



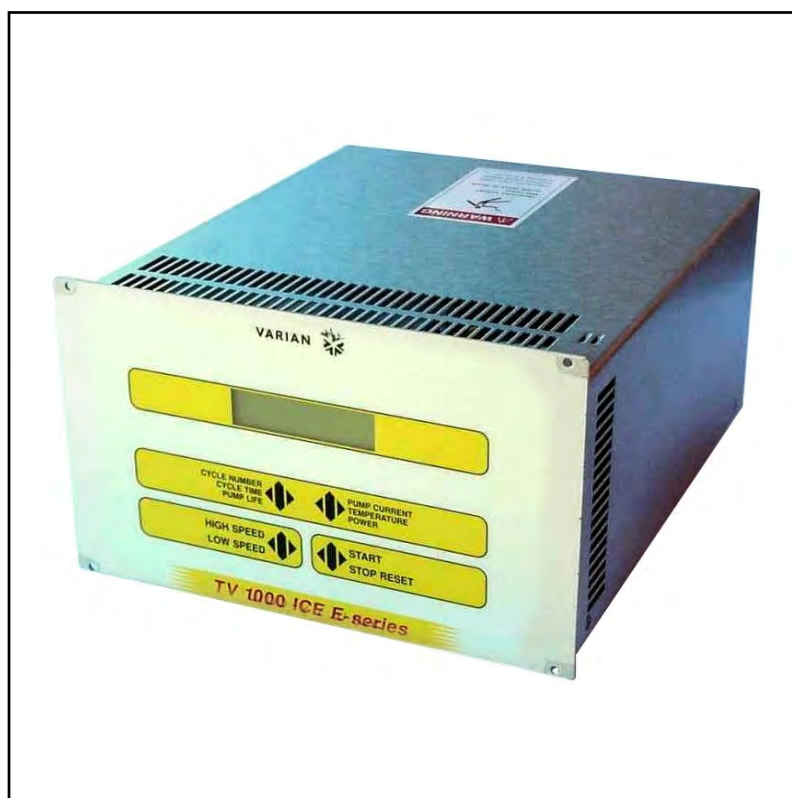
**VARIAN**   
*vacuum technologies*

# ***Turbo-V 1000 ICE E-series Controller***

**Model 969-9464  
Model 969-9564**

*MANUALE ISTRUZIONI*  
*BEDIENUNGSHANDBUCH*  
*NOTICE DE MODE D'EMPLOI*  
*MANUAL DE INSTRUCCIONES*  
*MANUAL DE INSTRUÇÕES*  
*BEDRIJFSHANDLEIDING*  
*ISTRUKSTIONSBOG*  
*BRUKSANVISNING*  
*INSTRUKSJON MANUAL*  
*OHJEKÄSIKIRJA*  
*ΟΔΗΓΙΕΣ ΧΡΗΣΕΩΣ*  
*INSTRUCTION MANUAL*

## ***Turbo-V 1000 ICE E-series Controller***



**VARIAN**



*vacuum technologies*

*Dear Customer,*

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

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

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

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

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

*Sincerely,*

**Sergio PIRAS**

*Vice President and General Manager  
VARIAN Vacuum Technologies*

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

**CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION**

TO : VARIAN VACUUM TECHNOLOGIES TORINO - QUALITY ASSURANCE

FAX N° : XXXX - 011 - 9979350

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

E-MAIL : marco.marzio@varianinc.com

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

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



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## INFORMAZIONI GENERALI

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Varian prima dell'utilizzo dell'apparecchiatura. La Varian si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche. I controller della serie Turbo-V 1000 ICE E-series sono dei convertitori di frequenza, controllati da un microprocessore, realizzati con componenti a stato solido e con capacità di autodiagnostica e autoprotezione. I controller pilotano le pompe della serie Turbo-V 1000 ICE E-series (con un processo suddiviso in dieci passi) durante la fase di avvio controllando la tensione e la corrente in rapporto alla velocità raggiunta dalla pompa. Essi incorporano tutta la circuiteria necessaria per il funzionamento automatico delle pompe della serie Turbo-V 1000 ICE E-series. Tramite connettori ausiliari sono disponibili i comandi per l'avvio e l'arresto della pompa da remoto, i segnali che indicano lo stato operativo della pompa, i comandi per l'avvio e l'arresto della pompa di pre-vuoto, i segnali di bloccaggio (per interruttori a pressione, interruttori di controllo del flusso dell'acqua, ecc.), i segnali di controllo della fascia riscaldante (heater jacket), i segnali di controllo del flussimetro e quelli per la gestione della valvola di pulizia (purge valve). Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante l'utilizzo dell'apparecchiatura. Informazioni dettagliate sono fornite nell'appendice "Technical Information".

**Questo manuale utilizza le seguenti convenzioni:**



### PERICOLO!

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



### ATTENZIONE!

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

### NOTA

Le note contengono informazioni importanti estrapolate dal testo.

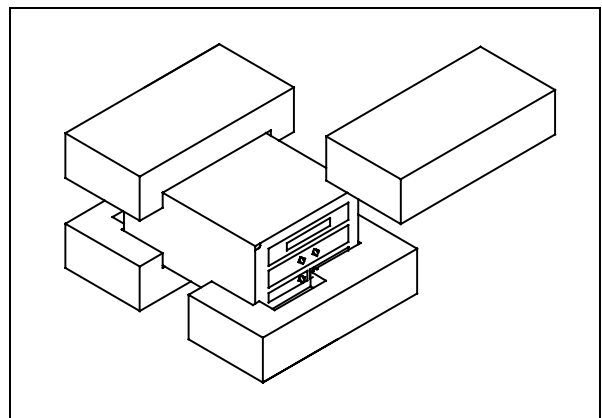
## IMMAGAZZINAMENTO

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

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

## PREPARAZIONE PER L'INSTALLAZIONE

Il controller viene fornito in un imballo protettivo speciale; se si presentano segni di danni, che potrebbero essersi verificati durante il trasporto, contattare l'ufficio vendite locale. Durante l'operazione di disimballaggio, prestare particolare attenzione a non lasciar cedere il controller e a non sottoporlo ad urti. Non disperdere l'imballo nell'ambiente. Il materiale è completamente riciclabile e risponde alla direttiva CEE 85/399 per la tutela dell'ambiente.



*Imballo dei controllers*

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

- il modello 969-9464 per 220 Vac
- il modello 969-9564 per 120 Vac

Verificare che sia stata selezionata la tensione corretta e quindi ricollegare il cavo di alimentazione.

## INSTALLAZIONE



**PERICOLO!**

Il controller è fornito di un cavo di alimentazione a tre fili con una spina di tipo approvato a livello internazionale. Utilizzare sempre questo cavo di alimentazione ed inserire la spina in una presa con un adeguato collegamento di massa onde evitare scariche elettriche.

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

### NOTA

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

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

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

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

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

## USO

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

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



**PERICOLO!**

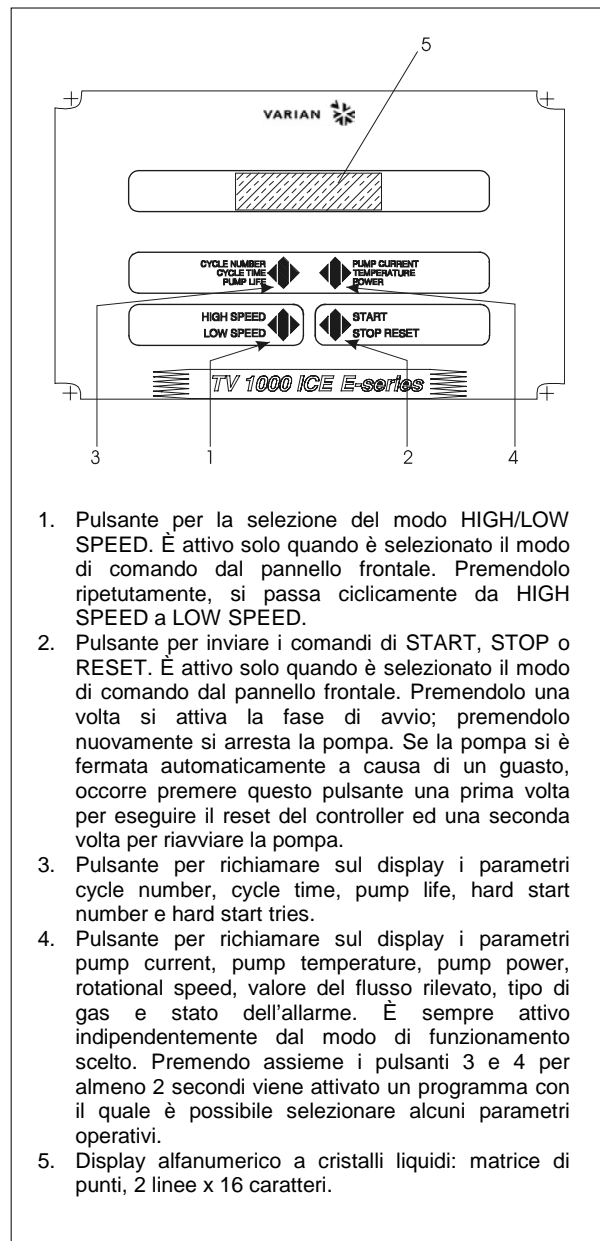
Per evitare danni alle persone ed all'apparato, nel caso in cui la pompa sia appoggiata su di un tavolo assicurarsi che sia stabile. Non fare funzionare mai la pompa se la flangia di ingresso non è collegata al sistema o non è chiusa con la flangia di chiusura.

## NOTA

Il connettore di richiusura J1 deve essere lasciato collegato con il suo ponticello se non viene effettuato alcun collegamento esterno. La pompa di pre-vuoto e la pompa Turbo-V possono essere accese contemporaneamente.

## Comandi, Indicatori e Connettori del Controller

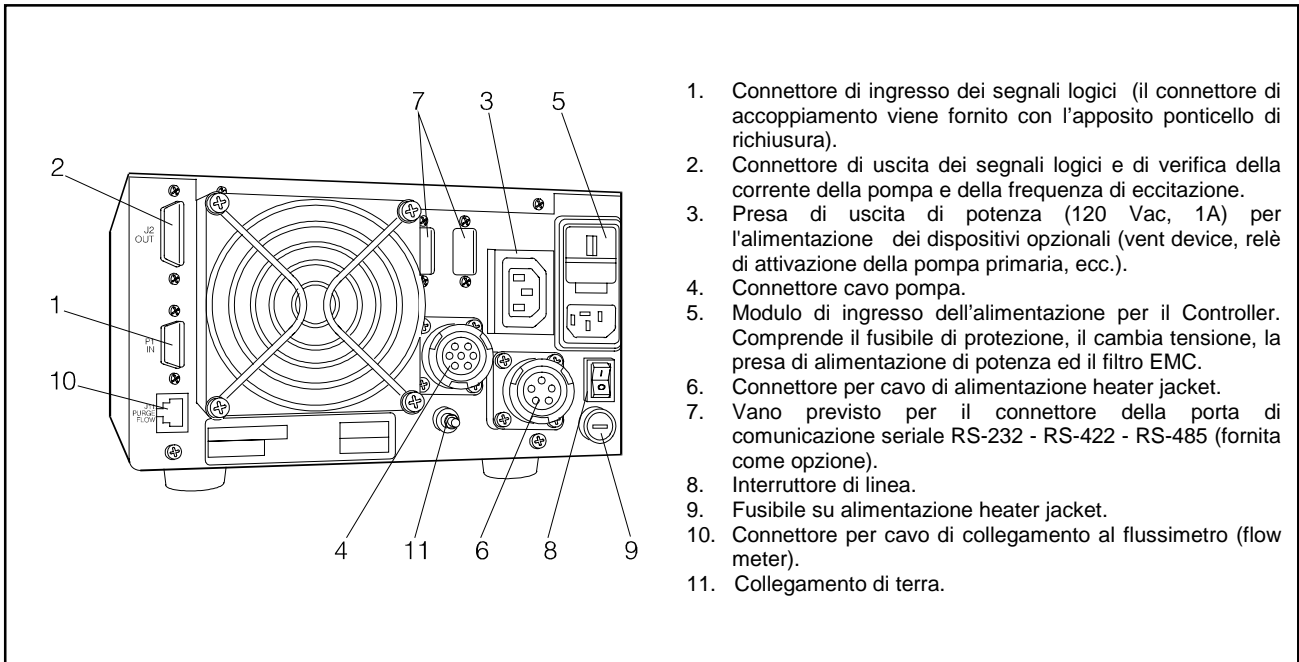
Di seguito sono illustrati il pannello di comando del Controller ed i pannelli di interconnessione. Per maggiori dettagli fare riferimento alla sezione "Technical Information".



1. Pulsante per la selezione del modo HIGH/LOW SPEED. È attivo solo quando è selezionato il modo di comando dal pannello frontale. Premendolo ripetutamente, si passa ciclicamente da HIGH SPEED a LOW SPEED.
2. Pulsante per inviare i comandi di START, STOP o RESET. È attivo solo quando è selezionato il modo di comando dal pannello frontale. Premendolo una volta si attiva la fase di avvio; premendolo nuovamente si arresta la pompa. Se la pompa si è fermata automaticamente a causa di un guasto, occorre premere questo pulsante una prima volta per eseguire il reset del controller ed una seconda volta per riavviare la pompa.
3. Pulsante per richiamare sul display i parametri cycle number, cycle time, pump life, hard start number e hard start tries.
4. Pulsante per richiamare sul display i parametri pump current, pump temperature, pump power, rotational speed, valore del flusso rilevato, tipo di gas e stato dell'allarme. È sempre attivo indipendentemente dal modo di funzionamento scelto. Premendo assieme i pulsanti 3 e 4 per almeno 2 secondi viene attivato un programma con il quale è possibile selezionare alcuni parametri operativi.
5. Display alfanumerico a cristalli liquidi: matrice di punti, 2 linee x 16 caratteri.

Pannello frontale del Controller  
969-9464 e 969-9564





*Pannello posteriore dei controller 969-9464 e 969-9564*

**PROCEDURE DI USO**

**Accensione del Controller**

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

**Avvio della Pompa**

Per avviare la pompa occorre premere il pulsante START del pannello frontale.

**Arresto della Pompa**

Per arrestare la pompa occorre premere il pulsante STOP del pannello frontale.

**MANUTENZIONE**

I controller della serie Turbo-V 1000 ICE E-series non richiedono alcuna manutenzione. Qualsiasi intervento deve essere eseguito da personale autorizzato.

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



**PERICOLO!**

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

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

**MESSAGGI DI ERRORE**

In alcuni casi di guasto la circuiteria di autodiagnosi del controller presenta alcuni messaggi di errore elencati nella tabella riportata nella pagina seguente.

MESSAGGIO	DESCRIZIONE	AZIONE CORRETTIVA
<b>CHECK CONNECTION TO PUMP</b>	Malfunzionamento nel collegamento tra pompa e controller	Verificare che il cavo di collegamento tra pompa e controller sia ben fissato da entrambe le estremità e non sia interrotto. Premere due volte il pulsante START per riavviare la pompa.
<b>PUMP WAITING INTERLOCK</b>	È attivo il segnale di interlock presente sul connettore P1 a causa dell'interruzione del corto circuito tra il pin 3 ed il pin 8 del connettore J1, o a causa dell'apertura del segnale di interlock esterno.	Ripristinare il corto circuito tra il pin 3 ed il pin 8 del connettore J1, o chiudere il segnale di interlock esterno
<b>FAULT: PUMP OVERTEMP.</b>	La temperatura del cuscinetto superiore della pompa ha superato i 60 °C.  La temperatura del cuscinetto inferiore della pompa ha superato gli 80 °C	Attendere che la temperatura ritorni al di sotto della soglia. Premere due volte il pulsante START per riavviare la pompa.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	La temperatura del trasformatore del controller ha superato i 90 °C.	Attendere che la temperatura ritorni al di sotto della soglia. Premere due volte il pulsante START per riavviare la pompa.
<b>FAULT: TOO HIGH LOAD</b>	Durante il funzionamento normale la corrente assorbita dalla pompa è maggiore di quella programmata (8 A).	Verificare che il rotore della pompa abbia la possibilità di ruotare liberamente. Premere due volte il pulsante START per riavviare la pompa.
<b>FAULT: SHORT CIRCUIT</b>	Durante il funzionamento normale (dopo la fase di avvio) la connessione di uscita è in corto circuito (corrente di uscita maggiore di 16 A).	Verificare i collegamenti tra pompa e controller. Premere due volte il pulsante START per riavviare la pompa.
<b>OVERVOLTAGE</b>	Si è verificato un guasto nella sezione di alimentazione del controller, o il controller ha ricevuto un segnale spurio.	Premere due volte il pulsante START per riavviare la pompa. Se il messaggio si ripresenta rivolgersi alla Varian per la manutenzione.
<b>FLOW METER ALARM</b>	Allarme relativo al flusso di purge. Il valore del flusso è rimasto ad un valore inferiore alla soglia impostata, per un tempo maggiore o uguale a 10 secondi.	Controllare il corretto funzionamento del circuito di alimentazione del gas.
<b>HIGH POWER START FAIL</b>	Il controller in fase di Start ha eseguito 5 sequenze di start in modalità alta coppia senza riuscire ad avviare la pompa.	Verificare che il rotore della pompa sia libero di ruotare. Premere due volte il pulsante start per avviare la pompa.

**ALLGEMEINES**

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 Varian keinerlei Haftung. Die Controller der Serie Turbo-V 1000 ICE E-series sind mikroprozessor-gesteuerte Frequenzwandler. Sie sind mit Festkörperbauteilen gefertigt und verfügen über ein Selbstdiagnose- und ein Selbstschutzsystem. Die Controller steuern die Pumpen der Serie 1000 ICE E-series (durch einen 10-Schritte-Prozeß) in der Startphase, indem sie die Spannung und die Stromstärke im Verhältnis zur Pumpengeschwindigkeit kontrollieren.

Sie enthalten alle für den automatischen Betrieb der Pumpenserie Turbo-V 1000 ICE E-series erforderlichen Schaltungen. Mittels Hilfsverbinder sind die Fernsteuerungen für Pumpenstart- und stopp, die Signale für die Anzeige des Pumpenzustands, die Start- und Stoppsteuerungen der Vorvakuumpumpen, sowie die Sperrsignale für Druckschalter, Wasserstrom-Kontrollschalter, Wärmeband, (heater jacket) die Kontrollsignale des Durchflußmessers, sowie die Kontrollsignale zur Überwachung der Reinigungsventile (purge valve) verfügbar. In den folgenden Abschnitten sind alle erforderlichen Informationen für die Sicherheit des Bedieners bei der Anwendung des Geräts aufgeführt. Detaillierte technische Informationen sind im Anhang "Technical Information" enthalten.

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



**GEFAHR!**

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



**ACHTUNG!**

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

**ANMERKUNG**

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

**LAGERUNG**

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

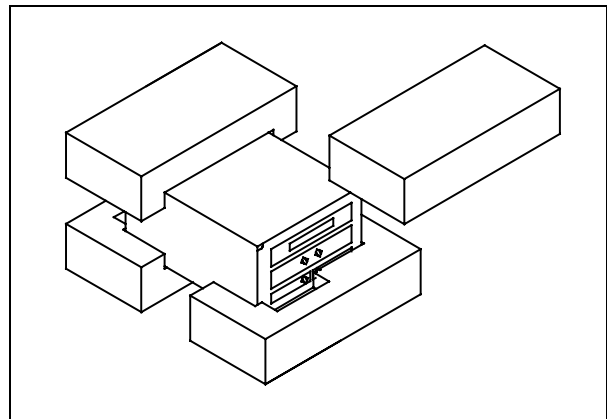
- Temperatur: von -20 °C bis +70 °C
- Relative Luftfeuchtigkeit: 0-95 % (nicht kondensierend)

**VOR DER INSTALLATION**

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

Beim Auspacken vorsichtig vorgehen, damit der Controller nicht fällt oder Stößen ausgesetzt wird.

Das Verpackungsmaterial muß korrekt entsorgt werden. Es ist vollständig recyclebar und entspricht der EG-Richtlinie 85/399 für Umweltschutz.



