										ETX	CRC	

## Technical Information

### Fixed/Step (603)

#### PC → Controller

02	80	36	30	33	30	03	38	36
STX	ADDR	WINDOW			RD	ETX	CRC	

#### Controller → PC

02	80	36	30	33	30	30	30	30	30	30	30	30	30	31	03	38	37
STX	ADDR	WINDOW			WR	DATA										ETX	CRC

The DATA field is made of 10 characters.

The 4 right justified char are the protect value of each channel.

In the example above we have 1 in the third char from right (all char are "30"=0 and only the third from right is "31"=1).

So it means activate the protect on CH3, while protect on CH1,2,4 will be not activated.

### Status Set Point (804)

#### PC → Controller

02	80	38	30	34	30	03	38	46
STX	ADDR	WINDOW			RD	ETX	CRC	

#### Controller → PC

02	80	38	30	34	30	30	30	30	30	30	30	30	30	31	03	38	45
STX	ADDR	WINDOW			WR	DATA										ETX	CRC

### Error Description

Controller errors can be displayed in two windows:

- WIN 505 where the user writes the channel whose error is to be viewed
- WIN 206 where the controller shows the error code of the channel written in window 505.

If the value 0 is written in window 505, the errors of all the channels remain displayed in window 206.

**Table 12**

WIN 505 value	Channel
0	All channels
1	Channel 1
2	Channel 2
3	Channel 3
4	Channel 4

### Error Code

The error code is displayed in decimal format. Binary representation of this number provides indications regarding the type of error that has occurred.

The error table is shown below:

**Table 13 Error Code**

Error code in decimal format	Binary	Description
0	00000000000000	No error
1	00000000000001	FAN error
2	00000000000010	Power input error from HV
4	00000000000100	Power input error from PFC
8	00000000010000	Overtemp PFC
16	00000000100000	Error communication CPU-HV
32	00000001000000	Interlock cable
64	00000010000000	Overtemp HV
128	00000100000000	Protect
256	00001000000000	Measurement error
512	00010000000000	HV out error
1024	00100000000000	Short circuit
2048	01000000000000	HV disabled

## Example

### Interlock cable

Error code: 32 (decimal) → 0000000010000 ( binary) → Interlock cable error

### Interlock cable + Overtemp HV

Error code: 96 (decimal) → 0000000110000 ( binary) → Interlock cable error + Overtemp HV

### Error code (Win 206)

Error interlock

02	80	32	30	36	30	03	38	37
STX	ADDR	WINDOW			RD	ETX	CRC	

02	80	32	30	36	30	30	30	30	30	33	32	03	38	36
STX	ADDR	WINDOW			WR	DATA						ETX	CRC	

### Channel selection (Win 505)

Read

02	80	35	30	35	30	03	38	33
STX	ADDR	WINDOW			RD	ETX	CRC	

02	80	35	30	35	30	30	30	30	30	30	30	03	38	33
STX	ADDR	WINDOW			WR	DATA						ETX	CRC	

Write 1

02	80	35	30	35	31	30	30	30	30	30	31	03	38	33
STX	ADDR	WINDOW			WR	DATA						ETX	CRC	

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

## Technical Information

### Error code (Win 206)

Interlock error:

02	80	32	30	36	30	03	38	37
STX	ADDR	WINDOW			RD	ETX	CRC	

02	80	32	30	36	30	30	30	30	33	32	03	38	36
STX	ADDR	WINDOW			WR	DATA					ETX	CRC	

### Channel selection (Win 505)

Write 2

02	80	35	30	35	31	30	30	30	30	30	32	03	38	30
STX	ADDR	WINDOW			WR	DATA					ETX	CRC		

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

### Error code (Win 206)

Interlock not present error because channel 2 has been selected:

02	80	32	30	36	30	03	38	37
STX	ADDR	WINDOW			RD	ETX	CRC	

02	80	32	30	36	30	30	30	30	30	30	03	38	37
STX	ADDR	WINDOW			WR	DATA					ETX	CRC	

Old Serial Protocol (“Binary Protocol”)

The “Binary Protocol” serial protocol used by some old controllers is no longer supported.

For new projects, Agilent advises that the new protocol “Window protocol” be used. Nevertheless, for compatibility with the old systems, some commands of the “Binary Dual” have been implemented.

The 4UHV controller cannot implement all the commands of the Dual but only a subset.

Communications Format

These protocols have the following formats:

Table 14

Type	No. of Bytes	Description
Read	1	“?” (3Fh <sup>3</sup> ) performs reads on the Splitter Box
Status	1	“0” (30h) = false = off, “1” (31h) = true = on <sup>5</sup>
Integer	5	“xxxxx” represented in BCD <sup>4</sup> with 5 digits (always positive)
BitField	8	Like integer type, but meanings are associated with the single bits of the number.
Exponential	7	“x.xEsxx” where x is BCD digits, E is the 45h character and s is the (“+” or “-” sign).
String	n	Sequence of n characters included within the 20h and 7Fh range

<sup>3</sup> The “h” notation following a number indicates that the number is expressed in hexadecimal format.

<sup>4</sup> BCD: The number is represented by digits included within the “0” and “9” range (ASCII 30h - 39h).

<sup>5</sup> Status can also assume values greater than “1”.



Technical Information

The commands have a read and a write mode. By specifying the type of read operation being performed, the Host queries the Splitter Box that, in turn, replies in a format that is compliant with the command sent. As long as a write operation can be carried out, the write and read formats for the same command coincide.

Host to Dual controller command format:

*[header command] [length] [command] [channel] [data] [checksum]*

Dual controller to Host reply format:

*[header response] [length] [command] [channel] [data] [checksum]*

Table 15

Field	No. of Bytes	Value	Description
Header command	1	81h	Header for the RS232 and RS422 serial.
		81h÷A0h	Header and address for the RS485 (129 – 160) serial.
Header response		01h	Header for the serial RS232, RS422.
		01h÷20h	Header and address for the RS485 serial.
Length	2		Data packet length in BCD (command, channel, data fields only).
Command			See description of commands (byte 0 command, byte 1 subcommand).
Channel	1	30h	No channel
		31h	High Voltage 1
		32h	High Voltage 2
		33h	High Voltage 3
		34h	High Voltage 4
Data	N		See description of commands
Checksum	1		XOR of all bytes (checksum excluded) in and with 7Fh.

### Command Listing

It is not possible to implement all the “Binary Dual” protocol commands on the 4UHV controller. The commands that are implemented on the 4UHV controller are the following:

**Table 16**

No.	Description	ASCII	Hex
1	Local/remote	Z0	5Ah 30h
3	HV-ON/OFF	A0	41h 30h
4	Device number	F0	46h 30h
5	Measurement unit	D0	44h 30h
7	Protect	C0	43h 30h
8	Fixed/Step	B0	42h 30h
9	Power supply polarity	G0	47h 30h
10	Max. power	J0	4Ah 30h
11	Vmax	H0	48h 30h
12	Iprotect	K0	4Bh 30h
13	Set Point	P0	50h 30h
14	V meas.	S0	53h 30h
15	I meas.	T0	54h 30h
16	P meas.	U0	55h 30h
17	Set Point status	g0	67h 30h
18	Interlock status	]0	5Dh 30h
19	Error status	z0	7Ah 30h

## Technical Information

**Table 17** Interlock Status Coding

Bit Field	Interlock Coding (active if 1)
01h	HV3 Cable Interlock
02h	Reserved
04h	Reserved
08h	HV1 Cable Interlock
10h	HV4 Cable Interlock
20h	Reserved
40h	Reserved
80h	HV2 Cable Interlock

**Table 18**

Bit Field	Interlock Coding (active if 1)
33h	Cable Interlock
36h	Excess temperature
37h	Power input error
38h	FAN Error
39h	Protect
31h 30h	Short-circuit
31h 31h	HV out error
31h 32h	Zero Measurement

Display and Menus

Switching on the unit, the initial screen that appears is as follows:

						V	A	C	U	U	M								
			T	E	C	H	N	O	L	O	G	I	E	S					

Afterwards a screen of the following type appears, which displays for each channel the name of the ion pump selected.

1	7	5	-	5	5	-	4	0		D	i	o	d	e					
2			X	X	X	X	X	X	X										
3	7	5	-	5	5	-	4	0	S	t	a	r	C	e	l				
4			X	X	X	X	X	X	X										

Displaying Channel-Related Information

The display can be configured easily to display different information, depending on the needs of the customer.

Information on All Channels

The voltage on all the four channels can be displayed simultaneously, or the current of all four channels, or the pressure.

To do this, press the “V/I/P” key; the following screens appear cyclically.

## Technical Information

1	7	5	-	5	5	-	4	0		D	i	o	d	e	
2				X	X	X	X	X	X	X					
3	7	5	-	5	5	-	4	0		S	t	a	r	C	e
4				X	X	X	X	X	X	X					

**5** Display the pump type for each channel

**6** Press "V/I/P"

1				X	.	X	E	-	X	X	m	b	a	r	
2				X	.	X	E	-	X	X	m	b	a	r	
3				X	.	X	E	-	X	X	Y	Y	Y	Y	
4				X	.	X	E	-	X	X	Y	Y	Y	Y	

**7** Display the pressure for each channel

**8** Press "V/I/P"

1				X	.	X	E	-	X	X	A				
2				X	.	X	E	-	X	X	A				
3				X	.	X	E	-	X	X	A				
4				X	.	X	E	-	X	X	A				

**9** Display the current for each channel

**10** Press "V/I/P"

1				-	7	0	0	0		V	S	t	e	p	
2				-	7	0	0	0		V	F	i	x		
3				+	7	0	0	0		V	S	t	e	p	
4				+	7	0	0	0		V	S	t	e	p	

**11** Display the voltage and operation mode "Step Mode" – "Fixed mode" for each channel

**12** Press "V/I/P"

Information on a Single Channel

You can display all the information (voltage, current, pressure and pump type) for each single pump. To do this, press the HV-x key, where x corresponds to the channel to display:

			7	5	-	5	5	-	4	0	S	t	a	r	C	e	l	
					X	.	X	E	-	X	X		m	B	a	r		
	3				X	.	X	E	-	X	X		A					
					+	7	0	0	0		V		S	t	e	p		

In this case, the pump type, pressure, current and voltage of channel 3 are being displayed.