*Verpackung der Controller*

Alle Varian-Controller sind werkseitig für eine bestimmte Anschlußspannung ausgelegt:

- Modell 969-9464 für 220 Vws
- Modell 969-9564 für 120 Vws

Sicherstellen, daß die korrekte Spannung gewählt wurde, und das Netzkabel wieder anschließen.

INSTALLATION



**GEFAHR!**

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

**ANMERKUNG**

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

Beim Betrieb müssen folgende Umgebungsbedingungen eingehalten werden:

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

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

Für weitere Hinweise bezüglich Anschlüsse und Montage des bestellbaren Zubehörs siehe "Technical Information".

**GEBRAUCH**

In diesem Kapitel sind die wichtigsten Betriebsvorgänge aufgeführt. Für weitere Hinweise bezüglich Anschlüsse und Montage des bestellbaren Zubehörs siehe Kapitel "Use" im Anhang zu "Technical Information". Vor Benutzung des Controllers sämtliche elektrischen und pneumatischen Anschlüsse ausführen, und die Betriebsanleitung der angeschlossenen Pumpe durchlesen.



**GEFAHR!**

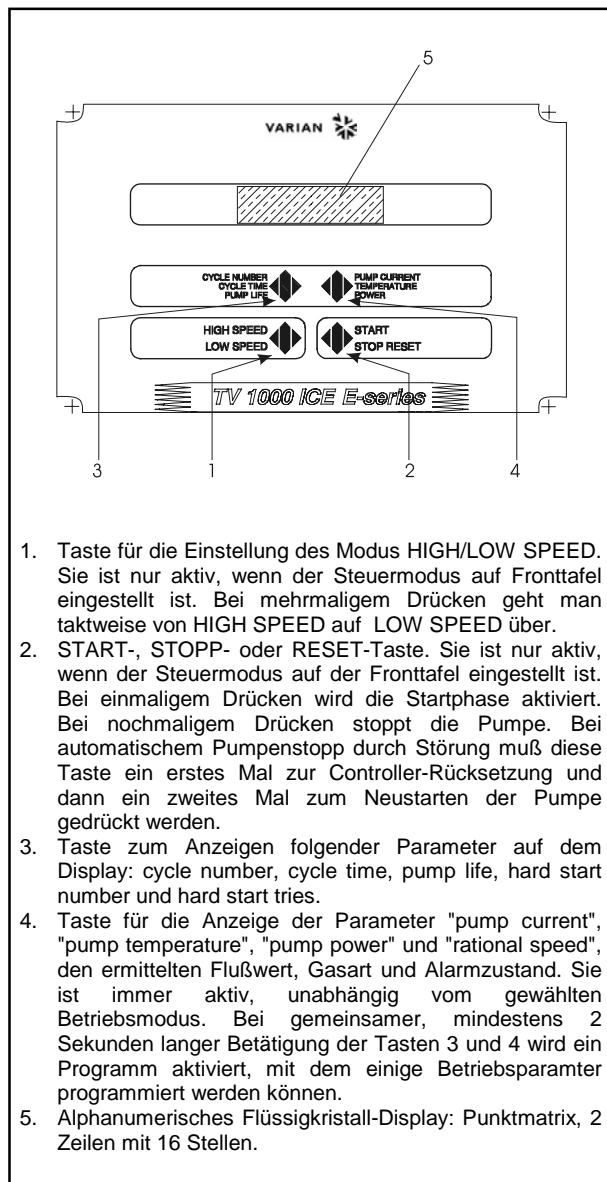
Steht die Pumpe auf einem Tisch, muß auf den stabilen Stand geachtet werden, da sonst die Gefahr von Personen- und Geräteschäden besteht. Die Pumpe nie einschalten, wenn der Eingangsflansch nicht am System angeschlossen bzw. nicht mit dem Schließflansch abgedeckt ist.

**ANMERKUNG**

Der Wiederverschließ-Verbinder J1 muß mit seiner Brücke angeschlossen bleiben, wenn kein externer Anschluß erfolgt. Die Vorvakuumpumpe und die Turbo-V-Pumpe können gleichzeitig eingeschaltet werden.

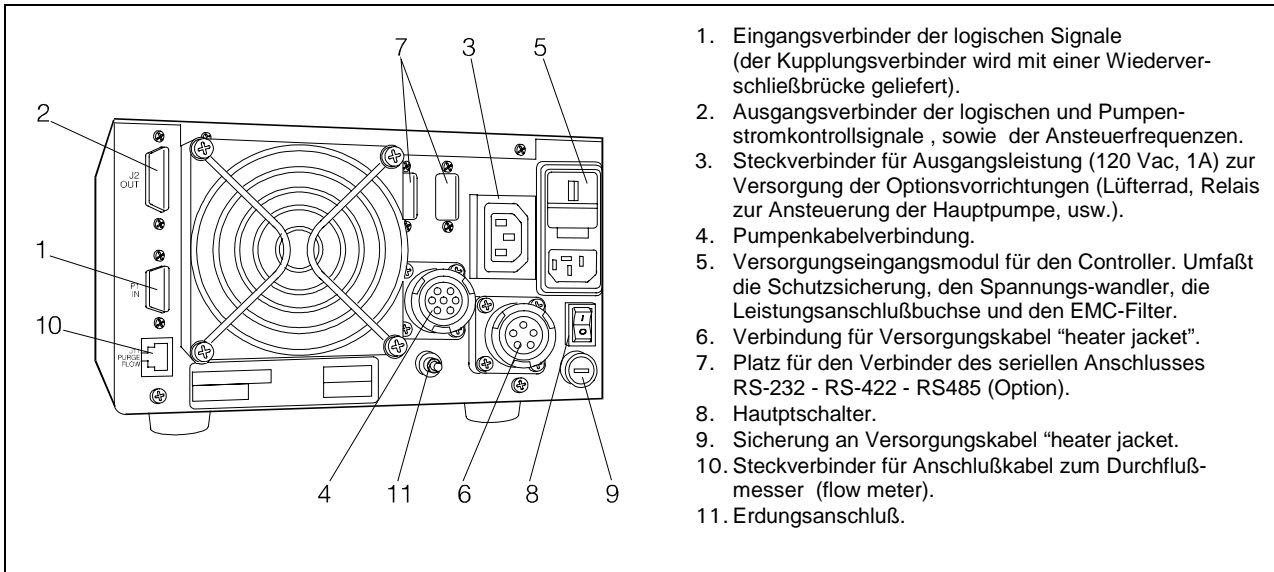
**Steuerungen, Anzeigen und Verbinder des Controllers**

Nachstehend werden die Steuertafel des Controllers sowie die Verbindungstafeln beschrieben. Für weitere Einzelheiten siehe "Technical Information".



1. Taste für die Einstellung des Modus HIGH/LOW SPEED. Sie ist nur aktiv, wenn der Steuermodus auf Fronttafel eingestellt ist. Bei mehrmaligem Drücken geht man taktweise von HIGH SPEED auf LOW SPEED über.
2. START-, STOPP- oder RESET-Taste. Sie ist nur aktiv, wenn der Steuermodus auf der Fronttafel eingestellt ist. Bei einmaligem Drücken wird die Startphase aktiviert. Bei nochmaligem Drücken stoppt die Pumpe. Bei automatischem Pumpenstopp durch Störung muß diese Taste ein erstes Mal zur Controller-Rücksetzung und dann ein zweites Mal zum Neustarten der Pumpe gedrückt werden.
3. Taste zum Anzeigen folgender Parameter auf dem Display: cycle number, cycle time, pump life, hard start number und hard start tries.
4. Taste für die Anzeige der Parameter "pump current", "pump temperature", "pump power" und "rational speed", den ermittelten Flußwert, Gasart und Alarmzustand. Sie ist immer aktiv, unabhängig vom gewählten Betriebsmodus. Bei gemeinsamer, mindestens 2 Sekunden langer Betätigung der Tasten 3 und 4 wird ein Programm aktiviert, mit dem einige Betriebsparameter programmiert werden können.
5. Alphanumerisches Flüssigkristall-Display: Punktmatrix, 2 Zeilen mit 16 Stellen.

Fronttafel der Controller  
969-9464 und 969-9564



Rückseitige Tafel der Controller 969-9464 und 969-9564

**BEDIENUNG**

**Einschalten des Controllers**

Zum Einschalten des Controllers genügt es, das Netzkabel an die Steckdose anzuschließen und den Leitungsschalter in Position 1 bringen.

**Pumpenstart**

Zum Starten der Pumpe muß die Taste START an der Fronttafel gedrückt werden.

**Pumpenstopp**

Zum Stoppen der Pumpe muß die STOPP-Taste an der Fronttafel gedrückt werden.

**WARTUNG**

Die Controller der Serie Turbo-V 1000 ICE E-series sind wartungsfrei. Eventuell erforderliche Eingriffe müssen von dazu befugtem Fachpersonal ausgeführt werden.

1. Eingangsverbinder der logischen Signale (der Kupplungsverbinder wird mit einer Wiederver-schließbrücke geliefert).
2. Ausgangsverbinder der logischen und Pumpen-stromkontrollsignale , sowie der Ansteuerfrequenzen.
3. Steckverbinder für Ausgangsleistung (120 Vac, 1A) zur Versorgung der Optionsvorrichtungen (Lüfterrad, Relais zur Ansteuerung der Hauptpumpe, usw.).
4. Pumpenkabelverbindung.
5. Versorgungseingangsmodul für den Controller. Umfaßt die Schutzsicherung, den Spannungs-wandler, die Leistungsanschlußbuchse und den EMC-Filter.
6. Verbindung für Versorgungskabel "heater jacket".
7. Platz für den Verbinder des seriellen Anschlusses RS-232 - RS-422 - RS485 (Option).
8. Hauptschalter.
9. Sicherung an Versorgungskabel "heater jacket".
10. Steckverbinder für Anschlußkabel zum Durchfluß-messer (flow meter).
11. Erdungsanschluß.

Bei einem Defekt kann der Varian-Reparaturdienst bzw. der "Varian advanced exchange service" in Anspruch genommen werden, der für die Erneuerung defekter Controller sorgt.



Vor jedem Eingriff am Controller muß der Netzstecker gezogen werden.

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

**FEHLERMELDUNGEN**

In einigen Störungsfällen zeigt das Selbstdiagnosesystem des Controllers die in der nachstehenden Tabelle zusammengefaßten Meldungen an.

<b>MELDUNG</b>	<b>BESCHREIBUNG</b>	<b>BEHEBUNG</b>
<b>CHECK CONNECTION TO PUMP</b>	Fehlfunktion der Pumpen-Controller Verbindung.	Sicherstellen, daß das Verbindungskabel zwischen Pumpe und Controller an beiden Seiten korrekt befestigt ist und keine Unterbrechung vorliegt. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
<b>PUMP WAITING INTERLOCK</b>	Das Interlock-Signal auf dem Verbinder P1 ist wegen der Kurzschlußunterbrechung zwischen Pin 3 und Pin 8 des Verbinders J1 oder wegen der Öffnung des externen Interlock-Signals aktiv.	Den Kurzschluß zwischen Pin 3 und Pin 8 des Verbinders J1 rücksetzen oder das externe Interlock-Signal schließen.
<b>FAULT: PUMP OVERTEMP.</b>	Die Temperatur des oberen Lagers bzw. der Pumpe hat 60 °C überschritten. Die Temperatur des unteren Lagers bzw. der Pumpe hat 80 °C überschritten.	Warten bis die Temperatur unter den Schwellenwert gesunken ist. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	Die Temperatur des Controller-Trafos hat 90 °C überschritten.	Warten bis die Temperatur unter den Schwellenwert gesunken ist. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
<b>FAULT: TOO HIGH LOAD</b>	Während des Normalbetriebs (nach der Startphase) ist die Pumpenstromaufnahme größer als die vorgesehene (8 A).	Sicherstellen, daß der Pumpenrotor ungehindert drehen kann. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
<b>FAULT: SHORT CIRCUIT</b>	Während des Normalbetriebs (nach der Startphase) erfolgt ein Kurzschluß der Ausgangsverbindung (Ausgangsstrom größer als 16 A).	Die Verbindung zwischen Pumpe und Controller prüfen. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
<b>OVERVOLTAGE</b>	Im Bereich der Kontrollerversorgung ist eine Störung aufgetreten oder der Controller hat ein unechtes Signal empfangen.	Die Taste START zweimal drücken, um die Pumpe wieder anzufahren. Falls die Meldung nochmals auftritt, die Firma Varian zur Instandsetzung zu Rate ziehen.
<b>FLOW METER ALARM</b>	Alarm hinsichtlich Auswurf Fluß. Der Flußwert befindet sich für die Dauer von mehr als oder gleich 10 Sekunden auf einem Wert unterhalb der eingestellten Schwelle.	Einwandfreien Betrieb des Gasversorgungskreises überprüfen.
<b>HIGH POWER START FAIL</b>	In der Startphase hat der Controller 5 Startsequenzen mit hoher Kopplung versucht, ohne dass ein Starten der Pumpe gelungen ist.	Sicherstellen, dass der Pumpenrotor sich frei bewegen kann. Zum Starten der Pumpe zweimal die Starttaste drücken.

**INDICATIONS GENERALES**

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 Varian, avant d'utiliser l'appareil. Varian décline par conséquent toute responsabilité en cas d'observation 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 contrôleurs de la série Turbo-V 1000 ICE E-series sont des convertisseurs de fréquence, contrôlés par un microprocesseur, réalisés avec des éléments à l'état solide et ayant des capacités d'autodiagnostic et d'auto-protection.

Les contrôleurs pilotent les pompes de la série Turbo-V 1000 ICE E-series (par un processus subdivisé en dix pas) lors de la phase de mise en marche, en contrôlant la tension et le courant par rapport à la vitesse atteinte par la pompe.

Ils incorporent l'ensemble de circuits nécessaire au fonctionnement automatique des pompes de la série Turbo-V 1000 ICE E-series.

Des connecteurs auxiliaires permettent de disposer des commandes de mise en marche et d'arrêt de la pompe à distance, des signaux indiquant l'état opérationnel de la pompe, des commandes de mise en marche et d'arrêt de la pompe à pré-vidé ainsi que de signaux de blocage (pour les interrupteurs à pression, les interrupteurs de contrôle du flux de l'eau, les signaux de commande de la bande chauffante (heater jacket), les signaux de commande du fluxmètre et ceux pour la commande de la soupape de purge (purge valve).

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 l'appendice "Technical Information".

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



**DANGER!**

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



**ATTENTION**

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

**NOTE**

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

**EMMAGASINAGE**

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

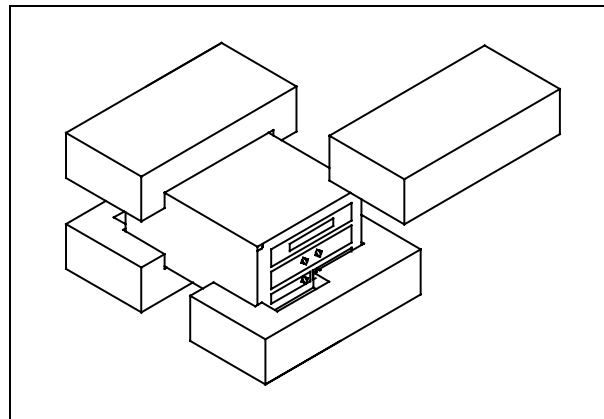
- température: de - 20 °C à + 70 °C
- humidité relative: de 0% à 95 % (non condensante).

**PREPARATION POUR L'INSTALLATION**

Le contrôleur est fourni dans un emballage de protection spécial; si l'on constate des marques de dommages pouvant s'être produits pendant le transport, contacter aussitôt le bureau de vente local.

Pendant l'opération d'ouverture de l'emballage, veiller tout particulièrement à ne pas laisser tomber le contrôleur et à ne lui faire subir aucun choc.

Ne pas jeter l'emballage dans la nature. Le matériel est entièrement recyclable et il est conforme aux directives CEE 85/399 en matière de protection de l'environnement.



*Emballage des contrôleurs*

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

- le modèle 969-9464 pour 220 Vca
- le modèle 969-9564 pour 120 Vca.

S'assurer que la tension correcte a été sélectionnée, puis reconnecter le câble d'alimentation.

**INSTALLATION**



**DANGER!**

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

**NOTE**

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

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

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

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

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

**UTILISATION**

Dans ce paragraphe, on indique les principales procédures opérationnelles. Pour tous autres détails et pour les procédures concernant des connexions ou des éléments en option, se reporter au paragraphe "Use" de l'appendice "Technical Information". Avant d'utiliser le contrôleur, effectuer toutes les connexions électriques et pneumatiques et se référer à la notice de la pompe connectée.



**DANGER!**

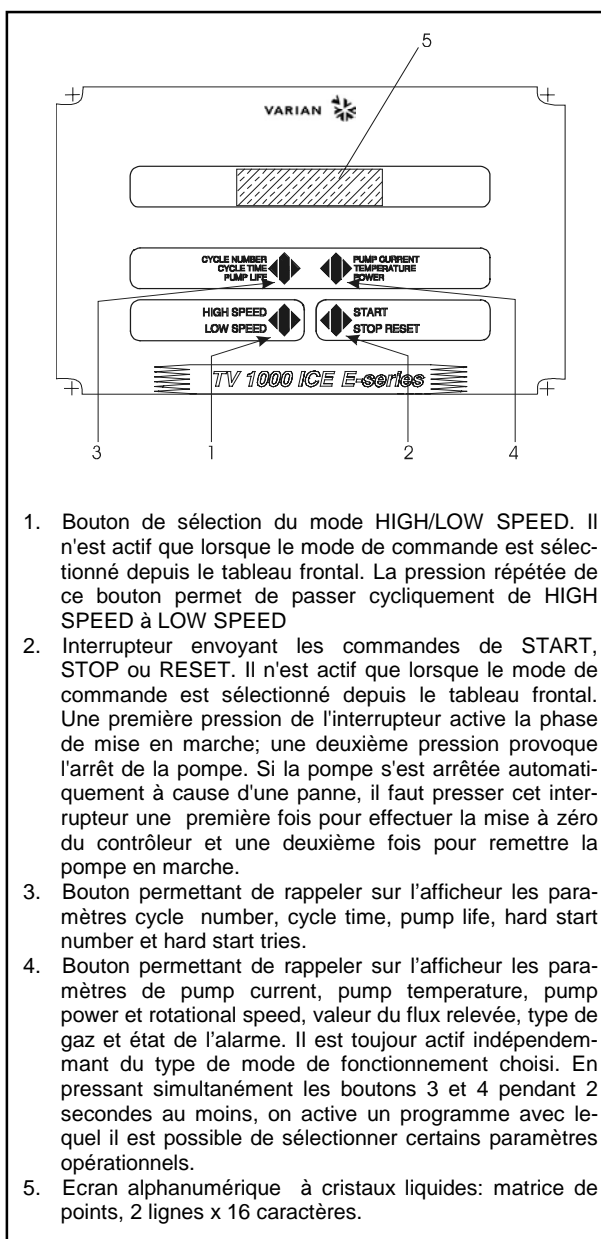
Pour éviter tous dommages aux personnes et à l'appareil, si la pompe est placée sur une table, s'assurer que cette dernière est stable. Ne jamais faire fonctionner la pompe si la bride d'entrée n'est pas connectée au système ou si elle n'est pas fermée à l'aide de la bride de serrage.

**NOTE**

Laisser le connecteur de réenclenchement J1 connecté à sa barrette s'il n'est procédé à aucune connexion extérieure. La pompe à pré-vide et la pompe Turbo-V peuvent être mises en marche simultanément.

**Commandes, Indicateurs et Connecteurs du Contrôleur**

On présente ci-dessous le tableau de commande du Contrôleur ainsi que les tableaux d'interconnexion. Pour de plus amples détails, se reporter à la section "Technical Information".