Commands

You can give the controller three types of commands:

- Switch on/off channels
- Activate/disactivate Protect mode
- Change output voltage

Switching Channels On/Off

To switch a high voltage channel on or off, keep the HV-ON/OFF key pressed while you press the HV-x key, where x is the number of the channel you want to switch on or switch off.

Activating /Disactivating Protect Mode

To activate or disactivate Protect mode, keep the Protect key pressed while you press the HV-x key, where x is the number of channel for which you want to activate or disactivate the "Protect" functionality.

Changing the Output Voltage

To change the output voltage choosing between 7KV, 5KV, 3KV, Step-Mode and Fixed-Mode, keep the Fixed Step key pressed while you press the HV-x key, where x is the number of the channel for which you want to change the output voltage.

The output voltage changes cyclicly between "STEP 7 KV, 5 KV, 3 KV".

# Menu

Keeping the “Mode” key pressed for a long time (> 2 sec), you enter the Menu. In the Menu, you can configure some parameters of the controller. These configurable parameters can be divided into two groups:

- Controller general parameters
- Specific parameters for each channel.

The general parameters of the controller are the following:

- Pressure measurement unit: mbar, torr, pascal
- Serial baud rate: 1200, 4800, 9600, 19200, 38400
- Serial Type: RS232, RS485
- RS485 Address: from 0 to 31
- Auto start: Yes, No
- Fan: Always on, switches on if the current descends below 1mA
- Set Point: The Set Point can be associated with the channels and a value set
- Analog output: Analog output is associated with the channels.
- Reset to standard settings

The specific parameters for each channel are the following:

- Pump: Select the type of pump
- I Protect: Set the Protect current
- Power max: Set the maximum power.

## Scrolling Through the Menus

The 4UHV controller menu has a three-level structure.

- To scroll through the menus, remaining on the same level, press the keys “◀” “▶”.
- To go to submenu, press “Enter” in the transition menus.
- To escape to go back, press “Esc” at any time.
- In multiple-choice menus, the symbol “■” appears next to the value currently in use and the value currently used will flash.
- To change the value in each menu, press the key + or -. This causes the symbol “■” to move, but the old value continues to flash.
- To save the new value, you must press “Enter”. As you press “Enter”, the new value is saved and starts to flash.

If it is not possible for all the choices to be displayed simultaneously, the values will scroll across (the titles of the menus remain fixed).

Menu Screens

Examples of all the screens that appear in the Menu are provided below.

Table 19

First Level	Second Level	Third Level
<div><div>CONF I G U R E</div><div>■ G E N E R A L</div><div>H V 1</div><div>H V 2</div></div>	<div><div>CONF I G - G E N E R A L</div><div>P r e s s u r e</div><div>m B a r</div><div>■ T o r r</div></div>	
	<div><div>CONF I G - G E N E R A L</div><div>S e r i a l B a u d R a t e</div><div>1 2 0 0</div><div>■ 4 8 0 0</div></div>	
	<div><div>CONF I G - G E N E R A L</div><div>S e r i a l T y p e</div><div>R S 2 3 2</div><div>■ R S 4 8 5</div></div>	
	<div><div>CONF I G - G E N E R A L</div><div>S e r i a l A d d r</div><div>X X</div></div>	
	<div><div>CONF I G - G E N E R A L</div><div>A u t o s t a r t</div><div>Y E S</div><div>■ N O</div></div>	
	<div><div>CONF I G - G E N E R A L</div><div>F a n</div><div>T H R E S H O L D</div><div>■ A L W A Y S O N</div></div>	



## Technical Information

### First Level

### Second Level

### Third Level

	C	O	N	F	I	G	-	G	E	N	E	R	A	L	
			S	e	t	p	o	i	n	t					
			■	S	E	T	P	O	I	N	T	A			
			S	E	T	P	O	I	N	T	B				

	G	E	N	E	R	A	L	-	S	E	T	P	O	I	N	T	
			S	e	t	P	o	i	n	t	A						
	C	H	x		X	.	X	E	-	X	X	A					
		▲															

	C	O	N	F	I	G	-	G	E	N	E	R	A	L	
			A	n	a	l	o	g	O	u	t				
			■	A	N	A	L	O	G			A			
			A	N	A	L	O	G			B				

	G	E	N	E	R	A	L	-	R	E	M	O	T	E	
			A	n	a	l	o	g	O	u	t	A			
						C	H	x							

	C	O	N	F	I	G	U	R	E						
						H	V	1							
						H	V	2							
			▶			H	V	3							

								H	V	1					
						P	u	m	p						
						X	X	X	X	X	X	X	X	X	X

								H	V	1					
						I	P	r	o	t	e	c	t		
						X	X	m	A						

								H	V	1					
						P	o	w	e	r		M	a	x	
						X	X	X	W						

## Profibus

### Connectors Pin-Out

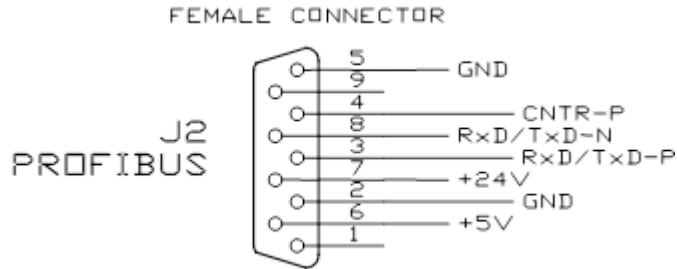


Figure 61 4UHV Profibus Connectors pin-out

### Rotary Switches

The interface has two switches.

The switches are used to set the ProfiBus address of the device. Up to 126 different addresses (from 0 to 125) can be selected.

The address value sets by the 2 switches is expressed in hexadecimal notation, so value from 00 to 7D are permitted; this setting is read by the interface during the power-on phase, so any change of the switch position after the power-on is ignored.

Indicators

Two LEDs are present on the interface: one green and one red.

The red led indicates that the interface is correctly powered.

The green led shows the interface status according the following table:

	<div><div></div><div>←----- 550 ms period -----&gt;</div></div>
1 pulse	<div><div></div></div>
2 pulses	<div><div></div><div></div></div>
Blink fast	<div><div></div><div></div><div></div><div></div></div>
Blink slow	<div><div></div></div>

1 pulse

ProfiBus link established, controller link NOT established yet (Controller state machine not in Regular data exchange). This situation could be normal in the first seconds after the interface power on (Controller address searching phase) or after the controller power-on.

2 pulses

ProfiBus link not established yet (ProfiBus state machine not in Regular data exchange). This failure has priority (in the indication) over the previous.

Blink fast

Gateway fail (internal check) or wrong address set (address > 0x7D or address not stable during power-on).

Blink slow

Gateway operating properly.

Technical Information

GSD File

The GSD file provided with this interface is:

AGIL0D32.gsd

The ID number is:

0D32 hex

State Machine

From the software point of view, the interface can be seen as two devices (one for ProfiBus and the other for RS-485) linked together. Each device has its own state machine to manage the device operation.

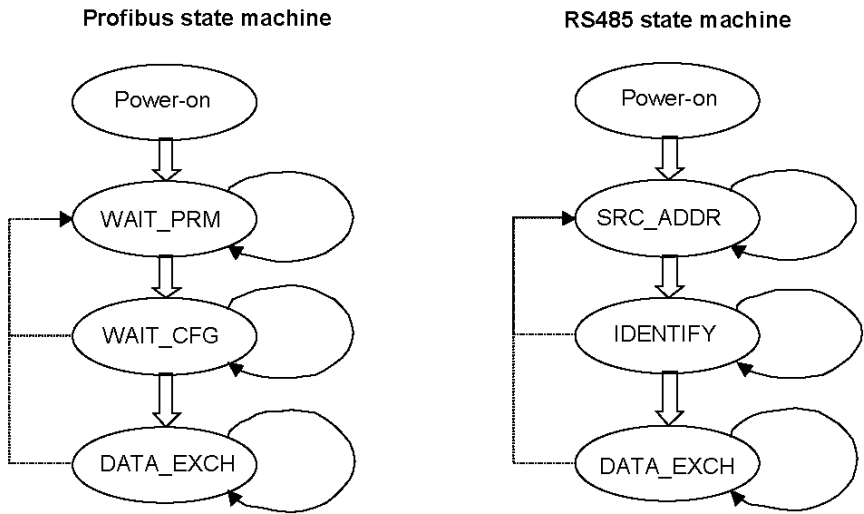


Figure 62

Table 20

PROFIBUS STATE MACHINE		RS485 STATE MACHINE	
Status	Meaning	Status	Meaning
POWER_ON	Interface set-up	POWER_ON	Interface set-up
WAIT_PRM	Wait for parameterisation from the master	SRC_ADDR	Search for the controller serial address
WAIT_CFG	Wait for configuration from the master	IDENTIFY	Identify controller model and protocol
DATA_EXCH	Regular data exchange	DATA_EXCH	Regular data exchange

The two machines continuously share I/O data with the relative bus, and interact each other only in following conditions:

- ProfiBus Data exchange is suspended (static diagnosis activated) if the RS-485 serial link is not established
- RS-485 Data exchange is suspended (only for output data) if the ProfiBus State machine is not in Data Exchange mode

As a general rule, unrecoverable communication errors make each machine to jump to the state immediately following the power-on state (WAIT\_PRM or SRC\_ADDR).