1. Bouton de sélection du mode HIGH/LOW SPEED. Il n'est actif que lorsque le mode de commande est sélectionné depuis le tableau frontal. La pression répétée de ce bouton permet de passer cycliquement de HIGH SPEED à LOW SPEED
2. Interrupteur envoyant les commandes de START, STOP ou RESET. Il n'est actif que lorsque le mode de commande est sélectionné depuis le tableau frontal. Une première pression de l'interrupteur active la phase de mise en marche; une deuxième pression provoque l'arrêt de la pompe. Si la pompe s'est arrêtée automatiquement à cause d'une panne, il faut presser cet interrupteur une première fois pour effectuer la mise à zéro du contrôleur et une deuxième fois pour remettre la pompe en marche.
3. Bouton permettant de rappeler sur l'afficheur les paramètres cycle number, cycle time, pump life, hard start tries.
4. Bouton permettant de rappeler sur l'afficheur les paramètres de pump current, pump temperature, pump power et rotational speed, valeur du flux relevée, type de gaz et état de l'alarme. Il est toujours actif indépendamment du type de mode de fonctionnement choisi. En pressant simultanément les boutons 3 et 4 pendant 2 secondes au moins, on active un programme avec lequel il est possible de sélectionner certains paramètres opérationnels.
5. Ecran alphanumérique à cristaux liquides: matrice de points, 2 lignes x 16 caractères.

Tableau frontal des Contrôleurs  
969-9464 et 969-9564



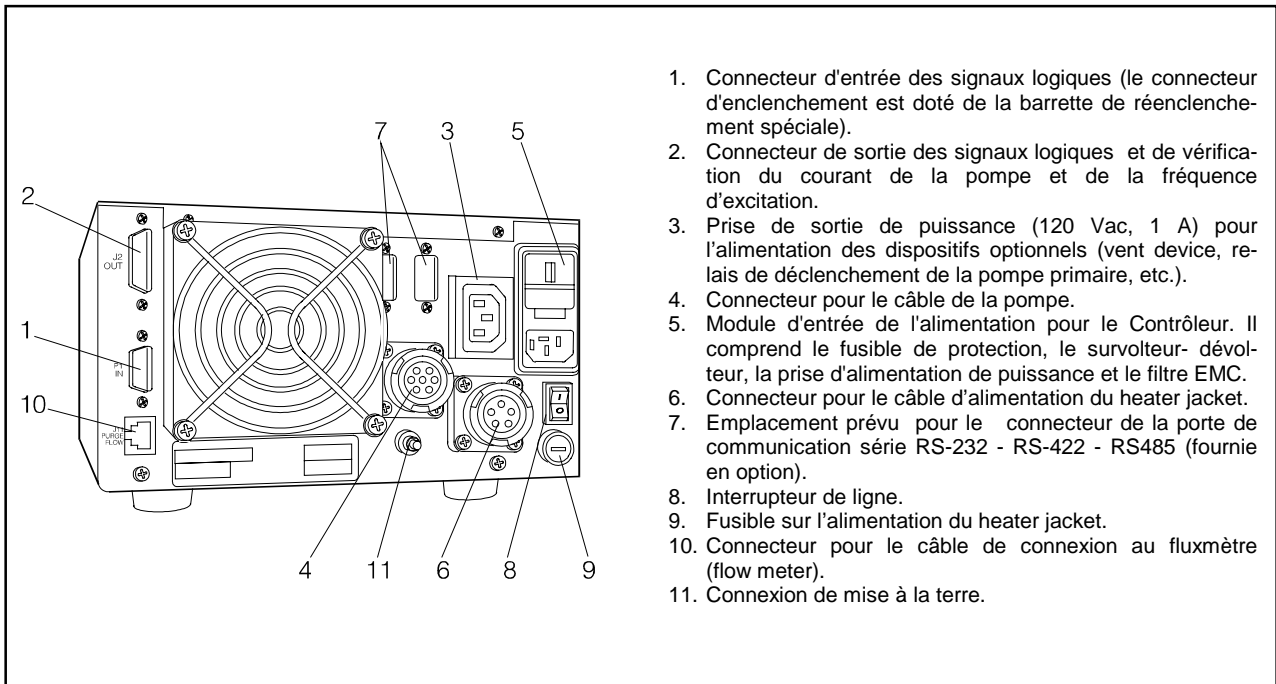


Tableau arrière des Contrôleurs 969-9464 et 969-9564

**PROCEDURES D'UTILISATION**

**Allumage du Contrôleur**

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

**Mise en marche de la Pompe**

Pour mettre la pompe en marche, presser l'interrupteur START du tableau frontal

**Arrêt de la Pompe**

Pour arrêter la pompe, presser l'interrupteur STOP du tableau frontal

**ENTRETIEN**

Les contrôleurs de la série Turbo-V 1000 ICE E-series n'exigent aucun entretien. Toute opération doit être effectuée par un personnel agréé.

1. Connecteur d'entrée des signaux logiques (le connecteur d'enclenchement est doté de la barrette de réenclenchement spéciale).
2. Connecteur de sortie des signaux logiques et de vérification du courant de la pompe et de la fréquence d'excitation.
3. Prise de sortie de puissance (120 Vac, 1 A) pour l'alimentation des dispositifs optionnels (vent device, relais de déclenchement de la pompe primaire, etc.).
4. Connecteur pour le câble de la pompe.
5. Module d'entrée de l'alimentation pour le Contrôleur. Il comprend le fusible de protection, le survolteur- dévolteur, la prise d'alimentation de puissance et le filtre EMC.
6. Connecteur pour le câble d'alimentation du heater jacket.
7. Emplacement prévu pour le connecteur de la porte de communication série RS-232 - RS-422 - RS485 (fournie en option).
8. Interrupteur de ligne.
9. Fusible sur l'alimentation du heater jacket.
10. Connecteur pour le câble de connexion au fluxmètre (flow meter).
11. Connexion de mise à la terre.

En cas de panne, il est possible de s'adresser au Service de réparation Varian ou bien au "Varian advance exchange service" qui permet d'obtenir un contrôleur régénéré à la place du contrôleur détraqué.



**DANGER!**

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

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

**MESSAGES D'ERREUR**

Dans certains cas de panne, l'ensemble de circuits d'autodiagnostic du contrôleur présente certains messages d'erreur indiqués dans le tableau ci-dessous.

<b>MESSAGE</b>	<b>DESCRIPTION</b>	<b>INTERVENTION</b>
<b>CHECK CONNECTION TO PUMP</b>	Disfonctionnement de la connexion entre la pompe et le contrôleur.	S'assurer que le câble de connexion entre la pompe et le contrôleur est bien fixé aux deux extrémités et qu'il n'est pas coupé. Presser deux fois l'interrupteur START pour réactiver la pompe.
<b>PUMP WAITING INTERLOCK</b>	Le signal d'interlock situé sur le connecteur P1 est actif à cause de la coupure du court-circuit entre le pin 3 et le pin 8 du connecteur J1 ou à cause de l'ouverture du signal d'interlock extérieur.	Rétablir le court-circuit entre le pin 3 et le pin 8 du connecteur J1 ou fermer le signal d'interlock extérieur.
<b>FAULT: PUMP OVERTEMP.</b>	La température du palier supérieur de la pompe a dépassé 60 °C. La température du palier inférieur de la pompe a dépassé 80 °C.	Attendre que la température retourne au-dessous du seuil. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	La température du transformateur du contrôleur a dépassé 90 °C.	Attendre que la température retourne au-dessous du seuil. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
<b>FAULT: TOO HIGH LOAD</b>	Au cours du fonctionnement normal, le courant consommé par la pompe est plus grand que celui qui a été programmé (8 A).	S'assurer que le rotor de la pompe a la possibilité de tourner librement. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
<b>FAULT: SHORT CIRCUIT</b>	Au cours du fonctionnement normal (après la phase de mise en marche), la connexion de sortie est en court-circuit (courant de sortie plus grand que 16 A).	Vérifier les connexions entre la pompe et le contrôleur. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
<b>OVERVOLTAGE</b>	Un défaut s'est avéré dans la section d'alimentation du contrôleur, ou le contrôleur a reçu un faux signal.	Appuyer deux fois sur le bouton START pour faire redémarrer la pompe. Si le message est réaffiché vous adresser à la société Varian pour l'entretien.
<b>FLOW METER ALARM</b>	Alarme concernant le flux de purge. La valeur du flux est restée au dessous du seuil défini pour une période supérieure ou égale à 10 secondes.	Vérifier le bon fonctionnement du circuit d'alimentation du gaz.
<b>HIGH POWER START FAIL</b>	Le contrôleur en phase de Start a effectué 5 séquences de start en modalité haut couple sans réussir à faire démarrer la pompe.	Vérifier que le rotor de la pompe soit libre de pouvoir tourner. Appuyer deux fois sur le bouton start pour faire démarrer la pompe.

**INFORMACIÓN GENERAL**

Este equipo se ha concebido para un uso profesional. El usuario deberá leer atentamente el presente manual de instrucciones y cualquier otra información suplementaria facilitada por Varian antes de utilizar el equipo. Varian se considera libre de cualquier responsabilidad debida al incumplimiento total o parcial de las instrucciones, al uso poco apropiado por parte de personal sin formación, a las operaciones no autorizadas o al uso que no cumpla con las normas nacionales específicas.

Los controlers de la serie Turbo-V 1000 ICE E-series son convertidores de frecuencia, controlados por un microprocesador, realizados con componentes en estado sólido y con capacidad de autodiagnos y autoprotección.

Los controlers pilotan las bombas de la serie Turbo-V 1000 ICE E-series (con un proceso dividido en diez pasos) durante la fase de puesta en marcha, controlando la tensión y la corriente en relación a la velocidad alcanzada por la bomba. Estos incorporan todos los circuitos de la serie Turbo-V 1000 ICE E-series.

Mediante conectores auxiliares están disponibles los mandos para la puesta en marcha y la parada de la bomba de remoto, las señales que indican el estado operativo de la bomba, los mandos para la puesta en marcha y la parada de la bomba de pre-vacío, las señales de bloqueo (para interruptores a presión, interruptores de control del caudal del agua, etc.), las señales de control de la faja de calefacción (heater jacket), las señales de control del indicador del flujo y las para la gestión de la válvula de limpieza (purge valve).

En los apartados siguientes se facilita toda la información necesaria para garantizar la seguridad del operador durante el uso del equipo. Una información más detallada se facilita en el Suplemento "Technical Information".

**Este manual utiliza los símbolos convencionales siguientes:**



**¡PELIGRO!**

Los mensajes de peligro atraen la atención del operador sobre un procedimiento o una operación específica que, al no realizarse correctamente, podría provocar graves lesiones personales.



**¡ATENCIÓN !**

Los mensajes de atención se visualizan antes de procedimientos que, al no respetarse, podrían provocar daños al equipo.

**NOTA**

*Las notas contienen información importante extraída del texto.*

**ALMACENAMIENTO**

Durante el transporte y el almacenamiento de los controlers se deberá cumplir con las condiciones ambientales siguientes:

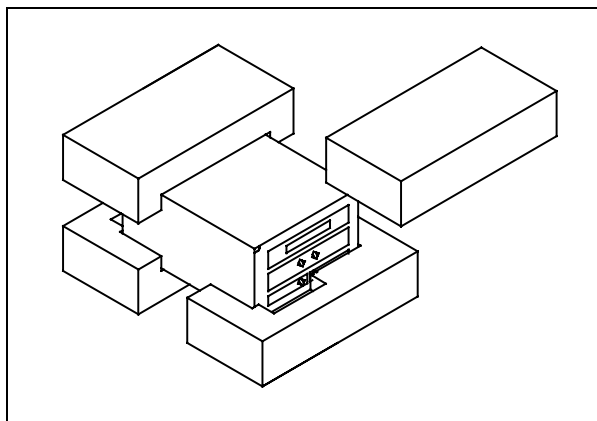
- temperatura: de -20 °C a +70 °C
- humedad relativa: 0 - 95% (no condensadora)

**PREPARACIÓN PARA LA INSTALACIÓN**

El controler se suministra en un embalaje de protección especial; si se observan señales de daños, que podrían haberse producido durante el transporte, ponerse en contacto con la oficina de venta más cercana.

Durante la operación de desembalaje, prestar una atención especial a no dejar caer el controler y evitarle golpes.

No dispersar el embalaje en el medio ambiente. El material es totalmente reciclable y cumple con la directiva CEE 85/399 para la preservación del medio ambiente.



*Embalaje de los Controlers*

Cada controler llega de Varian preparado para una cierta tensión de alimentación:

- el modelo 969-9464 por 220 Vac
- el modelo 969-9564 por 120 Vac

Comprobar que se ha seleccionado la tensión correcta y luego volver a conectar el cable de alimentación.

INSTALACIÓN



**¡PELIGRO!**

El controler va dotado de un cable de alimentación de tres hilos con una clavija de tipo aprobado a nivel internacional. Utilizar siempre este cable de alimentación e introducir la clavija en un enchufe con una conexión de masa adecuada para evitar descargas eléctricas.

Dentro del controler se desarrollan altas tensiones que pueden causar graves daños o la muerte. Antes de efectuar cualquier operación de instalación o mantenimiento del controler desconectarlo del enchufe de alimentación

**NOTA**

El controler puede instalarse en una mesa o dentro de un rack específico. En cualquier caso, es necesario que el aire de refrigeración pueda circular libremente alrededor del aparato. No instalar y/o utilizar el controler en ambientes expuestos a agentes atmosféricos (lluvia, hielo y nieve), polvos, gases agresivos, en ambientes explosivos o con alto riesgo de incendio.

Durante el funcionamiento es necesario que se respeten las condiciones ambientales siguientes:

- temperatura: de 0° C a + 40°C
- humedad relativa: 0 - 95% (no condensadora).

Para la conexión del controler con la bomba correspondiente utilizar el cable específico del controler.

Para otras conexiones y la instalación de los accesorios opcionales, véase la sección "Technical Information".

**USO**

En este apartado se citan los procedimientos operativos principales. Para más detalles y para procedimientos que impliquen conexiones u opcionales especiales, les remitimos al apartado "Use" del anexo "Technical Informations".

Antes de usar el controler efectuar todas las conexiones eléctricas y neumáticas y consultar el manual de la bomba conectada.



**¡PELIGRO!**

Para evitar lesiones a las personas y al aparato, si la bomba está apoyada sobre una mesa cerciorarse que es estable. No poner en marcha nunca la bomba si la brida de entrada no está conectada al sistema o no está cerrada con la brida de cierre.

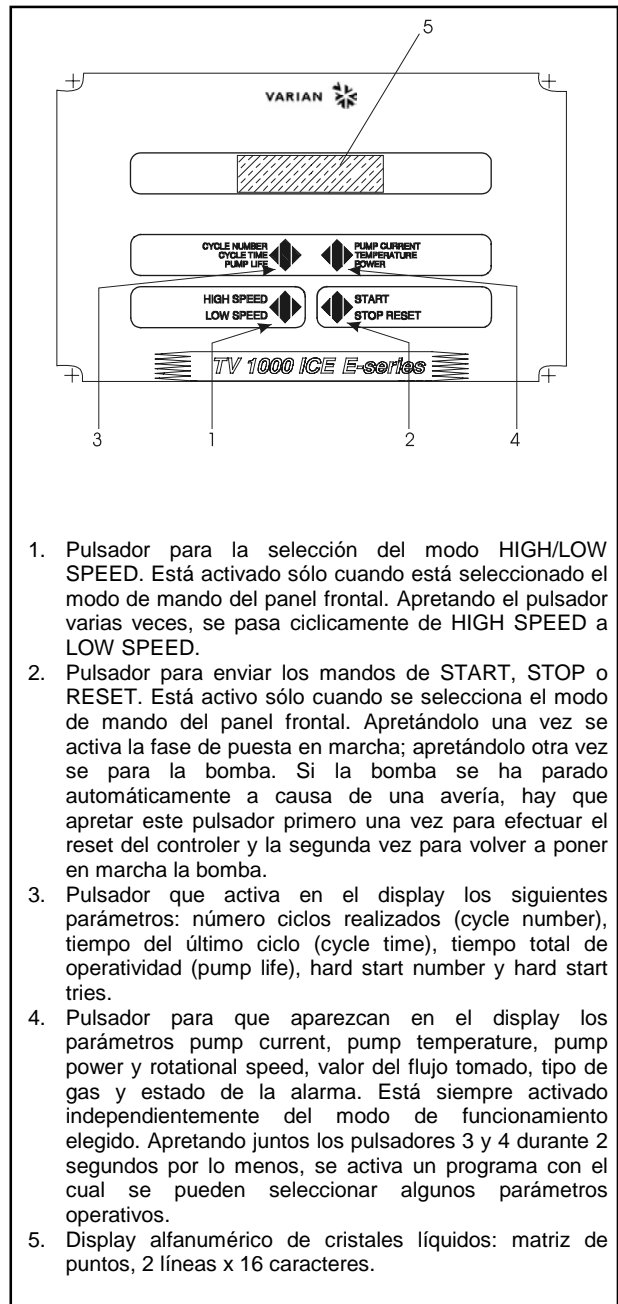
**NOTA**

El conector di cierre J1 ha de dejarse conectado con su conector puente si no se efectúa ninguna conexión exterior. La bomba pre-vacío y la bomba Turbo-V pueden encenderse simultáneamente.

**Mandos, Indicadores y Conectores del Controler**

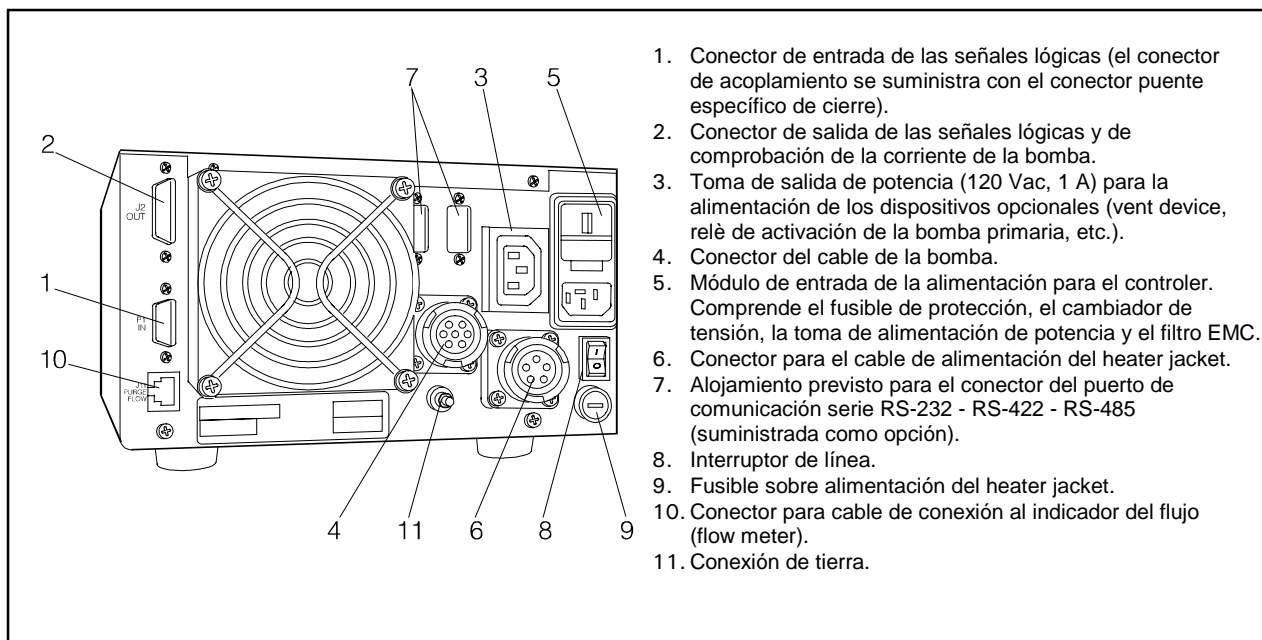
A continuación se ilustran el panel de mando del controler y los paneles de interconexión.

Para más detalles consultar la sección "Technical Information".