## Message Mapping

The communication is based on the continuous data exchange capability of the ProfiBus standard, where the master sends continuously the entire slave configuration and reads back the entire slave status.

For this purpose one Input (from slave to master) and one Output (from master to slave) buffers are provided. All the needed parameters are mapped inside each buffer. The following tables reassume the ProfiBus parameter access, related to the corresponding windows serial protocol.

NOTA

The profibus communication and the serial communication use the same link inside of the controller, then you can not use at the same time the profibus communication and the serial communication.

## Configuration Buffer Structure

Total buffer length: 15 bytes (4 words + 7 byte)

**Table 21**

Offset (byte)	Unit/Res.	Range	Size (byte)	Description
0	-		1	B <sub>7,6</sub> → Pressure unit ( 0= Torr, 1= mbar, 2 = Pa) B <sub>5</sub> → Auto power ON (0= NO, 1= Yes)
1	1bit = 1mA	1mA to 100mA	1	Ch1 Protect current value
2	1bit = 1mA	1mA to 100mA	1	Ch2 Protect current value
3	1bit = 1mA	1mA to 100mA	1	Ch3 Protect current value
4	1bit = 1mA	1mA to 100mA	1	Ch4 Protect current value
5	Pressure unit selected	1 to 99 for mantissa -9 to -1 for exponent	2	Set Point A value The first byte is the mantissa, the second byte is the exponent
7	Pressure unit selected	1 to 99 for mantissa -9 to -1 for exponent (see Note 1)	2	Set Point B value The first byte is the mantissa, the second byte is the exponent
9	Pressure unit selected	1 to 99 for mantissa -9 to -1 for exponent (see Note 1)	2	Set Point C value The first byte is the mantissa, the second byte is the exponent
11	Pressure unit selected	1 to 99 for mantissa -9 to -1 for exponent (see Note 1)	2	Set Point D value The first byte is the mantissa, the second byte is the exponent
12	-	(see Note 2)	1	B <sub>7,4</sub> → Set Point A mapping (default = 1) B <sub>5,0</sub> → Set Point B mapping (default = 1)
13	-	(see Note 2)	1	B <sub>7,4</sub> → Set Point C mapping (default = 1) B <sub>5,0</sub> → Set Point D mapping (default = 1)

**Note 1:** Each Set Point value is divided into 2 bytes: one for mantissa (the value is divided by 10) and one for exponent.

Example 1: if you want to set the Set Point A to 3.5E-5 you have to write: byte offset 4 = 35d (23hex) and byte offset 5 = 5d (FBhex)

Example 2: if you want to set the Set Point A to 1.0E-9 you have to write: byte offset 4 = 10d (0Ahex) and byte offset -5 = -5d (F7hex)

## Technical Information

**Note 2:** This byte is divided in two nibble (4 bits), each nibble is the number of HV channel to associated to the Set Point X.

**Example:**

if you want assign the Set Point A to channel 2 you have to write byte offset  
 $12 B_{7,4} = 0010$

if you want assign the Set Point B to channel 3 you have to write byte offset  
 $12 B_{5,0} = 0011$

if you want assign the Set Point C to channel 4 you have to write byte offset  
 $13 B_{7,4} = 0100$

if you want assign the Set Point D to channel 1 you have to write byte offset  
 $13 B_{5,0} = 0001$

# Configuration Output Structure

Total buffer length: 2 bytes

Table 22

Offset (byte)	Unit/Res.	Size (byte)	Description
0	-	1	B <sub>7</sub> → HV 1 On/Off B <sub>6</sub> → HV 2 On/Off B <sub>5</sub> → HV 3 On/Off B <sub>4</sub> → HV 4 On/Off B <sub>3</sub> → HV1 protect mode On/Off B <sub>2</sub> → HV2 protect mode On/Off B <sub>1</sub> → HV3 protect mode On/Off B <sub>0</sub> → HV4 protect mode On/Off
1	-	1	B <sub>7</sub> → HV 1 mode (0= Fixed, 1= Step) B <sub>6</sub> → HV 2 mode (0= Fixed, 1= Step) B <sub>5</sub> → HV 3 mode (0= Fixed, 1= Step) B <sub>4</sub> → HV 4 mode (0= Fixed, 1= Step) B <sub>1,0</sub> → 1=remote, 2 = local, 3= Profibus (1)

NOTA

It is not possible to switch between profibus mode and serial mode using the profibus communication you can switch between these two modes only in Local mode.



## Configuration Input Structure

Total buffer length: 40 bytes (9 bytes + 8 floating)

**Table 23**

Offset (byte)	Unit/Res.	Size (byte)	Description
0			B <sub>7</sub> → Communication status between CPU and internal profibus card B <sub>6</sub> → Communication status (0= ok, 1= not good) B <sub>1,0</sub> → 1=remote, 2=local, 3=Profibus
1	-	1	B <sub>7</sub> → HV 1 On/Off B <sub>6</sub> → HV 2 On/Off B <sub>5</sub> → HV 3 On/Off B <sub>4</sub> → HV 4 On/Off B <sub>3</sub> → HV1 protect mode On/Off B <sub>2</sub> → HV2 protect mode On/Off B <sub>1</sub> → HV3 protect mode On/Off B <sub>0</sub> → HV4 protect mode On/Off
2	.	1	B <sub>7</sub> → HV 1 mode (0= Fixed, 1= Step) B <sub>6</sub> → HV 2 mode (0= Fixed, 1= Step) B <sub>5</sub> → HV 3 mode (0= Fixed, 1= Step) B <sub>4</sub> → HV 4 mode (0= Fixed, 1= Step) B <sub>3</sub> → Set Point A ( 0= not active, 1 = active) B <sub>2</sub> → Set Point B ( 0= not active, 1 = active) B <sub>1</sub> → Set Point C ( 0= not active, 1 = active) B <sub>0</sub> → Set Point D ( 0= not active, 1 = active)
3	-	1	B <sub>7</sub> → HV 1 cable interlock B <sub>6</sub> → HV 2 cable interlock B <sub>5</sub> → HV 3 cable interlock B <sub>4</sub> → HV 4 cable interlock B <sub>3</sub> → HV 1 Remote on/off B <sub>2</sub> → HV 1 Remote on/off B <sub>1</sub> → HV 1 Remote on/off B <sub>0</sub> → HV 1 Remote on/off
4	1 bit = 100V	1	Controller status ( 0= no error, 6 = error)
5	1 bit = 100V	1	Channel 1, High voltage measured
6	1 bit = 100V	1	Channel 2, High voltage measured
7	1 bit = 100V	1	Channel 3, High voltage measured
8	1 bit = 100V	1	Channel 4, High voltage measured

## Technical Information

Offset (byte)	Unit/Res.	Size (byte)	Description
9	Ampere	4 (floating point)	Channel 1, Current measured
13	Ampere	4 (floating point)	Channel 2, Current measured
17	Ampere	4 (floating point)	Channel 3, Current measured
21	Ampere	4 (floating point)	Channel 4, Current measured
25	Pressure unit selected	4 (floating point)	Channel 1, Pressure measured
29	Pressure unit selected	4 (floating point)	Channel 2, Pressure measured
33	Pressure unit selected	4 (floating point)	Channel 3, Pressure measured
37	Pressure unit selected	4 (floating point)	Channel 4, Pressure measured

## Diagnosis Management

In addition to the Profibus six byte standard diagnostic, the interface provides both user diagnostic and static diagnostics functions.

### Standard diagnostic

The standard diagnostic management is fully compliant with the Profibus specification.

### User diagnostic

The first byte in the user diagnostic area reflects the controller serial link status with following meaning:

- Bit 0: controller doesn't respond
- Bit 2: first loop of requests not ended (values in the input data are not fully coherent yet)

So, if the low nibble in the first byte is equal to 0, the interface is working properly. Otherwise there is a problem.

During the start-up phase after one interface power on or controller power on, the first byte can assume values different from zero for few seconds

Each nibble (4 bits) in the bytes following the interface status byte, represents the status of the last attempt to write a parameter with following coding (diag status byte):

- 1** Write success
- 2** Protocol error (checksum error on low speed network)
- 3** Invalid channel
- 4** Invalid data
- 5** Invalid channel
- 6** Range error
- 7** Format error
- 8** Write not allowed while HV ON
- 9** Write not allowed while HV OFF
- 10** Write allowed only in serial mode

The Profibus external diagnosis services are used to report following unexpected situations:

### **Controller Fails**

If the controller switches to fail mode, an external diagnostic service is required and one byte in the diagnostic buffer signals the type of failure.

### **User Parameter Mismatch**

If the user sets one or more parameters out of their allowed range, a Profibus external diagnostic service is required and some bits in the diagnosis frame signals which parameter is wrong (i.e. over range or under range).

# Diagnostic Buffer (15 byte)

Table 24

Offset	Meaning	Standard diagnostics
0	B <sub>0</sub> → station non exist (set by master) B <sub>1</sub> → station not ready (slave not ready for data exchange) B <sub>2</sub> → cfg fault (configuration data doesn't match) B <sub>3</sub> → ext diag (slave has external diagnostic data) B <sub>4</sub> → not supported (slave doesn't support requested function) B <sub>5</sub> → invalid slave response ( slave sets permanent '0') B <sub>6</sub> → prm fault (wrong parameter assignment) B <sub>7</sub> → master_lock (slave is parameterised by another master)	
1	B <sub>0</sub> → prm req (slave has to be re-parameterised) B <sub>1</sub> → stat diag (static diagnosis) B <sub>2</sub> → fixed '1' B <sub>3</sub> → wd_on (response monitoring active) B <sub>4</sub> → Freeze mode (received freeze command) B <sub>5</sub> → Synch mode (received synch command) B <sub>6</sub> → reserved B <sub>7</sub> → diag deactivated (slave is parameterised by another master)	
2	Reserved	
3	Master Add (master address after parameterisation. FF= without parameter)	
4	Ident number high	
5	Ident number low	
6	External diagnosis "Header" length indication including header	