1. Pulsador para la selección del modo HIGH/LOW SPEED. Está activado sólo cuando está seleccionado el modo de mando del panel frontal. Apretando el pulsador varias veces, se pasa ciclicamente de HIGH SPEED a LOW SPEED.
2. Pulsador para enviar los mandos de START, STOP o RESET. Está activo sólo cuando se selecciona el modo de mando del panel frontal. Apretándolo una vez se activa la fase de puesta en marcha; apretándolo otra vez se para la bomba. Si la bomba se ha parado automáticamente a causa de una avería, hay que apretar este pulsador primero una vez para efectuar el reset del controler y la segunda vez para volver a poner en marcha la bomba.
3. Pulsador que activa en el display los siguientes parámetros: número ciclos realizados (cycle number), tiempo del último ciclo (cycle time), tiempo total de operatividad (pump life), hard start number y hard start tries.
4. Pulsador para que aparezcan en el display los parámetros pump current, pump temperature, pump power y rotational speed, valor del flujo tomado, tipo de gas y estado de la alarma. Está siempre activado independientemente del modo de funcionamiento elegido. Apretando juntos los pulsadores 3 y 4 durante 2 segundos por lo menos, se activa un programa con el cual se pueden seleccionar algunos parámetros operativos.
5. Display alfanumérico de cristales líquidos: matriz de puntos, 2 líneas x 16 caracteres.

Panel frontal del controler  
969-9464 y 969-9564



*Panel trasero del controler 969-9464 y 969-9564*

**PROCEDIMIENTOS DE USO**

**Encendido del controler**

Para encender el controler es suficiente introducir el cable de alimentación en la toma de red y colocar el interruptor de línea en posición 1.

**Puesta en marcha de la Bomba**

Para poner en marcha la bomba hay que apretar el pulsador START del panel frontal.

**Parada de la Bomba**

Para detener la bomba hay que apretar el pulsador STOP del panel frontal.

**MANTENIMIENTO**

Los controlers de la serie Turbo-V 1000 ICE E-series no necesitan ningún mantenimiento. Cualquier operación ha de ser efectuada por personal autorizado.

En caso de avería es posible utilizar el servicio de reparación Varian o del "Varian advance exchange service", que permite obtener un controler regenerado en vez del averiado.



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

En caso de que un controler se tenga que desguazar, efectuar su eliminación respetando las normas nacionales específicas.

**MENSAJES DE ERROR**

En algunos casos de avería los circuitos de autodiagnos del controler presenta algunos mensajes de error detallados en la tabla siguiente.

<b>MENSAJE</b>	<b>DESCRIPCIÓN</b>	<b>ACCIÓN CORRECTIVA</b>
<b>CHECK CONNECTION TO PUMP</b>	Mal funcionamiento en la conexión entre la bomba y el Controler.	Comprobar que el cable de conexión entra en la bomba y el controler está bien fijado por ambos extremos y no está interrumpido. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
<b>PUMP WAITING INTERLOCK</b>	Está activa la señal de interlock presente en el conector P1 a causa de la interrupción del cortocircuito entre el pin 3 y el pin 8 del conector J1, o a causa de la apertura de la señal de interlock externo.	Eliminar el cortocircuito entre el pin 3 y el pin 8 del conector J1, o cerrar la señal de interlock exterior.
<b>FAULT: PUMP OVERTEMP.</b>	La temperatura del rodamiento superior de la bomba ha superado los 60 °C.  La temperatura del rodamiento inferior de la bomba ha superado los 80 °C.	Esperar a que la temperatura vuelva por debajo del umbral. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	La temperatura del transformador del controler ha superado los 90 °C.	Esperar a que la temperatura vuelva por debajo del umbral. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
<b>FAULT: TOO HIGH LOAD</b>	Durante el funcionamiento normal (tras la fase de puesta en marcha) la corriente absorbida por la bomba es superior a la programada (8 A).	Comprobar que el rotor de la bomba tiene la posibilidad de girar libremente. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
<b>FAULT: SHORT CIRCUIT</b>	Durante el funcionamiento normal (tras la fase de puesta en marcha) la conexión de salida está en cortocircuito (corriente de salida más 16 A).	Comprobar las conexiones entre la bomba y el controler. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
<b>OVERVOLTAGE</b>	Ha ocurrido una avería en la sección de alimentación del controler, o el controler recibió una señal espuria.	Apretar dos veces el pulsador START para volver a poner en marcha la bomba. En caso el mensaje vuelva a aparecer, llamar a Varian para la manutención.
<b>FLOW METER ALARM</b>	Alarma concerniente al flujo de limpieza (purge). El valor del flujo se ha quedado a un valor inferior del limen impostado durante un tiempo mayor o igual de 10 segundos.	Controlar el correcto funcionamiento del circuito de alimentación del gas.
<b>HIGH POWER START FAIL</b>	El controler en fase de Start ha realizado 5 secuencias de start en el modo de "par alto" sin poder poner en marcha la bomba.	Comprobar que el rotor de la bomba tenga la posibilidad de girar libremente. Apretar dos veces el pulsador start para poner en marcha la bomba.

## INFORMAÇÕES GERAIS

Esta aparelhagem destina-se ao uso profissional. O utilizador deve ler atentamente o presente manual de instruções e todas as informações adicionais fornecidas pela Varian antes de utilizar a aparelhagem. A Varian não se responsabiliza pela inobservância total ou parcial das instruções, pelo uso indevido por parte de pessoas não treinadas, por operações não autorizadas ou pelo uso contrário às normas nacionais específicas.

Os controllers da série Turbo-V 1000 ICE E-series são conversores de frequência, controlados por um microprocessador, realizados com componentes em estado sólido e com capacidade de autodiagnóstico e autoprotecção.

Os controllers comandam as bombas da série Turbo-V 1000 ICE E-series (com um processo subdividido em dez passos) durante a fase de activação, controlando a tensão e a corrente em relação à velocidade atingida pela bomba.

Incorporam todos os circuitos necessários para o funcionamento automático das bombas da série Turbo-V 1000 ICE E-series.

Através de conectores auxiliares, estão disponíveis os comandos para a activação e a paragem da bomba por controlo remoto, os sinais que indicam o estado operativo da bomba, os comandos para a activação e a paragem da bomba de pré-vácuo, os sinais de bloqueio (para interruptores de pressão, interruptores de controlo do fluxo de água, etc.), os sinais de controlo da cinta aquecedora (heater jacket), os sinais de controlo do fluxímetro e os para a activação da válvula de descarga (purge valve). Nos parágrafos seguintes estão descritas todas as informações necessárias para garantir a segurança do operador durante o uso da aparelhagem. Informações pormenorizadas são fornecidas no apêndice "Technical Information".

**Este manual utiliza as seguintes convenções:**



**PERIGO!**

As mensagens de perigo chamam a atenção do operador para um procedimento ou uma prática específica que, se não efectuada correctamente, pode provocar graves lesões pessoais.



**ATENÇÃO!**

As mensagens de atenção são visualizadas antes de procedimentos que, se não observados, podem causar danos à aparelhagem.

## NOTA

As notas contêm informações importantes destacadas do texto.

## ARMAZENAGEM

Durante o transporte e a armazenagem dos controllers, devem ser satisfeitas as seguintes condições ambientais:

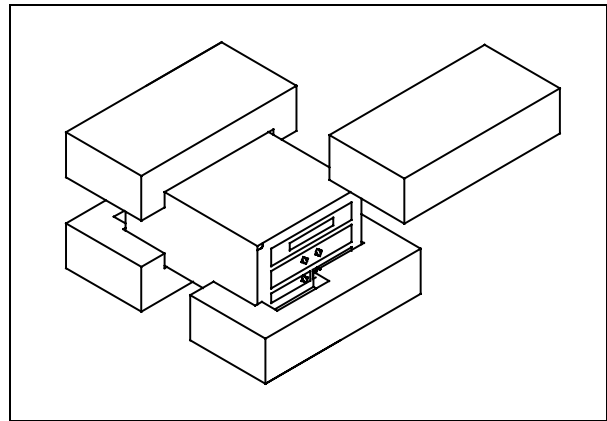
- temperatura: de -20 °C a + 70 °C
- humidade relativa: 0 - 95% (não condensante)

## PREPARAÇÃO PARA A INSTALAÇÃO

O controller é fornecido numa embalagem protectora especial; se apresentar sinais de danos, que poderiam verificar-se durante o transporte, entrar em contacto com o escritório de vendas local.

Durante a retirada da embalagem, tomar muito cuidado para não deixar cair o controller e para não submetê-lo a choques.

Não depositar a embalagem no meio ambiente. O material é completamente reciclável e responde à directriz CEE 85/399 para a protecção do meio ambiente.



*Embalagem dos controllers*

Cada controller chega à Varian predisposto para uma determinada tensão de alimentação:

- o modelo 969-9464 para 220 Vac
- o modelo 969-9564 para 120 Vac

Verificar se foi seleccionada a tensão correcta e, a seguir, ligar novamente o cabo de alimentação.

## INSTALAÇÃO



**!PERIGO!**

O controller é fornecido com um cabo de alimentação de três fios com uma tomada de tipo aprovado a nível internacional. Utilizar sempre este cabo de alimentação e ligar a tomada à rede com uma ligação de massa adequada, para evitar descargas eléctricas. No interior do controller desen-volvem-se altas tensões que podem provocar graves danos ou a morte. Antes de efectuar qualquer operação de instalação ou manutenção do controller, desligar a tomada de alimentação.

### NOTA

O controller pode ser instalado numa mesa ou no interior de um rack específico. Em todo caso, é necessário que o ar de refrigeração possa circular livremente ao redor da aparelhagem. Não instalar e/ou utilizar o controller em ambientes expostos a agentes atmosféricos (chuva, gelo, neve), poeiras, gases agressivos ou em ambientes com perigo de explosão ou com elevado risco de incêndio.

Durante o funcionamento é necessário que sejam respeitadas as seguintes condições ambientais:

- temperatura: de 0 °C a + 40 °C
- humidade relativa: 0 - 95% (não condensante).

Para a ligação do controller à respectiva bomba, utilizar o cabo específico do próprio controller.

Para as outras ligações e a instalação dos acessórios opcionais, ver a secção "Technical Information".

## UTILIZAÇÃO

Neste parágrafo são descritos os principais procedimentos operativos. Para maiores detalhes e para procedimentos que envolvem ligações ou peças opcionais, consultar o parágrafo "Use" do apêndice "Technical Information". Antes de usar o controller, efectuar todas as ligações eléctricas e pneumáticas e consultar o manual da bomba ligada.



**!PERIGO!**

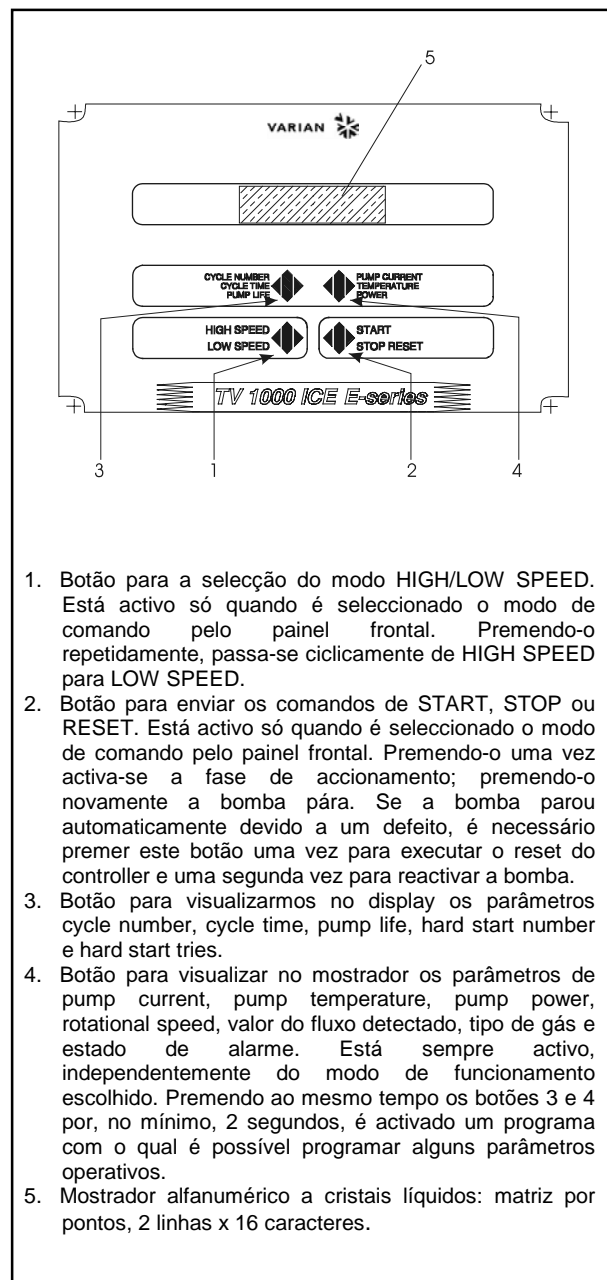
Para evitar danos às pessoas e à aparelhagem, caso a bomba esteja apoiada numa mesa, certificar-se que esteja estável. Nunca activar a bomba se o flange de entrada não estiver ligado ao sistema ou não estiver fechado com o flange de fecho.

### NOTA

O conector de fecho J1 deve permanecer ligado à sua ponte se não é efectuada nenhuma ligação externa. A bomba de pré-vácuo e a bomba Turbo-V podem ser ligadas simultaneamente.

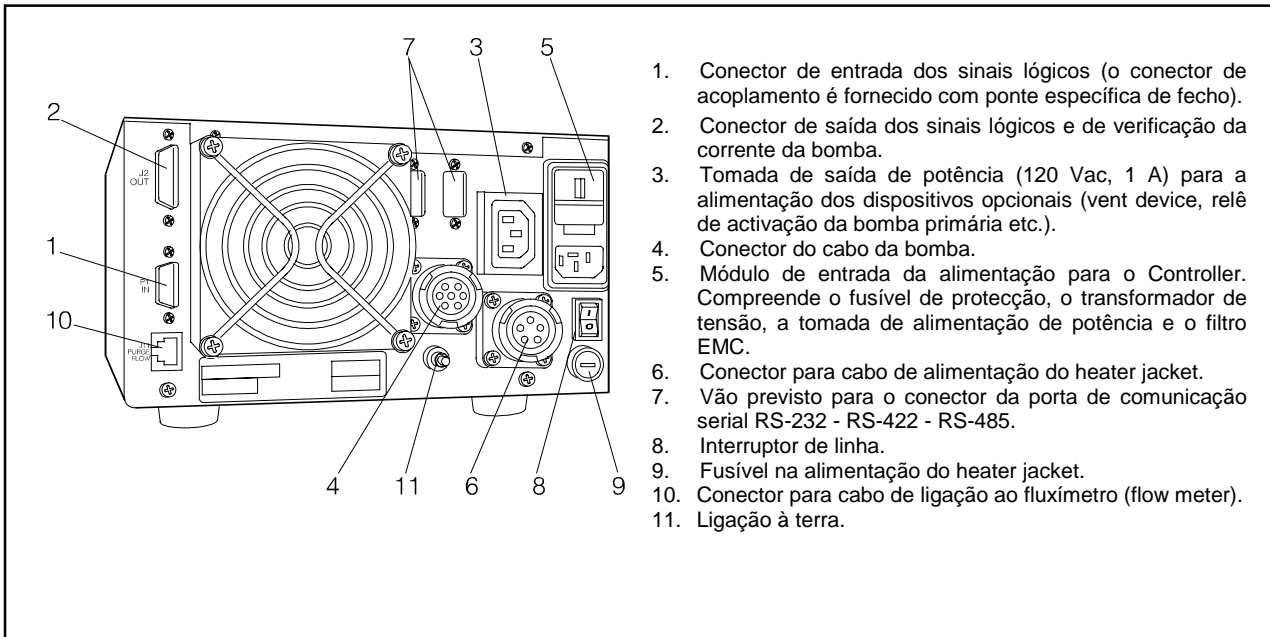
### Comandos, Indicadores e Conectores do Controller

A seguir, estão ilustrados o painel de comando do Controller e os painéis de interconexão. Para maiores detalhes, consultar a secção "Technical Information".



Painel frontal do Controller  
969-9464 e 969-9564





*Painel posterior dos Controladores 969-9464 e 969-9564*

**PROCEDIMENTOS DE USO**

**Acendimento do Controller**

Para ligar o controller, é suficiente inserir o cabo de alimentação na tomada de rede e coloque o interruptor de linha em posição 1.

**Activação da bomba**

Para activar a bomba, é necessário premer o botão START do painel frontal.

**Paragem da bomba**

Para parar a bomba, é necessário premer o botão STOP do painel frontal.

**MANUTENÇÃO**

Os controllers da série Turbo-V 1000 ICE E-series não requerem qualquer manutenção. Todas as operações devem ser efectuadas por pessoal autorizado.

Em caso de defeito é possível utilizar o serviço de reparação Varian ou o "Varian advanced exchange service", que permite obter um controller regenerado que substitua o controller com defeito.



**PERIGO!**

As Antes de efectuar qualquer operação no controller, desligar o cabo de alimentação.

Caso um controller deva ser destruído, proceder à sua eliminação respeitando as normas nacionais específicas.

**MENSAGENS DE ERRO**

Em alguns casos de defeitos, os circuitos de autodiagnóstico do controller apresentam mensagens de erro relacionadas na tabela abaixo.

<b>MENSAGEM</b>	<b>DESCRIÇÃO</b>	<b>ACÇÃO CORRECTIVA</b>
<b>CHECK CONNECTION TO PUMP</b>	Mau funcionamento na ligação entre a bomba e o controller.	Verificar se o cabo de ligação entre a bomba e o controller está bem fixado em ambas as extremidades e não está interrompido.  Premer duas vezes o botão START para reactivar a bomba.
<b>PUMP WAITING INTERLOCK</b>	É activado o sinal de interlock existente no conector P1 devido à interrupção do curto circuito entre o pin 3 e o pin 8 do conector J1 ou devido à abertura do sinal de interlock externo.	Restabelecer o curto circuito entre o pin 3 e o pin 8 do conector J1 ou fechar o sinal de interlock externo.
<b>FAULT: PUMP OVERTEMP.</b>	A temperatura do rolamento superior da bomba superou os 60 °C. A temperatura do rolamento inferior da bomba superou os 80 °C.	Aguardar até que a temperatura regresse dentro do limite estabelecido.  Premer duas vezes o botão START para reactivar a bomba.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	A temperatura do transformador do controller superou os 90 °C.	Aguardar até que a temperatura volte ao limite estabelecido.  Premer duas vezes o botão START para reactivar a bomba.
<b>FAULT: TOO HIGH LOAD</b>	Durante o funcionamento normal a corrente absorvida pela bomba é maior do que a programada (8 A).	Verificar se o rotor da bomba pode rodar livremente.  Premer duas vezes o botão START para reactivar a bomba.
<b>FAULT: SHORT CIRCUIT</b>	Durante o funcionamento normal (após a fase de accionamento) a conexão de saída está em curto circuito (corrente de saída maior que 16 A).	Verificar as ligações entre a bomba e o controller.  Premer duas vezes o botão START para reactivar a bomba.
<b>OVERVOLTAGE</b>	Verificou-se um defeito na secção de alimentação do controller, ou o controller recebeu um sinal falso	Premer duas vezes o botão START para reactivar a bomba.  Se a mensagem se reapresenta, dirigir-se à Varian para a manutenção.
<b>FLOW METER ALARM</b>	Alarme relativo ao fluxo de descarga. O valor do fluxo permaneceu num valor inferior ao limite estabelecido, durante um tempo maior ou igual a 10 segundos.	Verificar se o circuito de alimentação do gás funciona correctamente.
<b>HIGH POWER START FAIL</b>	O controlo em fase de Start conseguiu 5 sequências de start na modalidade alto par sem conseguir a reactivar a bomba.	Verificar que o rotor da bomba esteja livre de rodar. Premer duas vezes o botão start para reactivar a bomba

**ALGEMENE INFORMATIE**

Deze apparatuur is bestemd voor beroepsmatig gebruik. De gebruiker wordt verzocht aandachtig deze handleiding en alle overige door Varian verstrekte informatie door te lezen alvorens het apparaat in gebruik te nemen. Varian acht zich niet aansprakelijk voor de gevolgen van het niet of gedeeltelijk in acht nemen van de aanwijzingen, onoordeelkundig gebruik door niet hiervoor opgeleid personeel, reparaties waarvoor geen toestemming is verkregen of gebruik in strijd met de specifieke nationale wetgeving. De controllers van de Turbo-V 1000 ICE E-series zijn frequentieomzeters die gestuurd worden door een microprocessor, zijn gemaakt van halfgeleider-elementen en zijn in staat om zelfdiagnose en zelfbescherming uit te voeren.

De controllers sturen de pompen van de serie Turbo-V 1000 ICE E-series (met een proces bestaande uit tien stappen) tijdens de startfase, en controleren hierbij de spanning en de stroom in verhouding tot de door de pomp bereikte snelheid. De controllers zijn van circuits voorzien die noodzakelijk zijn voor de automatische werking van de pompen van de serie Turbo-V 1000 ICE E-series. Via hulpconnectoren zijn de sturingen voor het op afstand starten en stoppen van de pomp beschikbaar, de signalen die de bedrijfstoestand van de pomp aangeven, de sturingen voor het starten en stoppen van de pre-vacuümpomp, blokkeersignalen (voor drukschakelaars, regelschakelaars van de waterstroom, enz.), stuursignalen van de verhittingsmantel (heater jacket), stuursignalen van de stromingsmeter en regelsignalen van de reinigingsklep (purge valve). In de volgende paragrafen is alle informatie vermeld om de veiligheid van de operator tijdens het gebruik van de apparatuur te verzekeren. Gedetailleerde informatie is te vinden in de bijlage "Technical information".

**Deze handleiding hanteert de volgende symbolen:**



**GEVAAR!**

Bij dit symbool staat tekst die de aandacht van de operator vestigt op een speciale procedure of methode die, indien niet correct uitgevoerd, ernstig lichamelijk letsel kan veroorzaken.



**ATTENTIE**

Bij dit symbool staat tekst met procedures die, indien niet opgevolgd, schade aan apparatuur kunnen veroorzaken.

**OPMERKING**

*De opmerkingen bevatten belangrijke informatie die uit de tekst is gelicht.*

**OPSLAG**

Tijdens het transport en de opslag van de controllers moeten de volgende omgevingscondities aanwezig zijn:

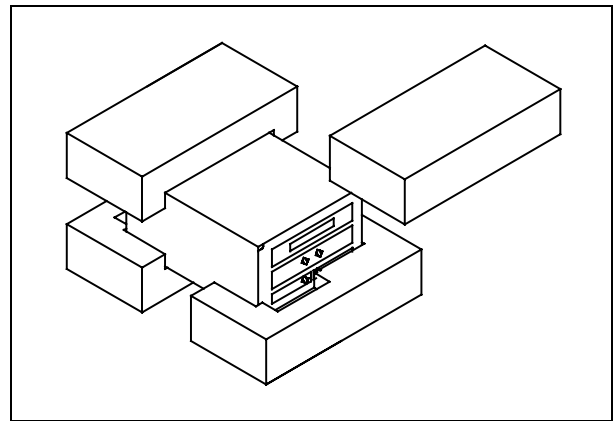
- temperatuur: van -20 °C tot +70 °C
- relatieve vochtigheid: 0 - 95% (niet condenserend)

**VOORBEREIDING VOOR INSTALLATIE**

De controller wordt in een speciale beschermende verpakking geleverd; als er schade wordt geconstateerd die tijdens het transport veroorzaakt zou kunnen zijn, meteen contact opnemen met het plaatselijke verkoopkantoor.

Zorg er bij het uitpakken voor dat de controller niet kan vallen of stoten te verduren krijgt.

Laat de verpakking niet ergens buiten achter. Het verpakkingsmateriaal is volledig recyclebaar en voldoet aan de EEG milieuriichtlijn 85/399.



*Verpakking van de controllers*

Varian heeft elke controller voorbereid voor een bepaalde voedingsspanning:

- het model 969-9464 voor 220 Vac
- het model 969-9564 voor 120 Vac

Controleer of de juiste spanning is gekozen en sluit de voedingskabel weer aan.

**INSTALLATIE**



**GEVAAR!**

De controller is voorzien van een voedingskabel met drie draden en een stekker van het internationaal goedgekeurde type. Gebruik altijd deze voedingskabel en steek de stekker in een geaard contactstop om elektrische ontladingen te voorkomen. In de controller ontwikkelen zich hoge spanningen die zware beschadigingen of de dood kunnen veroorzaken. Alvorens installatie- of onderhoudswerkzaamheden uit te voeren, de controller van de contactstop afkoppelen.

**OPMERKING**

De controller kan op een tafel of in een speciaal rack worden geïnstalleerd. In ieder geval moet de koellucht vrij rondom het apparaat kunnen circuleren. De controller mag niet geïnstalleerd en/of gebruikt worden in ruimten die blootgesteld zijn aan de weersomstandigheden (regen, vorst, sneeuw), stof, agressieve gassen, of in ruimten met explosiegevaar of zeer hoog brandgevaar.

Tijdens de werking moeten de volgende omgevingscondities aanwezig zijn:

- temperatuur: van 0 °C tot +40 °C
- relatieve vochtigheid: 0 - 95% (niet condenserend).

Gebruik voor aansluiting van de controller op de pomp de speciale kabel van de controller.

Voor de overige aansluitingen en de installatie van de accessoires wordt verwezen naar het hoofdstuk "Technical Information".

**GEBRUIK**

In deze paragraaf worden de voornaamste bedieningswijzen uitgelegd. Voor meer informatie of procedures die aansluitingen of speciale opties betreffen wordt verwezen naar de paragraaf "Use" van de bijlage "Technical Informations". Breng, alvorens de controller in gebruik te nemen, alle elektrische en pneumatische aansluitingen tot stand en raadpleeg hiervoor de handleiding van de aan te sluiten pomp.



**GEVAAR!**

Indien de pomp op een tafel is geplaatst, controleren of deze stabiel staat om letsel aan personen en schade aan het apparaat te voorkomen. Laat de pomp nooit werken zonder dat de ingangsfens aan het systeem is gekoppeld of de afsluitfens is gesloten.

**OPMERKING**

De connector J1 moet met zijn jumper aangesloten blijven als geen externe aansluiting tot stand wordt gebracht. De pre-vacuümpomp en de Turbo-V pomp mogen beide gelijktijdig ingeschakeld zijn.

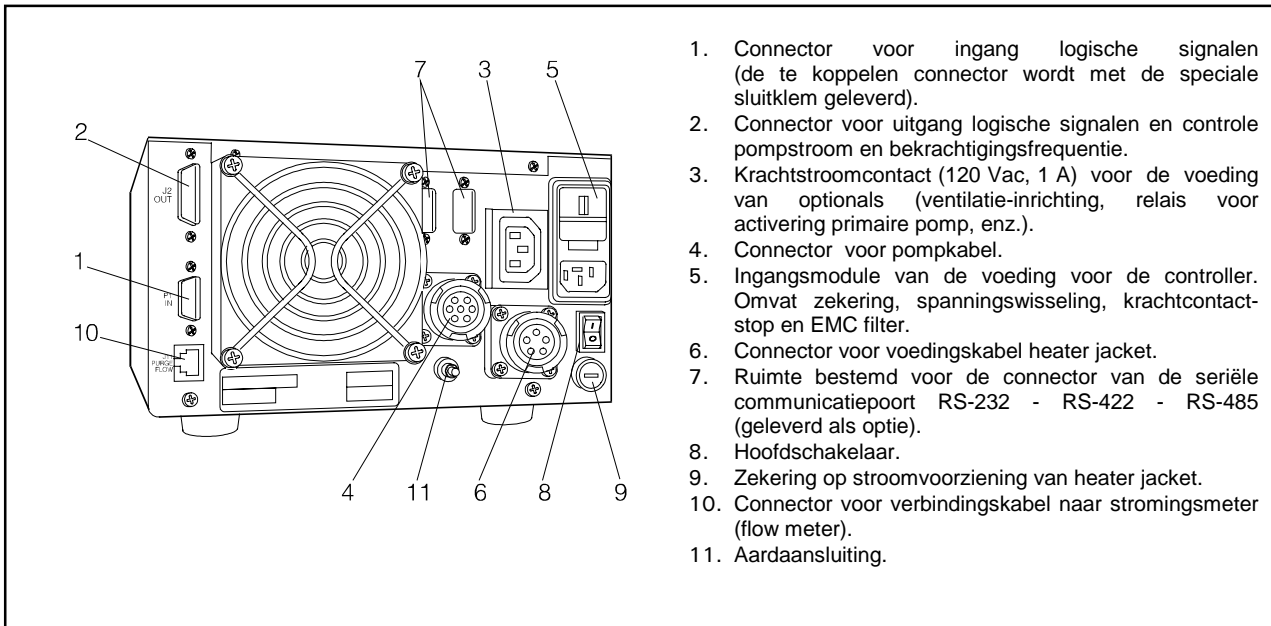
**Bedieningsorganen, Controlelampjes en Connectoren van de Controller**

Hier volgt de beschrijving van het bedieningspaneel van de controller en van de doorverbindingspanelen. Voor meer informatie wordt verwezen naar het hoofdstuk "Technical Information".



1. Drukknop voor selectie van de bedrijfswijze HIGH/LOW SPEED. Is alleen actief wanneer de bedrijfswijze op het frontpaneel wordt geselecteerd. Door de knop herhaaldelijk in te drukken, gaat de pomp cyclisch van HIGH SPEED naar LOW SPEED over.
2. Drukknop voor het zenden van de sturingen START, STOP of REST. Is alleen actief wanneer de bedrijfswijze op het frontpaneel wordt geselecteerd. Door de knop een maal in te drukken wordt de startfase geactiveerd; door de knop opnieuw te bedienen wordt de pomp gestopt. Als de pomp automatisch is gestopt ten gevolge van een storing, moet deze knop een eerste maal worden bediend om de controller te resetten en een tweede maal om de pomp weer op te starten.
3. Drukknop voor weergave op het display van de parameters cycle number, cycle time, pump life, hard start number en hard start tries.
4. Drukknop voor weergave op het display van de parameters pump current, pump temperature, pump power, rotational speed, gemeten stromingswaarde, type gas en alarmstatus. Is altijd actief, onafhankelijk van de gekozen bedrijfswijze. Door drukknoppen 3 en 4 gelijktijdig gedurende ten minste 2 seconden in te drukken, wordt een programma gestart waarmee enkele bedrijfsparameters kunnen worden geprogrammeerd.
5. Alfanumeriek display met vloeibare kristallen (LCD): puntjespatroon, 2 lijnen x 16 karakters.

Frontpaneel van de controllers  
969-9464 en 969-9564



Achterpaneel van de controllers 969-9464 en 969-9564

**GEBRUIKSPROCEDURES**

**Inschakelen van de controller**

Om de controller in te schakelen, de voedingskabel in de netcontactdoos inbrengen en de stroomschakelaar in stand 1 zetten.

**Starten van de pomp**

Voor het starten van de pomp de START knop op het frontpaneel bedienen.

**Stoppen van de pomp**

Voor het stoppen van de pomp de STOP knop op het frontpaneel bedienen.

**ONDERHOUD**

De controllers van de serie Turbo-V 1000 ICE E-series zijn onderhoudsvrij. Eventuele werkzaamheden moeten door bevoegd personeel worden uitgevoerd.

1. Connector voor ingang logische signalen (de te koppelen connector wordt met de speciale sluitklem geleverd).
2. Connector voor uitgang logische signalen en controle pompstroom en bekrachtigingsfrequentie.
3. Krachtstroomcontact (120 Vac, 1 A) voor de voeding van optionals (ventilatie-inrichting, relais voor activering primaire pomp, enz.).
4. Connector voor pompkabel.
5. Ingangsmodule van de voeding voor de controller. Omvat zekering, spanningswisseling, krachtcontact-stop en EMC filter.
6. Connector voor voedingskabel heater jacket.
7. Ruimte bestemd voor de connector van de seriële communicatiepoort RS-232 - RS-422 - RS-485 (geleverd als optie).
8. Hoofdschakelaar.
9. Zekering op stroomvoorziening van heater jacket.
10. Connector voor verbindingskabel naar stromingsmeter (flow meter).
11. Aardaansluiting.

In geval van storing is het mogelijk om de reparatiedienst van Varian of de "Varian advanced exchange service" in te schakelen: zo krijgt men een ruilcontroller ter vervanging van de defecte controller.



**GEVAAR!**

Alvorens werkzaamheden aan de controller uit te voeren, de voedingskabel afkoppelen.

Mocht de controller gesloopt worden, ga dan overeenkomstig de specifieke nationale wetgeving te werk.

**FOUTMELDINGEN**

In geval van bepaalde stringen wekt het zelfdiagnose-circuit van de controller enkele foutmeldingen op die in de tabel op de volgende bladzijde zijn omschreven.

FOUTMELDING	OMSCHRIJVING	REMEDIE
<b>CHECK CONNECTION TO PUMP</b>	Foutieve verbinding tussen pomp en controller.	Controleer of de verbindingkabel tussen pomp en controller aan beide uiteinden goed bevestigd is en geen onderbrekingen vertoond. Bedien twee maal de START-knop om de pomp weer op te starten.
<b>PUMP WAITING INTERLOCK</b>	Het interlock-sigitaal op connector P1 is actief wegens onderbreking van de kortsluiting tussen pin 3 en pin 8 van connector J1 of wegens het openen van het externe interlock-sigitaal.	Herstel de kortsluiting tussen pin 3 en pin 8 van connector J1 of sluit het externe interlock-sigitaal.
<b>FAULT: PUMP OVERTEMP.</b>	De temperatuur van het bovenste pomplager bedraagt meer dan 60 °C. De temperatuur van het onderste pomplager bedraagt meer dan 80 °C.	Wacht tot de temperatuur weer onder de drempelwaarde is gezakt. Bedien twee maal de START-knop om de pomp weer op te starten.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	De temperatuur van de transformator van de controller bedraagt meer dan 90 °C.	Wacht tot de temperatuur weer onder de drempelwaarde is gezakt. Bedien twee maal de START-knop om de pomp weer op te starten.
<b>FAULT: TOO HIGH LOAD</b>	Tijdens normale werking ligt de door de pomp geabsorbeerde stroom hoger dan de geprogrammeerde waarde (8 A).	Controleer of de pomprotor vrij kan draaien. Bedien twee maal de START-knop om de pomp weer op te starten.
<b>FAULT: SHORT CIRCUIT</b>	Tijdens normale werking (na startfase) is de uitgangsverbinding in kortsluiting (uitgangsstroom groter dan 16 A).	Controleer de verbindingen tussen pomp en controller. Bedien twee maal de START-knop om de pomp weer op te starten.
<b>OVERVOLTAGE</b>	Er is een storing opgetreden in het voedingsgedeelte van de controller, of de controller heeft een stoorsigitaal ontvangen.	Bedien twee maal de START-knop om de pomp weer op te starten. Als de melding weer verschijnt, zich voor onderhoud tot Varian wenden.
<b>FLOW METER ALARM</b>	Alarm betreffende de reinigungsstroom. De stromingswaarde is gedurende 10 of meer seconden beneden de ingestelde drempelwaarde gebleven.	Controleer of het gastoevoercircuit correct functioneert.
<b>HIGH POWER START FAIL</b>	De controller heeft tijdens de startfase 5 startsequenties uitgevoerd met een hoge koppel, maar de pomp is niet gestart.	Controleer of de pomprotor vrij kan draaien. Bedien twee maal de START-knop om de pomp weer op te starten.

## GENEREL INFORMATION

Dette materiel er beregnet til professionel anvendelse. Brugeren bør læse denne brugsanvisning og anden yderligere information fra Varian, før udstyret anvendes. Varian tager ikke ansvar for skader helt eller delvis som følge af tilsidesættelse af disse instruktioner, fejlagtig brug af personer uden tilstrækkelig kendskab, ukorrekt anvendelse af udstyret eller håndtering, der strider imod gældende lokale regler.

Styreenhederne i Turbo-V 1000 ICE E-series er mikroprocessorstyrede frekvens-omformere, der består af komponenter med fast tilstand.

Styreenhederne er udstyrede med selvdiagnose- og selvbeskyttelsesfunktioner. Styreenhederne kontrollerer pumperne i Turbo-V 1000 ICE E-series (med en ti-trins-proces) i forbindelse med start. Spænding og strøm reguleres i forhold til pumpens opnåede hastighed.

Styreenhederne omfatter alle kredsløb, der er nødvendig til automatisk drift af pumperne i Turbo-V 1000 ICE E-series serien.

Hjælpekontakter forsyner kontrol til fjernstart og -stop af pumpen, signaler om pumpens tilstand, kontrol til start og stop af forvakuumpumpen, blokerings signaler (til tryk- og vandføringsafbrydere, osv.), kontrolsignaler om varmebåndet (heater jacket), kontrolsignaler om gennemstrømningsmåler, samt om betjening af udluftningsventil (purge valve). De følgende afsnit indeholder al information, der er nødvendig for at garantere operatørens sikkerhed i forbindelse med anvendelse af udstyret. Detaljeret information findes i bilaget "Technical Information".

I brugsanvisningen anvendes følgende standard-rubrikker:



**ADVARSEL !**

Advarselsmeddelelserne informerer operatøren om, at en speciel procedure eller en vis type arbejde skal udføres præcist efter anvisningerne. I modsat fald er der risiko for svære personskader.



**VIGTIGT !**

Denne advarselsmeddelelse vises før procedurer, der skal følges nøje for ikke at risikere maskinskader.

**BEMÆRK**

*Dette gør opmærksom på vigtig information i teksten.*

## OPBEVARING

Følgende krav til omgivelsesforholdene gælder ved transport og opbevaring af styreenheden:

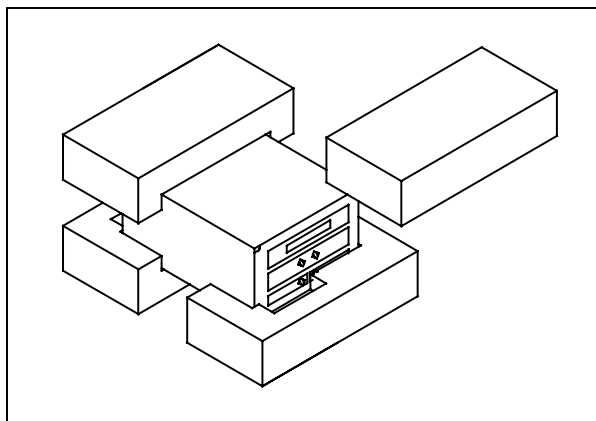
- temperatur: fra -20 °C til +70 °C
- relativ luftfugtighed: 0 - 95% (ikke kondenserende)

## FORBEREDELSE FØR INSTALLATION

Styreenheden leveres i en speciel beskyttende emballage. Kontakt den lokale forhandler, hvis emballagen viser tegn på skader, der kan være opstået under transporten.

Sørg for at styreenheden ikke tabes eller udsættes for stød ved udpakningen.

Smid ikke emballagen ud. Materialet kan genbruges 100% og opfylder EU-direktiv 85/399 om miljøbeskyttelse.



Styreenhedens emballage

Styreenheden leveres fra Varian forindstillet til en vis strømforsyning:

- modellen 969-9464 til 220 V vekselstrøm
- modellen 969-9564 til 120 V vekselstrøm

Kontrollér at den valgte spænding er korrekt. Tilslut strømkablet.

## INSTALLATION

**ADVARSEL !**

Styreenheden leveres med strømkabel med tre ledere og godkendt stik efter internationale standarder. Anvend udelukkende det medleverede strømkabel. Stikket må kun tilsluttes et vægudtag med fungerende jordtilslutning, for at undgå elektriske stød. Spænding frembragt i styreenheden kan nå høje værdier og forårsage stor skade og dødsfald. Frakobl altid strømkablet, inden der udføres installations- eller vedligeholdelsesarbejde på styreenheden.

**BEMÆRK**

Styreenheden kan installeres på et bord eller et velegnet stativ. I begge tilfælde skal der være plads nok til, at luft kan cirkulere frit omkring apparatet. Installér og anvend ikke styreenheden i miljøer, der udsættes for påvirkninger fra atmosfæren (regn, sne, is), damp, aggressive gasser, og ligeledes ikke i eksplosivt eller brandfarligt miljø.

Følgende krav til omgivelsesforholdene gælder ved drift:

- temperatur: fra 0 °C til +40 °C
- relativ luftfugtighed: 0 - 95% (ikke kondenserende)

Pumpen og styreenheden tilsluttes med det specielle kabel, der leveres med styreenheden.