Table 25

Offset	Meaning	External diagnostics
7	Interface Status B <sub>0</sub> → Controller not responds B <sub>1</sub> → Not used B <sub>2</sub> → Input data not fully coherent yet B <sub>3</sub> → Not used B <sub>1..7</sub> → Not used	
8	B <sub>7..4</sub> → HV1 On/Off diagnostic status B <sub>3..0</sub> → HV2 On/Off diagnostic status	
9	B <sub>7..4</sub> → HV3 On/Off diagnostic status B <sub>3..0</sub> → HV4 On/Off diagnostic status	
10	B <sub>7..4</sub> → HV1 Protect Mode diagnostic status B <sub>3..0</sub> → HV2 Protect Mode diagnostic status	
11	B <sub>7..4</sub> → HV3 Protect Mode diagnostic status B <sub>3..0</sub> → HV4 Protect Mode diagnostic status	
12	B <sub>7..4</sub> → HV1 Fixed/Step Mode diagnostic status B <sub>3..0</sub> → HV2 Fixed/Step Mode diagnostic status	
13	B <sub>7..4</sub> → HV3 Fixed/Step Mode diagnostic status B <sub>3..0</sub> → HV4 Fixed/Step Mode diagnostic status	
14	B <sub>7..4</sub> → Serial/Remote/Local/Profibus diagnostic status B <sub>3..0</sub> → Not used	

# Accessories and Spare Parts

Table 26 Accessories and spare parts

Part Number	Description
<b>HV Cables</b>	
9290705	HV bakeable cable, radiation resistant, 4 meter
9290707	HV bakeable cable, radiation resistant, 7 meter
9290708	HV bakeable cable, radiation resistant, 10 meter
9290709	HV bakeable cable, radiation resistant, 20 meter
<b>Power Cord</b>	
9699958	Mains Cable US/NEMA plug (3m long)
9699957	Mains Cable EU plug (3m long)
8121-0703	Mains Cable CHINA plug (3m long)
9499399	Power Cable IEC 320



***Vacuum Products Division***

*Dear Customer,*

*Thank you for purchasing an Agilent vacuum product. At Agilent Vacuum Products Division 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 products. 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,*

*Giampaolo LEVI*

*Vice President and General Manager  
Agilent Vacuum Products Division*

**Note:** Fax or mail the Customer Request for Action (see backside page) to Agilent Vacuum Products Division (Torino) – Quality Assurance or to your nearest Agilent representative for onward transmission to the same address.



## CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO: AGILENT VACUUM PRODUCTS DIVISION TORINO – QUALITY ASSURANCE FAX

N°: XXXX-011-9979350

ADDRESS: AGILENT TECHNOLOGIES ITALIA S.p.A. – Vacuum Products Division –

Via F.Ili Varian, 54 – 10040 Leini (TO) – Italy

E-MAIL: [vpd-qualityassurance\\_pdl-ext@agilent.com](mailto:vpd-qualityassurance_pdl-ext@agilent.com)

NAME	COMPANY	FUNCTION
ADDRESS:		
TEL. N° : FAX N° :		
E-MAIL:		
PROBLEM / SUGGESTION :		
REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.):		
DATE		
CORRECTIVE ACTION PLAN / ACTUATION (by AGILENT VPD)		LOG N°

XXX = Code for dialing Italy from your country (es. 01139 from USA; 00139 from Japan, etc.)



Agilent Technologies



## Vacuum Products Division Instructions for returning products

Dear Customer,

Please follow these instructions whenever one of our products needs to be returned.

Complete the attached **Request for Return** form and send it to Agilent Technologies (see below), taking particular care to include the completed **Health and Safety** declaration Section. No work can be started on your unit until we receive a completed copy of this form.

After evaluating the information, Agilent Technologies will provide you with a **Return Authorization (RA)** number via email or fax, as requested. Note: Depending on the type of return, a Purchase Order may be required at the time the **Request for Return** is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).

### Product preparation

- Remove all accessories from the core product (e.g. inlet screens, vent valves).
- Prior to shipment and if applicable for your product, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
- If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
- Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
- Include a copy of the Health and Safety Declaration in the shipping documentation on the outside of the shipping box of your returning product.
- Clearly label package with RA number. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.
- Return only products for which the RA was issued.

### Shipping

- Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information. Customer is responsible for freight charges on returning product.
- Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, ADR, etc.) and carrier requirements.