For øvrige tilslutninger og installation af tilbehør henvises til afsnittet "Technical Information".

## ANVENDELSE

Dette afsnit beskriver de vigtigste driftsprocedurer. For en detaljeret beskrivelse samt procedurer, der involverer tilslutninger eller tilbehør, henvises til afsnittet "Use" i bilag "Technical Information". Inden styreenheden anvendes, bør samtlige elektriske og pneumatiske tilslutninger udføres. Læs brugsanvisningen før pumpen tilsluttes.

**ADVARSEL !**

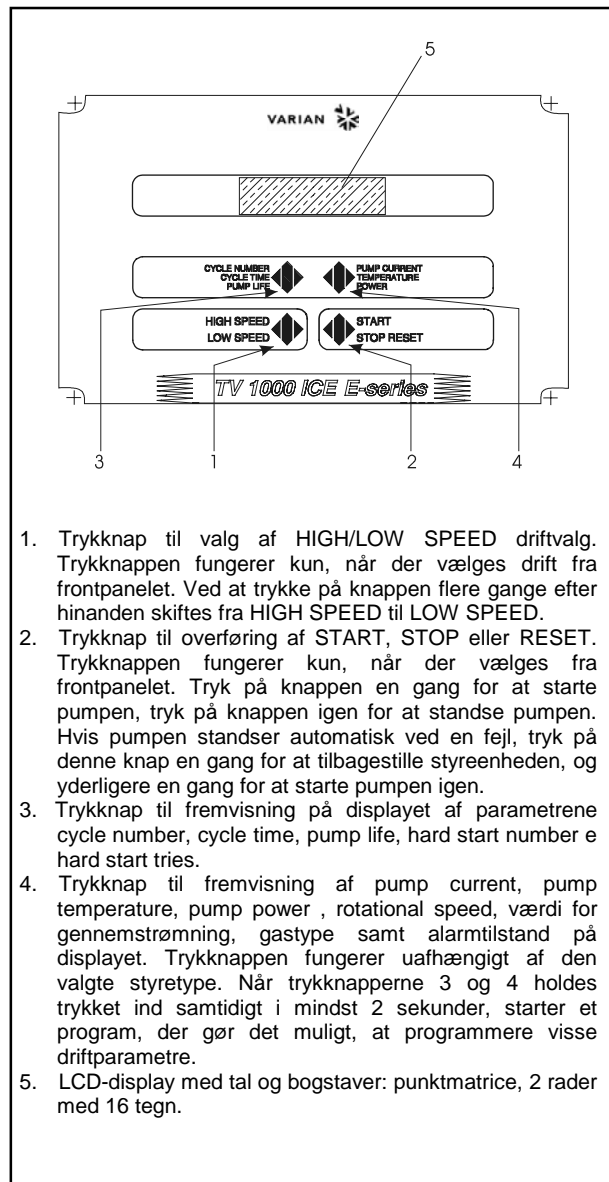
Sørg for, at pumpen står fast, hvis den er installeret på et bord. Dette er for at forebygge skader på apparatet og personer. Start aldrig pumpen, hvis pumpetiløbet ikke er tilsluttet systemet eller er blokeret.

**BEMÆRK**

Afbryderkontakten J1 skal forblive tilsluttet med aktuell bro, når der ikke udføres eksterne tilslutninger. Forvakuumpumpen og Turbo-V-pumpen skal fungere samtidigt.

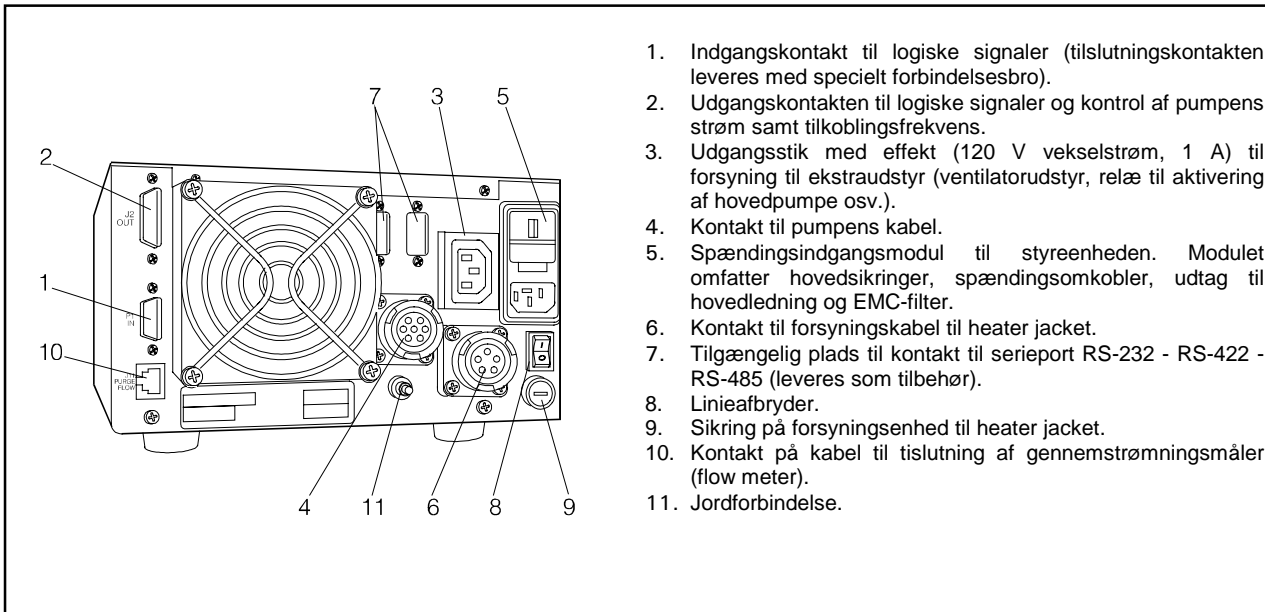
**Kontroller, Indikatorer og Kontakter på Styreenheden**

Følgende beskriver manøvrepanelet til styreenheden samt tilslutningspanelerne. For yderligere information henvises til bilag "Technical Information".



Frontpanelet på Styreenheden  
969-9464 og 969-9564





Bageste panel på styreenheden 969-9464 og 969-9564

## INSTRUKTION

### Start af styreenheden

Styreenheden startes ved at sætte strømkablet i vægudtaget og sæt hovedafbryderen i stilling 1.

### Start af pumpen

Pumpen startes ved at trykke på START-tryknappen.

### Stop af pumpen

Pumpen stopper ved at trykke på STOP-tryknappen på frontpanelet.

## VEDLIGEHOLDELSE

Styreenhederne i Turbo-V 1000 E-series behøver ikke nogen vedligeholdelse. Ethvert indgreb på pumpen skal foretages af autoriseret personale.

1. Indgangskontakt til logiske signaler (tilslutningskontakten leveres med specielt forbindelsesbro).
2. Udgangskontakten til logiske signaler og kontrol af pumpens strøm samt tilkoblingsfrekvens.
3. Udgangsstik med effekt (120 V vekselstrøm, 1 A) til forsyning til ekstraudstyr (ventilatorudstyr, relæ til aktivering af hovedpumpe osv.).
4. Kontakt til pumpens kabel.
5. Spændingsindgangsmodul til styreenheden. Modulet omfatter hovedsikringer, spændingsomkobler, udtag til hovedledning og EMC-filter.
6. Kontakt til forsyningskabel til heater jacket.
7. Tilgængelig plads til kontakt til serieport RS-232 - RS-422 - RS-485 (leveres som tilbehør).
8. Linieafbryder.
9. Sikring på forsyningsenhed til heater jacket.
10. Kontakt på kabel til tilslutning af gennemstrømningsmåler (flow meter).
11. Jordforbindelse.

Hvis pumpen går i stykker, kan man benytte sig af Varians reparations-service eller Varian udvekslingsservice, hvor man kan få en repareret pumpe i bytte for den, der er gået i stykker.



**ADVARSEL !**

Inden der foretages noget som helst indgreb på styreenheden, skal strømmen først afbrydes.

Skrotning af pumpen skal foregå i overensstemmelse med det pågældende lands særlige love.

## FEJLMEDDELELSER

Når visse fejl opstår, viser styreenheden ved selvdiagnose aktuelle fejl på displayet. De mulige meddelelser beskrives i tabellen på følgende side.

MEDDELELSE	BESKRIVELSE	KONTROL
<b>CHECK CONNECTION TO PUMP</b>	Tilslutning mellem pumpe og styreenhed er defekt.	Kontrollér at tilslutningskabel mellem pumpe og styreenhed er korrekt monteret samt at ingen afbrydninger forekommer. Tryk to gange på START for at starte pumpen igen.
<b>PUMP WAITING INTERLOCK</b>	Interlocksignalet findes på kontakt P1 p.g.a. kortslutning mellem stift 3 og stift 8 i kontakten J1 eller p.g.a. at det eksterne interlocksignal er åbent.	Tilbagestil kortslutningen mellem stift 3 og stift 8 på kontakt J1 eller sluk for det eksterne interlocksignal.
<b>FAULT: PUMP OVERTEMP.</b>	Temperaturen i det øverste leje eller pumpen er over 60 °C. Temperaturen i det nederste leje eller pumpen er over 80 °C.	Vent på, at temperaturen falder til under tærskelværdi. Tryk to gange på START for at starte pumpen igen.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	Temperaturen på styreenhedens transformator er over 90 °C.	Vent på, at temperaturen falder til under tærskelværdi. Tryk to gange på START for at starte pumpen igen.
<b>FAULT: TOO HIGH LOAD</b>	Under normal drift er pumpens strømforbrug større end den programmerede værdi (8 A).	Kontrollér, at pumpens rotor kan rotere frit. Tryk to gange på START for at starte pumpen igen.
<b>FAULT: SHORT CIRCUIT</b>	Under normal drift (efter startfasen) er udgangseffekten kortsluttet (udgangsstrømmen højere end 16 A).	Kontrollér forbindelserne mellem pumpe og styreenhed. Tryk to gange på START for at starte pumpen igen.
<b>OVERVOLTAGE</b>	Defekt i styreenhedens forsyning, eller styreenheden har modtaget et ikke korrekt signal.	Tryk to gange på START for at starte pumpen igen. Såfremt meddelelsen fremvises på ny, rettes henvendelse til Varian for foretagelse af vedligeholdelse.
<b>FLOW METER ALARM</b>	Alarm for udluftningsventil. Værdien for gennemstrømningen er under den indtastede tærskelværdi i et tidsrum på min. 10 sekunder.	Kontrollér, at kredsløbet til gasforsyning fungerer korrekt.
<b>HIGH POWER START FAIL</b>	Styreenheden har udført 5 start sekvenser ved høj drejningsmoment uden at starte pumpen.	Kontroller, at pumpens rotor kan rotere frit. Tryk to gange på start trykknappen for at starte pumpen.

## ALLMÄN INFORMATION

Utrustningen är avsedd för yrkesmässig användning. Användaren bör läsa denna bruksanvisning, samt övrig dokumentation från Varian före användning av utrustningen. Varian tar inget ansvar för skador som helt eller delvis orsakats av åsidosättande av instruktionerna, olämplig användning av person utan tillräcklig kunskap, obehörigt bruk av utrustningen eller hantering som strider mot gällande lokala föreskrifter.

Styrenheterna i Turbo-V 1000 ICE E-series är mikroprocessorstyrda frekvensomvandlare som består av komponenter med fast tillstånd. Styrenheterna är försedda med självdiagnos- och självskyddsfunktion.

Styrenheterna kontrollerar pumparna i Turbo-V 1000 ICE E-series (med en tiostegs-process) i samband med start. Spänning och ström regleras i förhållande till pumpens uppnådda hastighet.

Styrenheterna omfattar alla kretsar som behövs för automatisk drift av pumparna i Turbo-V 1000 ICE E-series.

Hjälpkontakter erbjuder kontroller för fjärrstart och fjärrstopp av pumpen, signaler för pumpens tillstånd, kontroller för start och stopp av förvakuumpumpen, blockeringssignaler (för tryckvakter, kontrollbrytare för vattenflöde osv) kontrollsignaler för uppvärmningsområdet (heater jacket), flödesmätare och för styrning av rengöringsventilen (purge valve). De följande avsnitten innehåller all information som behövs för att garantera operatörens säkerhet under driften. Detaljerade uppgifter finns i bilagan "Technical information".

I bruksanvisningen används följande standard-rubriker:



### VARNING

Varningsmeddelandena informerar operatören om att en speciell procedur eller en viss typ av arbete måste utföras exakt enligt anvisningarna. I annat fall finns risk för svåra personskador.



### VIKTIGT

Detta varningsmeddelande visas framför procedurer som måste följas exakt för att undvika skador på maskinen.

### OBSERVERA

Detta visar på viktig information i texten.

## FÖRVARING

Följande krav på omgivningsförhållanden gäller vid transport och förvaring av styrenheten:

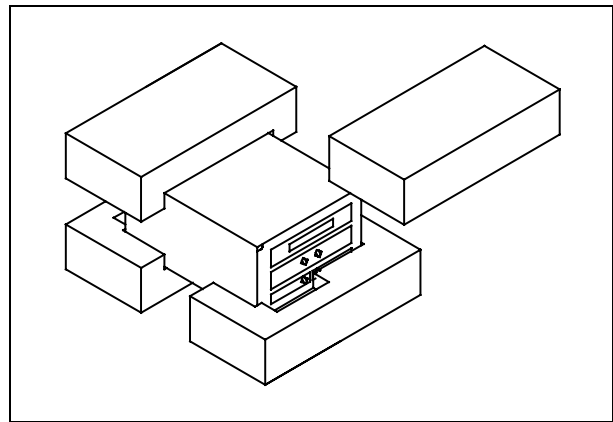
- temperatur: från -20 °C till +70 °C
- relativ luftfuktighet: 0 - 95% (utan kondens)

## FÖRBEREDELSE FÖR INSTALLATION

Styrenheten levereras i ett särskilt skyddande emballage. Kontakta det lokala försäljningskontoret om emballaget visar tecken på skador som kan ha uppstått under transporten.

Se till att styrenheten inte tappas eller utsätts för stötar vid uppbyggnaden.

Kasta inte packmaterialet i soporna. Materialet är återvinningsbart till 100% och uppfyller EU-direktiv 85/399 om miljöskydd.



Styrenhetens förpackning

Styrenheten levereras från Varian med förinställning för en viss matningsspänning:

- modellen 969-9464 för 220 V växelström
- modellen 969-9565 för 120 V växelström

Kontrollera att den valda matningsspänningen är korrekt. Återanslut strömkabeln.

## INSTALLATION



### VARNING

Styrenheten levereras med strömkabel med tre ledare och godkänd stickpropp enligt internationella standarder. Använd endast den medlevererade strömkabeln. Stickproppen får endast anslutas till ett vägguttag med fungerande jordanslutning för att undvika elstötar.

Spänningen inuti styrenheten kan nå höga värden och förorsaka allvarliga skador och dödsfall. Frånkoppla alltid strömkabeln innan något installations- eller underhållsmoment utförs på styrenheten.

### OBSERVERA

Styrenheten kan installeras på ett bord eller inuti ett därtill avsett rack. I samtliga fall måste dock kyl Luft kunna cirkulera fritt kring apparaten.

Installera och använd inte styrenheten i miljöer som utsätts för påverkan från atmosfären (regn, snö, is), damm, aggressiva gaser, och inte heller i explosiv eller brandfarlig miljö.

Följande krav på omgivningsförhållanden gäller vid drift:

- temperatur: från 0 °C till +40 °C
- relativ luftfuktighet: 0 - 95% (utan kondens)

Pumpen och styrenheten ansluts med den speciella kabeln, som levereras med styrenheten.

Beträffande övriga anslutningar och installation av tillbehör hänvisas till avsnittet "Technical Information".

## ANVÄNDNING

Detta avsnitt beskriver de viktigaste driftmomenten. För en detaljerad beskrivning samt beträffande moment som involverar anslutningar eller tillbehör hänvisas till avsnittet "Use" i bilaga "Technical Information". Innan styrenheten används bör samtliga elektriska och pneumatiska anslutningar utföras. Läs bruksanvisningen för den anslutna pumpen.



### VARNING

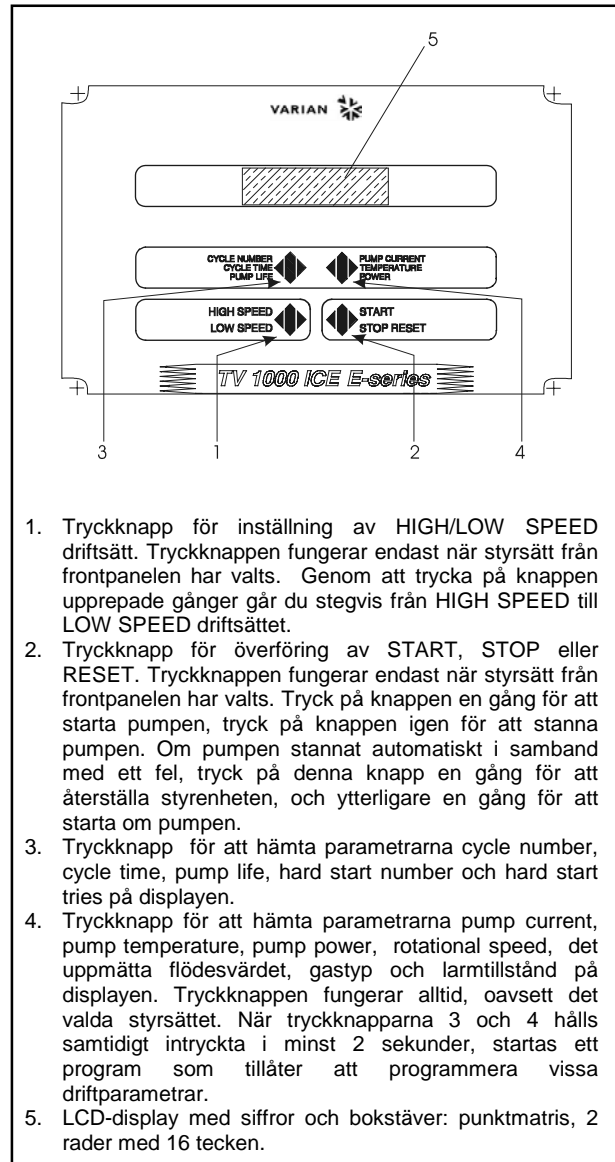
Försäkra dig om att pumpen står stadigt, om den är installerad på ett bord, detta för att förebygga skador på apparaten och personer. Sätt aldrig igång pumpen, om intagsflänsen varken är kopplad till systemet eller är blockerad på plats med låsflänsen.

## OBSERVERA

Stängningskontakten J1 måste lämnas ansluten med aktuell brygga om ingen extern anslutning utförs. Förvakuumpumpen och Turbo-V-pumpen kan fungera samtidigt.

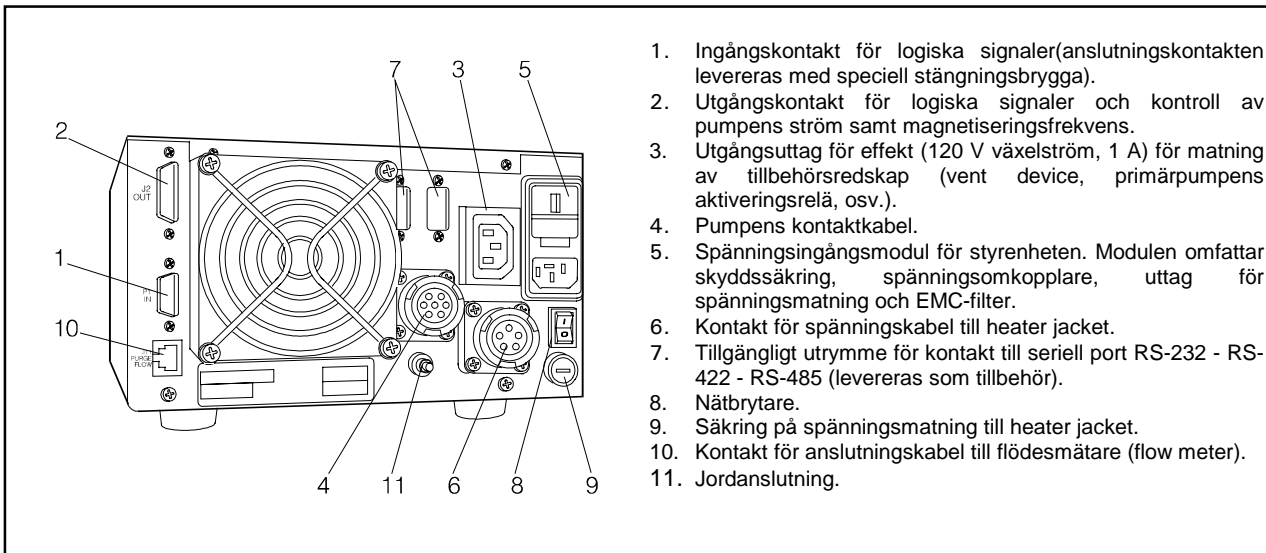
### Kontroller, Indikatorer och Kontakter på Styrenheten

Nedan beskrivs manöverpanelen för styrenheten samt anslutningspanelerna. För ytterligare information hänvisas till bilaga "Technical Information".



1. Tryckknapp för inställning av HIGH/LOW SPEED driftsätt. Tryckknappen fungerar endast när styrsätt från frontpanelen har valts. Genom att trycka på knappen upprepade gånger går du stegvis från HIGH SPEED till LOW SPEED driftsättet.
2. Tryckknapp för överföring av START, STOP eller RESET. Tryckknappen fungerar endast när styrsätt från frontpanelen har valts. Tryck på knappen en gång för att starta pumpen, tryck på knappen igen för att stanna pumpen. Om pumpen stannat automatiskt i samband med ett fel, tryck på denna knapp en gång för att återställa styrenheten, och ytterligare en gång för att starta om pumpen.
3. Tryckknapp för att hämta parametrarna cycle number, cycle time, pump life, hard start number och hard start tries på displayen.
4. Tryckknapp för att hämta parametrarna pump current, pump temperature, pump power, rotational speed, det uppmätta flödesvärdet, gastyp och larmtillstånd på displayen. Tryckknappen fungerar alltid, oavsett det valda styrsättet. När tryckknapparna 3 och 4 hålls samtidigt intryckta i minst 2 sekunder, startas ett program som tillåter att programmera vissa driftparametrar.
5. LCD-display med siffror och bokstäver: punktmatrix, 2 rader med 16 tecken.

Frontpanelen på Styrenheten  
969-9464 och 969-9564



Bakre panel på Styrenheten 969-9464 och 969-9564

## INSTRUKTIONER FÖR BRUK

### Start av styrenheten

Styrenheten startas enkelt genom att sätta strömkabeln i vägguttaget och sätt huvudströmbrytaren i läge 1.

### Start av pumpen

Pumpen startas genom att trycka på tryckknappen START.

### Stopp av pumpen

Pumpen stoppas genom att trycka på tryckknappen STOPP på frontpanelen.

## UNDERHÅLL

Styrenheterna i Turbo-V 1000 ICE E-series är underhållsfria. Allt servicearbete måste utföras av auktoriserad personal.

Om styrenheten havererar, kontakta Varian reparationsverkstad eller Varian utbyteservice, som kan ersätta styrenheten med en renoverad styrenhet.



**VARNING**

Innan något arbete utförs på styrenheten måste dess strömförsörjning brytas.

Skrotning av pumpen ska ske enligt gällande lagstiftning.

## FELMEDDELANDEN

När vissa fel uppstår visar styrenhetens självdiagnoskrets aktuellt felmeddelande på displayen. De möjliga meddelandena listas i följande tabell.

MEDDELANDE	BESKRIVNING	ÅTGÄRD
<b>CHECK CONNECTION TO PUMP</b>	Anslutningen mellan pump och styrenhet är defekt.	Kontrollera att anslutningskabeln mellan pump och styrenhet är ordentligt monterad samt att inget avbrott förekommer. Tryck två gånger på knappen START för att starta om pumpen.
<b>PUMP WAITING INTERLOCK</b>	Interlock-signalen finns på kontakt P1 på grund av kortslutning mellan stift 3 och stift 8 i kontakten J1, eller på grund av att den externa interlock-signalen är öppen.	Åtgärda kortslutningen mellan stift 3 och stift 8 på kontakt J1 eller stäng den externa interlock-signalen.
<b>FAULT: PUMP OVERTEMP.</b>	Temperaturen på det övre lagret eller pumpen överskrider 60 °C. Temperaturen på det undre lagret eller pumpen överskrider 80 °C.	Vänta tills temperaturen sjunker under tröskelvärdet. Tryck två gånger på knappen START för att starta om pumpen.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	Temperaturen på styrenhetens transformator överskrider 90 °C.	Vänta tills temperaturen sjunker under tröskelvärdet. Tryck två gånger på knappen START för att starta om pumpen.
<b>FAULT: TOO HIGH LOAD</b>	Under normal drift förbrukar pumpen en större effekt än det programmerade värdet (8 A).	Kontrollera att pumpens rotor kan rotera fritt. Tryck två gånger på knappen START för att starta om pumpen.
<b>FAULT: SHORT CIRCUIT</b>	Under normal drift (efter startmomentet) har utgången kortslutits (utgångsström högre än 16 A).	Kontrollera anslutningarna mellan pump och styrenhet. Tryck två gånger på knappen START för att starta om pumpen.
<b>OVERVOLTAGE</b>	Ett fel har upptäckts i styrenhetens spänningsmatning eller styrenheten har fått en falsk signal.	Tryck två gånger på knappen START för att starta om pumpen. Om meddelandet upprepas kontakta Varian för underhåll.
<b>FLOW METER ALARM</b>	Larm angående rengöringsflödet. Värdet är under det inmatade tröskelvärdet under 10 sekunder eller längre.	Kontrollera korrekt funktion av gasens matningskrets.
<b>HIGH POWER START FAIL</b>	Kontrollern i Startfasen har utfört 5 startfrekvenser med hög reaktionskraft utan att kunna starta pumpen.	Kontrollera att pumpens rotor kan rotera fritt. Tryck två gånger på knappen START för att starta om pumpen.

## GENERELL INFORMASJON

Dette utstyret er beregnet til bruk av profesjonelle brukere. Brukeren bør lese denne brukerveiledningen og all annen informasjon fra Varian før utstyret tas i bruk.

Varian kan ikke holdes ansvarlig for hendelser som skjer på grunn av manglende oppfølging, selv delvis, av disse instruksjonene, feilaktig bruk av utrenet personell, ikke godkjente endringer av utstyret eller handlinger som på noen måte er i strid med nasjonale bestemmelser.

Styreenhetene i Turbo-V 1000 ICE E-series er mikroprosessorstyrte frekvensomformere, som består av komponenter med fast tilstand. Styreenhetene har funksjoner for selvd Diagnose og selvbeskyttelse.

Styreenhetene kontrollerer pumpene i Turbo-V 1000 ICE E-series (med en titrinnspesess) ved oppstart. Spenning og strømstyrke justeres i forhold til pumpens oppnådde hastighet.

Styreenhetene omfatter alle kretser som er nødvendige for automatisk drift av pumpene i Turbo-V 1000 ICE E-series.

Hjelpetaster gir muligheter for fjernstyrt start og stopp av pumpen, signaler for pumpens tilstand, kontroller for start og stopp av forvakuumpumpen, blokkeringssignaler (for trykksensorer, kontrollbrytere for vannflyt osv), kontrollsignaler for varmebåndet (heater jacket), strømningsmålerens kontrollsignal, og signaler for styringen av spyleventilen (purge valve). De følgende avsnittene inneholder all informasjon som er nødvendig for å sikre brukeren når utstyret er i bruk. For mer detaljert bruk vises det til tillegget "Technical Information".

**Denne veiledningen bruker følgende standardprotokoll:**



### ADVARSEL

Disse meldingene skal tiltrekke seg brukerens oppmerksomhet til en spesiell fremgangsmåte eller praksis som, hvis den ikke følges, kan medføre alvorlige skader.



### FORSIKTIG

Denne advarselen vises foran fremgangsmåter som, dersom de ikke følges, kan føre til at utstyret skades.

### MERK

Merknadene inneholder viktig informasjon som er hentet fra teksten.

## LAGRING

Når styreenhetene transporteres eller lagres, må følgende forhold være oppfylt:

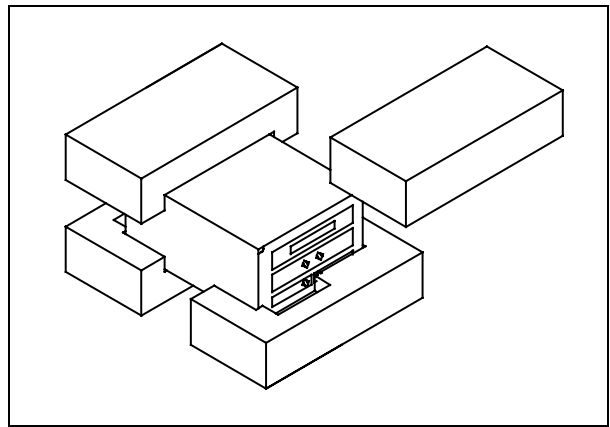
- temperatur: fra 20 °C til +70 °C
- relativ fuktighet: 0 - 95% (uten kondens)

## FORBEREDE INSTALLASJONEN

Styreenheten leveres i en spesiell beskyttelsesemballasje. Viser denne tegn på skader som kan ha oppstått under transporten, må du ta kontakt med det lokale salgskontoret.

Når styreenheten pakkes ut, må du passe på at den ikke slippes ned eller utsettes for noen form for støt.

Emballasjen må ikke kastes på en ulovlig måte. Alle materialer er 100% resirkulerbare og er i samsvar med EU-direktiv 85/399 om miljøbeskyttelse.



Styreenhetens emballasje

Styreenheten leveres fra Varian med forhåndsinnstillinger for en viss nettspenning:

- modellen 969-9464 for 220 V vekselstrøm
- modellen 969-9564 for 120 V vekselstrøm

Kontroller at den valgte nettspenningen er korrekt, og kople maskinen til strømmettet.

## INSTALLASJON



### ADVARSEL

Styreenheten leveres med strømkabel med tre ledere og godkjent støpsel i henhold til internasjonale standarder. Bruk kun den vedlagte strømkabelen. Støpslet må kun benyttes i en veggkontakt som har tilfredsstillende jording, slik at faren for strømstøt kan unngås. Spenningen inne i styreenheten kan nå høye verdier og kan føre til alvorlige skader og dødsfall. Kople alltid strømkabelen fra strømmettet før alle installasjons- eller vedlikeholdsarbeider som utføres på styreenheten.

### MERK

Styreenheten kan installeres på et bord eller inne i et passende stativ. Uansett så må kjøleluften kunne sirkulere fritt rundt apparatet. Ikke installer eller bruk styreenheten i miljøer som utsettes for regn, snø eller is, støv, aggressive gasser, eksplosjonsfarlige miljøer eller i miljøer med stor brannfare.

Under bruk må følgende forhold respekteres:

- temperatur: fra 0 °C til +40 °C
- relativ fuktighet: 0 - 95% (uten kondens)

Pumpen og styreenheten tilkoples den spesielle kabelen som leveres sammen med styreenheten.

Når det gjelder andre tilkoblinger og installasjon av ekstrautstyr vises det til avsnittet "Technical Information".

## BRUK

Dette avsnittet beskriver de viktigste driftsmomentene. For en detaljert beskrivelse samt moment som omfatter tilkoblinger eller ekstrautstyr vises det til avsnittet "Use" i vedlegget "Technical Information". Før styreenheten tas i bruk bør samtlige elektriske og pneumatiske tilkoblinger gjøres. Les brukerveiledningen for pumpen som er tilkopledd.



### ADVARSEL

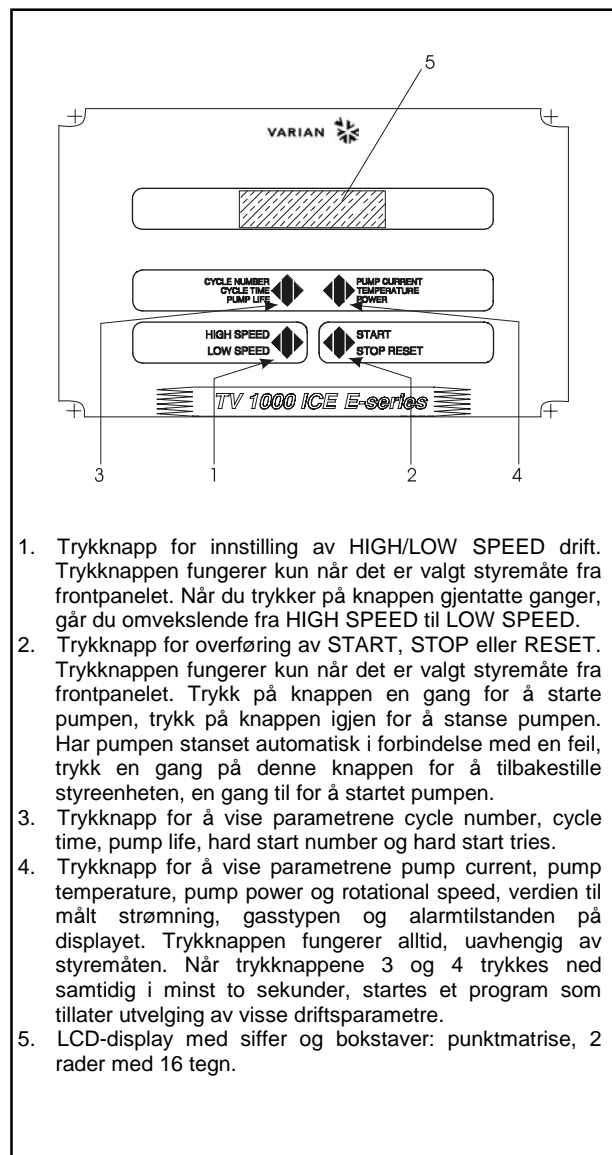
Dersom pumpen er installert på et bord må du kontrollere at pumpen står støtt. Dette er viktig for å forhindre skader på apparatet og på personer. Dersom inngangsfleksen hverken er tilkopledd systemet eller dersom den er blokkert av låseflensen må pumpen aldri startes opp.

### MERK

Lukkekontakten J1 må være tilkopledd aktuell brygge dersom det ikke skjer en annen ekstern tilkobling. Forvakuumpumpen og Turbo-V-pumpen må fungere sammen.

### Kontroller, Indikatorer og Kontakter på Styreenheten

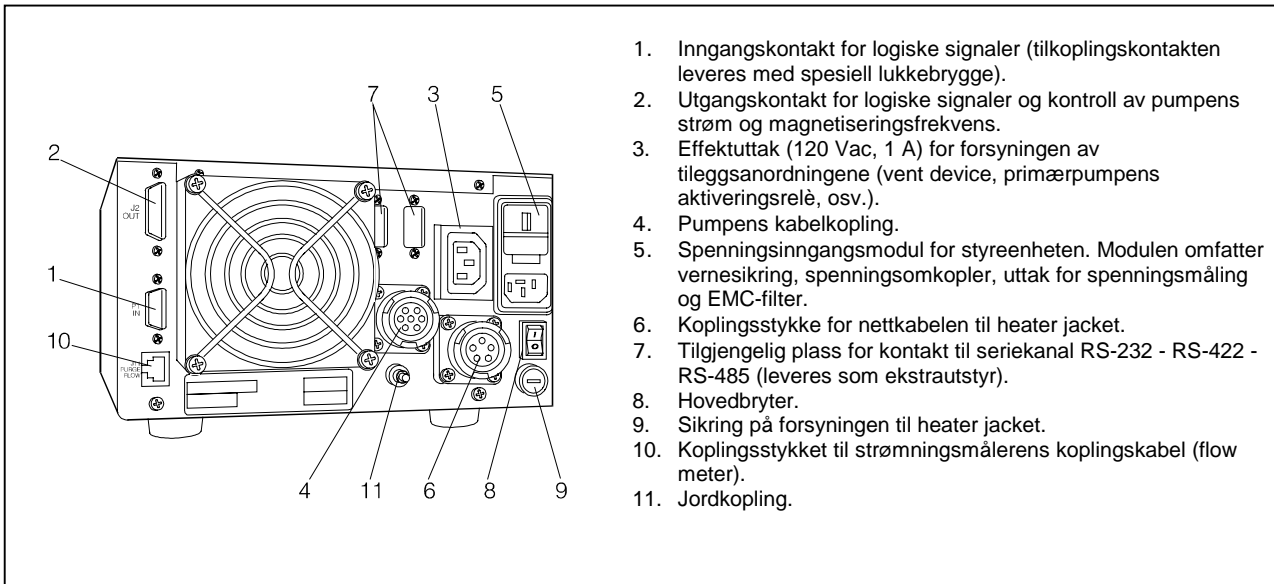
Nedenfor beskrives styrepanelet til styreenheten samt tilkoplingspanelene. For ytterligere informasjon vises det til avsnittet "Accessories and Spare Parts" i vedlegget "Technical Information".



1. Trykknapp for innstilling av HIGH/LOW SPEED drift. Trykknappen fungerer kun når det er valgt styremåte fra frontpanelet. Når du trykker på knappen gjentatte ganger, går du omvekslende fra HIGH SPEED til LOW SPEED.
2. Trykknapp for overføring av START, STOP eller RESET. Trykknappen fungerer kun når det er valgt styremåte fra frontpanelet. Trykk på knappen en gang for å starte pumpen, trykk på knappen igjen for å stanse pumpen. Har pumpen stanset automatisk i forbindelse med en feil, trykk en gang på denne knappen for å tilbakestille styreenheten, en gang til for å startet pumpen.
3. Trykknapp for å vise parametrene cycle number, cycle time, pump life, hard start number og hard start tries.
4. Trykknapp for å vise parametrene pump current, pump temperature, pump power og rotational speed, verdien til målt strømnings, gasstypen og alarmtilstanden på displayet. Trykknappen fungerer alltid, uavhengig av styremåten. Når trykknappene 3 og 4 trykkes ned samtidig i minst to sekunder, startes et program som tillater utvelgning av visse driftsparametre.
5. LCD-display med siffer og bokstaver: punktmatrixe, 2 rader med 16 tegn.

Frontpanelet på styreenheten  
969-9464 og 969-9564





Bakpanelet på styreenheten 969-9464 og 969-9564

## INSTRUKSJONER FOR BRUK

### Starte styreenheten

Styreenheten startes ved å sette strømkabelen i veggkontakten og sett hovedbryteren i stilling 1.

### Starte pumpen

Pumpen startes ved å trykke på knappen START.

### Stoppe pumpen

Pumpen stoppes ved å trykke på knappen STOPP på frontpanelet.

## VEDLIKEHOLD

Turbo-V 1000 ICE E-series styreenheter er vedlikeholdsfrie. Alt arbeid på styreenheten må kun utføres av autorisert personell.

Dersom styreenheten stanser, må du ta kontakt med Varians reparasjonsservice eller med Varians avanserte bytteservice, som kan tilby overholte styreenheter til erstatning for den ødelagte styreenheten.



### ADVARSEL

Før noe arbeid utføres på styreenheten, må den frakoples strømmettet.

Dersom en styreenhet skal kasseres, må dette skje i henhold til nasjonale bestemmelser.

## FEILMELDINGER

Når det oppstår visse feil viser selvdiagnosekretsen i styreenheten den aktuelle feilmeldingen i displayet. De aktuelle feilmeldingen fremgår av tabellen nedenfor.