RETURN THE COMPLETED REQUEST FOR RETURN FORM TO YOUR NEAREST LOCATION:

#### EUROPE:

Fax: 00 39 011 9979 330

Fax Free: 00 800 345 345 00

Toll Free: 00 800 234 234 00

[vpt-customer care@agilent.com](mailto:vpt-customer care@agilent.com)

#### NORTH AMERICA:

Fax: 1 781 860 9252

Toll Free: 800 882 7426

[vpl-ra@agilent.com](mailto:vpl-ra@agilent.com)

#### PACIFIC RIM:

please visit our website for individual  
office information

<http://www.agilent.com>



**TERMS AND CONDITIONS**

**Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.**

- Unless otherwise pre-negotiated, customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Agilent Technologies is not responsible for returning customer provided packaging or containers.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- Products returned that have not been drained from oil will be disposed.
- A Special Cleaning fee will apply to all exposed products
- If requesting a calibration service, units must be functionally capable of being calibrated.

**Vacuum Products Division  
Request for Return Form**

Customer information		
Company :		Contact Name:
Address:		Tel: Fax:
		Email:

Equipment			
Product description	Agilent PartNo	Agilent Serial No	Original Purchasing Reference
Failure description		Type of process (for which the equipment was used)	

Type of return
<input type="checkbox"/> Non Billable <input type="checkbox"/> Billable ➡ New PO # (hard copy must be submitted with this form): _____
<input type="checkbox"/> Exchange <input type="checkbox"/> Repair <input type="checkbox"/> Upgrade <input type="checkbox"/> Consignment/Demo <input type="checkbox"/> Calibration <input type="checkbox"/> Evaluation <input type="checkbox"/> Return for Credit

Health and safety		Substances (please refer to MSDS forms)			
The product has been exposed to the following substances: (by selecting 'YES' you MUST complete the table to the right)		* Agilent will not accept delivery of any product that is exposed to radioactive, biological, explosive substances or dioxins, PCB's without written evidence of decontamination.			
		Trade name	Chemical name	Chemical Symbol	CAS Number
Toxic	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Harmful	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Corrosive	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Reactive	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Flammable	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Explosive (*)	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Radioactive (*)	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Biological (*)	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Oxidizing	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Sensitizer	<input type="checkbox"/> YES <input type="checkbox"/> NO				
Other dangerous substances	<input type="checkbox"/> YES <input type="checkbox"/> NO				

Goods preparation	
If you have replied YES to one of the above questions. Has the product been purged?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If yes, which cleaning agent/method:	
Has the product been drained from oil?	<input type="checkbox"/> YES <input type="checkbox"/> NOT APPLICABLE
I confirm to place this declaration on the outside of the shipping box. <input type="checkbox"/>	

I declare that the above information is true and complete to the best of my knowledge and belief. I understand and agree to the terms and conditions on page 2 of this document.	
Name:	Authorized Signature:
Position:	
Date:	
<b>NOTE:</b> If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, <b>the customer will be held responsible</b> for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.	

## Agilent Vacuum Products Division/Sales and Service Offices

### **United States**

#### **Agilent Technologies**

121 Hartwell Avenue  
Lexington, MA 02421 - USA  
Ph. +1 781 861 7200  
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Toll-Free: +1 800 882 7426  
[vpl-customer@agilent.com](mailto:vpl-customer@agilent.com)

### **Netherlands**

#### **Agilent Technologies Netherlands B.V.**

Customer Contact Center  
Laan van Langerhuizen 1, toren A-8  
1186 DS Amstelveen  
Tel. +31 020 547 2600  
Fax +31 020 654 5748  
[customer@netherlands.agilent.com](mailto:customer@netherlands.agilent.com)

### **Belgium**

#### **Agilent Technologies Belgium S.A./N.V.**

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Barueri, Sao Paulo CEP: 06460-040  
Toll free: 0800 728 1405

### **China**

#### **Agilent Technologies Co. Ltd (China)**

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Toll free: 400 8203278 (mobile)  
Toll free: 800 8203278 (landline)  
[vacuum.cnmarketing@agilent.com](mailto:vacuum.cnmarketing@agilent.com)  
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10040 Leini, (Torino) - Italy  
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10/2022

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#### **Agilent Technologies**

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[vpt-customer@agilent.com](mailto:vpt-customer@agilent.com)

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Toll Free: 800 882 7426  
[vpl-ra@agilent.com](mailto:vpl-ra@agilent.com)  
[Lexington-service@agilent.com](mailto:Lexington-service@agilent.com)

#### **EUROPE:**

Toll Free: 00 800 234 234 00  
[vpt-customer@agilent.com](mailto:vpt-customer@agilent.com)

#### **PACIFIC RIM:**

please visit our website for individual office  
information  
<http://www.agilent.com/chem/vacuum>

**Worldwide Web Site, Catalog and Order On-  
line:**

[www.agilent.com/chem/vacuum](http://www.agilent.com/chem/vacuum)  
Representatives in most countries



**Agilent Technologies**

## In This Book

The manual describes the following:

- Istruzioni per l'uso
- Bedienungshandbuch
- Notice de mode d'emploi
- Manual de instrucciones
- 用户手册
- ユーザーマニュアル
- Instruction for Use
- Technical information

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87-900-137-01

Edition 05/23  
Issue F.00