MELDING	BESKRIVELSE	FORHOLDSREGEL
<b>CHECK CONNECTION TO PUMP</b>	Defekt kopling mellom pumpe og styreenhet.	Kontroller at tilkoplingskabelen mellom pumpe og styreenhet er skikkelig montert samt at kabelen ikke er skadet. Trykk to ganger på knappen START for å starte pumpen.
<b>PUMP WAITING INTERLOCK</b>	Låsesignalet for kontakt P1 skyldes en kortslutning mellom stift 3 og stift 8 i kontakten J1 eller fordi det eksterne låsesignalet er åpent.	Tilbakestill kortslutningen mellom stift 3 og stift 8 på kontakt J1 eller steng det eksterne låsesignalet.
<b>FAULT: PUMP OVERTEMP.</b>	Temperaturen på pumpens øverste lager er over 60 °C. Temperaturen på pumpens nederste lager er over 80 °C.	Vent til temperaturen synker under terskelverdien. Trykk to ganger på knappen START for å starte pumpen.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	Temperaturen på styreenhetens transformator er over 90 °C.	Vent til temperaturen synker under terskelverdien. Trykk to ganger på knappen START for å starte pumpen.
<b>FAULT: TOO HIGH LOAD</b>	Ved normal drift har pumpen et strømforbruk som er høyere enn det som er programmert (8 A).	Kontroller om pumpens rotor kan rotere fritt. Trykk to ganger på knappen START for å starte pumpen.
<b>FAULT: SHORT CIRCUIT</b>	Ved normal drift (etter startmomentet) er utgangen kortsluttet (utgangsstrøm over 16 A).	Kontroller tilkoplingene mellom pumpe og styreenhet. Trykk to ganger på knappen START for å starte pumpen.
<b>OVERVOLTAGE</b>	Det er en feil i styreenhetens forsyningsseksjon, eller styreenheten har mottatt et falsk signal.	Trykk to ganger på knappen START for å starte pumpen. Hvis meldingen dukker opp igjen, må du ta kontakt med Varian for vedlikehold.
<b>FLOW METER ALARM</b>	Alarm for purgestrømmingen. Strømningsverdien har i 10 sekunder eller mer, blitt liggende på en verdi som er lavere enn innstilt terskel.	Kontroller at gassmatekretsen fungerer riktig.
<b>HIGH POWER START FAIL</b>	Styreenheten har i startfasen utført 5 startsekvenser på høyt dreiemoment uten å greie å starte pumpen.	Kontroller at pumperotoren kan rotere fritt. Trykk to ganger på startknappen for å starte pumpen.

## YLEISIÄ TIETOJA

Tämä laite on tarkoitettu ammattimaiseen käyttöön. Ennen laitteen käyttöönottoa käyttäjän tulee lukea huolellisesti mukana seuraava käyttöohje sekä kaikki muut Varianin toimittamat lisätiedot. Varian ei vastaa seurauksista, jotka johtuvat laitteen käyttöohjeiden täydellisestä tai osittaisesta laiminlyömisestä, ammattitaidottomien henkilöiden suorittamasta laitteen virheellisestä käytöstä, valtuuttamattomista toimenpiteistä tai maakohtaisten säädösten ja normien vastaisesta käytöstä.

Sarjan Turbo-V 1000 ICE E-series valvojat ovat mikroprosessorien valvomia kiinteistä materiaaleista tehtyjä taajuudenmuuntimia, jotka kykenevät itsensä säätelyyn ja itsesuojaukseen.

Valvojat ajavat Turbo-V 1000 ICE E-series pumppuja (kymmenportaisessa järjestelmässä) käynnistysvaiheessa valvoen jännitettä ja sähkövirtaa suhteessa pumpun saavuttamaan nopeuteen.

Ne sisältävät kaikki virtapiirit, jotka ovat välttämättömiä Turbo-V 1000 ICE E-series -sarjan pumppujen automaattiselle toiminnalle. Apuliittimien kautta voidaan käyttää pumpun kauko-ohjattavia käynnistys- ja pysäytyslaitteita; signaaleja, jotka ilmaisevat pumpun toimintatilan; esityhjiöpumpun käynnistys- ja pysäytyslaitteita; pysäytyssignaaleja (paineatkaisimille, virtauksen ohjauskatkaisimille, jne.); kuumennusvaipan ohjaussignaaleja; virtausmittarin ohjaussignaaleja ja puhdistusventtiilin ohjaussignaaleja.

Seuraavissa kappaleissa on kaikki tarpeelliset tiedot käyttäjän turvallisuuden takaamiseksi laitteen käytön aikana. Yksityiskohtaiset tiedot löytyvät liitteestä "Tekniset tiedot".

**Tämä ohjekirja käyttää seuraavia merkintöjä:**



**VAARA!**

Vaara-merkinnät saavat käyttäjän huomion kiinnittymään erityisiin toimintotapoihin, joiden seuraamatta jättäminen voi aiheuttaa vakavia henkilövaurioita.



**HUOMIO !**

Huomio-merkinnät varoittavat toiminnoista, joiden laiminlyönti voi johtaa laitteen vaurioitumiseen.

**HUOM**

*Huomiot sisältävät tärkeää tekstistä otettua tietoa.*

## VARASTOINTI

Valvojan kuljetuksen ja varastoinnin aikana tulevat seuraavat ympäristövaatimukset olla täytettyinä:

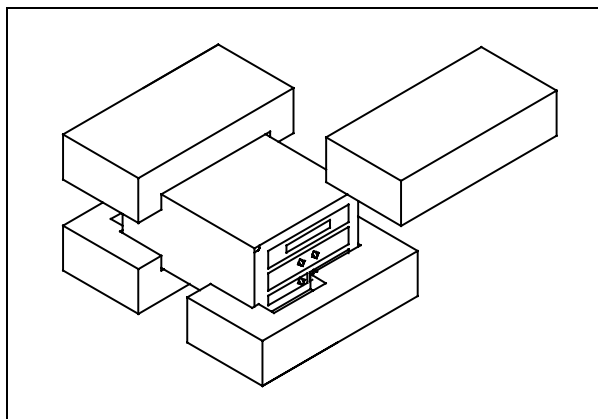
- lämpötila: -20 °C ja +70 °C asteen välillä
- suhteellinen kosteus: 0 - 95% (ilman lauhdetta)

## VALMISTELUT ASENNUSTA VARTEN

Valvoja toimitetaan erityisessä suojaavassa pakkauksessa. Mikäli havaitsette mahdollisesti kuljetuksen aikana tapahtuneita vaurioita, ottakaa yhteys paikalliseen myyntitoimistoon.

Pakkauksen purkamisen yhteydessä huolehtikaa, että valvoja ei pääse putoamaan ja välttää sen joutumista iskujen kohteeksi.

Älkää jättäkö pakkausta ympäristöön. Materiaali voidaan kokonaisuudessaan kierrättää ja se vastaa EU:n 85/399 direktiiviä ympäristön suojelusta.



*Valvojan pakkaus*

Jokainen valvoja on Varianilla säädetty tietyille sähköjännitteelle:

- malli 969-9464 220 V:n vaihtovirralla
- malli 969-9564 120 V:n vaihtovirralla

Tarkistakaa, että valittu jännite on oikea ja kytkekää virtakaapeli uudelleen.

## ASENNUS



**VAARA!**

Valvoja toimitetaan kolmijohtoisella sähkökaapelilla, jonka pistoke on kansainvälisesti hyväksytty. Käyttäkää aina tätä kaapelia ja asettakaa pistoke riittävästi maadoitettuun pistorasiaan, jotta sähköiskulta vältetään.

Valvojan sisällä syntyy korkeajännitettä, joka voi aiheuttaa vakavia vammoja tai jopa kuoleman. Ennen minkä tahansa valvojan huolto- tai asennustoimenpiteen suorittamista, irrottakaa valvoja sähköverkosta.

## HUOM

Valvoja voidaan asentaa pöydän päälle tai siihen tarkoitukseen sopivan hyllyn sisään. Joka tapauksessa huolehtikaa siitä, että riittävä jäähdytysilma pääsee vapaasti kiertämään laitteen sisällä. Älkää asentako ja/tai käytäkö valvojaa tiloissa, joissa se joutuu alltiiksi ympäristötekijöille (sade, jää, lumi), pölylle, syövyttävälle kaasulle, räjähdysalttiissa ympäristössä tai tiloissa, joissa paloriski on suuri.

Toiminnan aikana tulee noudattaa seuraavia ympäristöolosuhteita koskevia sääntöjä:

- lämpötila: 0 °C ja +40 °C välillä
- suhteellinen kosteus: 0 - 95% välillä (ilman lauhdetta)

Valvojaa kytkettäessä sille tarkoitettuun pumppuun käyttäkää valvojalta tarkoitettua erityiskaapelia.

Muiden kytkentöjen ja valinnaisten lisälaitteiden asennusten suorittamiseksi, katsokaa kappaletta "Tekniset tiedot".

## KÄYTTÖ

Tähän kappaleeseen on kirjattu tärkeimmät käyttötoimenpiteet. Tarkempia lisätietoja sekä kytkentöjä ja valinnaisia lisälaitteita koskevien toimenpiteiden suorittamista käsitteleviä tietoja löydätte kappaleesta "Käyttö", joka on "Tekniset tiedot"- kappaleen liitteenä. Ennen valvojan käyttöä suorittakaa kaikki sähkökytkennät seuraten kytkettävän pumpun käyttöohjeita.



**VAARA!**

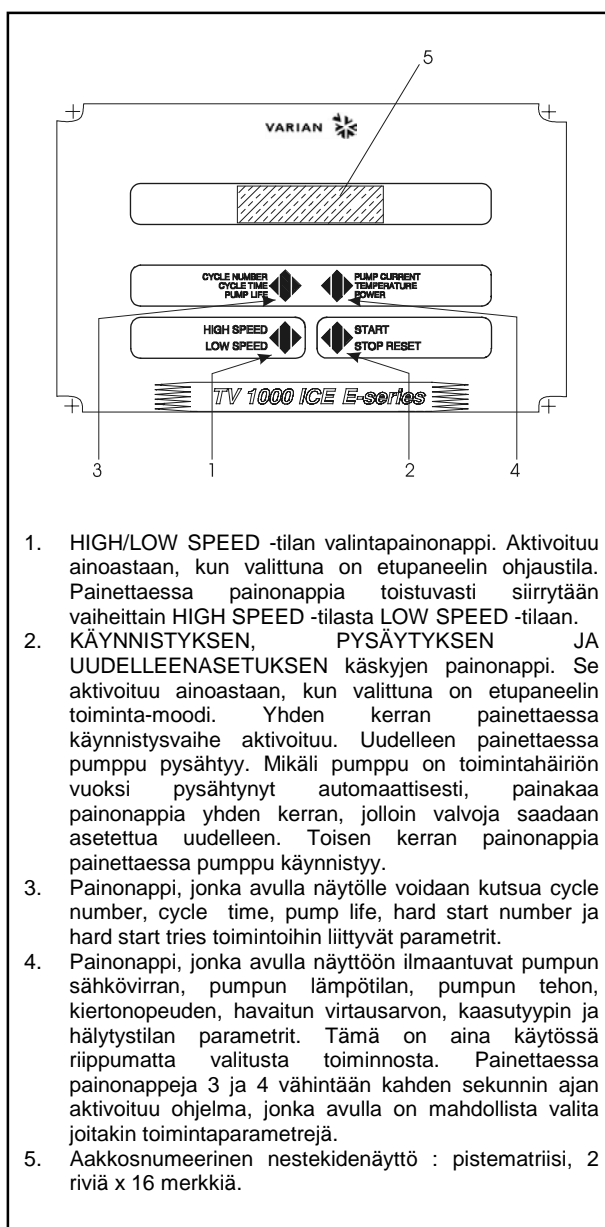
Mikäli pumppu on asetettu pöydälle, varmistakaa että se on vakaa. Näin vältetään vammoilta ihmisille sekä itse koneelle. Älkää myöskään käyttäkö pumppua, mikäli sisääntulon laippaa ei ole kytketty järjestelmään tai mikäli sitä ei ole suljettu laippasulkijalla.

## HUOM

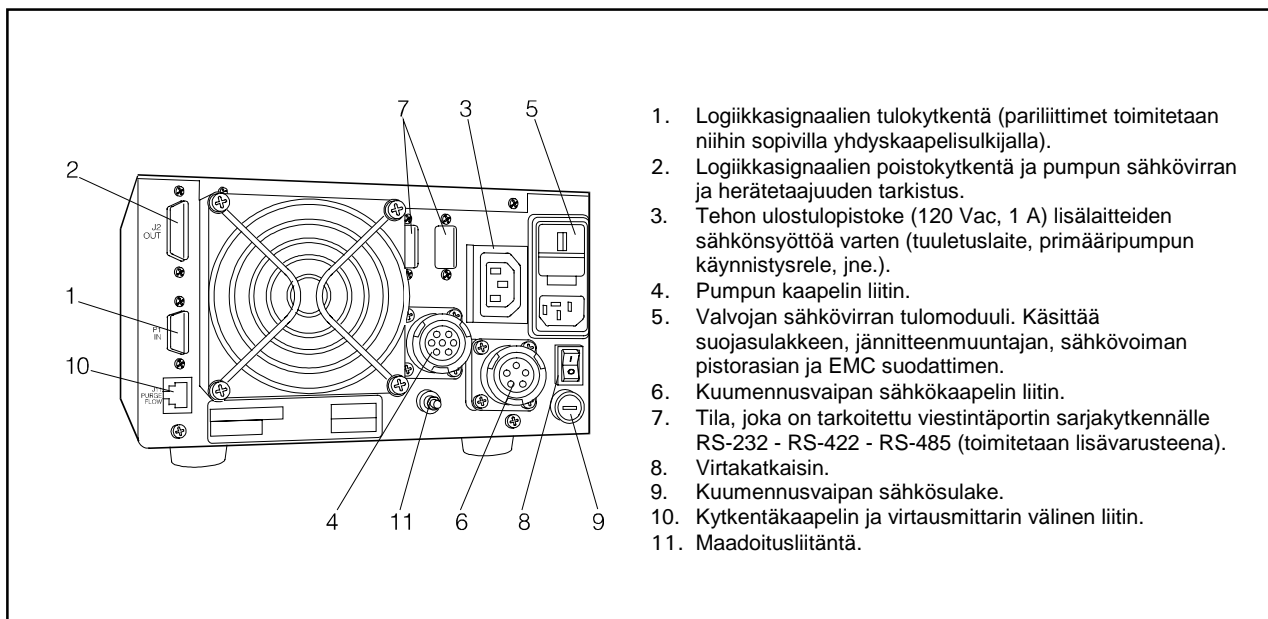
Sulkimen J1 liitin tulee jättää yhdyskaapelilla kytketyksi, mikäli ulkoisia kytkentöjä ei suoriteta. Esityhjiöpumppu ja Turbo-V-pumppu voidaan käynnistää samanaikaisesti.

## Valvojan Säätimet, Osoittimet ja Liittimet

Seuraavassa on esitelty Valvojan valvontapaneeli ja yhteyspaneeli. Tarkempia lisätietoja saatte kappaleesta "Tekniset Tiedot".



Valvojen 969-9464 ja 969-9564 etupaneelit



Valvojen 969-9464 ja 969-9564 takapaneeli

## KÄYTTÖTOIMENPITEET

### Valvojan käynnistys

Valvoja käynnistyy asettaessa virtakaapeli pistorasiaan ja käännettäessä pääkatkaisin asentoon 1.

### Pumpun käynnistys

Pumppu käynnistyy painettaessa START-painonappia.

### Pumpun pysäyttäminen

Pumppu pysähtyy painettaessa etupaneelissa olevaa STOP-painonappia.

## HUOLTO

Turbo-V 1000 ICE E-series valvoja ei tarvitse huoltaa millään tavoin. Mahdolliset valvojan tehtävät toimenpiteet tulee jättää aina valtuutetun henkilön tehtäväksi.

1. Logiikkasignaalien tulokytettä (pariliittimet toimitetaan niihin sopivilla yhdyskaapelisulkijalla).
2. Logiikkasignaalien poistokytettä ja pumpun sähkövirran ja herätetaajuuden tarkistus.
3. Tehon ulostulopistoke (120 Vac, 1 A) lisälaitteiden sähkönsyöttöä varten (tuuletuslaite, primääripumpun käynnistysrele, jne.).
4. Pumpun kaapelin liitin.
5. Valvojan sähkövirran tulomoduuli. Käsittää suojauslakkeen, jännitteenmuuntajan, sähkövoiman pistorasian ja EMC suodattimen.
6. Kuumennusvaipan sähkökaapelin liitin.
7. Tila, joka on tarkoitettu viestintäportin sarjakytkennälle RS-232 - RS-422 - RS-485 (toimitetaan lisävarusteena).
8. Virtakatkaisin.
9. Kuumennusvaipan sähkösulake.
10. Kytkentäkaapelin ja virtausmittarin välinen liitin.
11. Maadoitusliitäntä.

Toimintahäiriön sattuessa on mahdollista käyttää Varianin korjauspalvelua tai "Varian advance exchange service" -palvelua, jolloin on mahdollista vaihtaa rikkoontunut valvoja ladattuun valvojaan.



Ennen minkä tahansa valvojaan tehtävän toimenpiteen suorittamista irrottakaa sähkökaapeli pistorasiasta.

Mikäli valvoja täytyy romuttaa, toimikaa sen hävittämisessä kansallisten säädösten ja normien määräämällä tavalla.

## VIANETSINTÄ

Joidenkin toimintahäiriöiden yhteydessä valvojan itsemäärittelypiiri analysoi virheen, joka näkyy viesteinä, jotka on kuvailtu seuraavassa taulukossa.

VIESTI	VIKA	KORJAUSTOIMENPITEET
<b>CHECK CONNECTION TO PUMP</b>	Toimintahäiriö pumpun ja valvojan liittännässä.	Tarkistakaa, että pumpun ja valvojan välinen yhteyskaapeli on hyvin kiinnitetty päistään ja ettei siinä ole esteitä. Painakaa kaksi kertaa START-painonappia, jolloin pumppu käynnistyy.
<b>PUMP WAITING INTERLOCK</b>	Lukitusignaali (interlock) liittimessä P1 on aktiivinen johtuen liittimen J1 neurojen 3 ja 8 välillä tapahtuneen oikosulun keskeytyksestä tai ulkoisen lukitusignaalin (interlock) avautumisesta.	Palauttakaa liittimen J1 neurojen 3 ja 8 välinen oikosulku tai sulkekaa ulkopuolinen lukitusignaali (interlock).
<b>FAULT: PUMP OVERTEMP.</b>	Pumpun ylä lämpötila on ylittänyt 60 °C:tta. Pumpun alalaakerin lämpötila on ylittänyt 80 °C:tta.	Odottakaa, että lämpötila palaa kynnysarvon alapuolelle. Painakaa START-painonappia kaksi kertaa, jolloin pumppu käynnistyy.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	Valvojan muuntajan lämpötila on ylittänyt 90 °C:tta.	Odottakaa, että lämpötila palaa kynnysarvon alapuolelle. Painakaa START-painonappia kaksi kertaa, jolloin pumppu käynnistyy.
<b>FAULT: TOO HIGH LOAD</b>	Normaalityöskentelyn aikana (käynnistysvaiheen jälkeen) pumpun kuluttama sähkövirta on suurempi kuin sille on ohjelmoitu (6 A).	Tarkistakaa, että pumpun roottori pyörii vapaasti. Painakaa START-painonappia kaksi kertaa, jolloin pumppu käynnistyy.
<b>FAULT: SHORT CIRCUIT</b>	Normaalityöskentelyn aikana (käynnistysvaiheen jälkeen) poistoliitin on oikosulussa (ulostulovirta suurempi kuin 16 A).	Tarkistakaa pumpun ja valvojan välinen liitos. Painakaa START-painonappia kaksi kertaa, jolloin pumppu käynnistyy.
<b>OVERVOLTAGE</b>	Valvojan sähköosastossa on jokin vika tai se on ottanut vastaan häiriösignaalin.	Painakaa START-painonappia kaksi kertaa, jolloin pumppu käynnistyy. Jos viesti ilmaantuu uudelleen, ottakaa yhteys Variiniin huoltoa varten.
<b>FLOW METER ALARM</b>	Puhdistusvirtaukseen liittyvä hälytys. Virtausarvo on jäänyt asetettua kynnysarvoa alhaisemmaksi vähintään 10 sekunnin ajaksi.	Tarkista kaasun syöttöpiirin asianmukainen toiminta.
<b>HIGH POWER START FAIL</b>	Valvoja on Start- vaiheen aikana suorittanut 5 start- yritystä korkeilla kierroksilla ilman, että pumppu on käynnistynyt.	Tarkistakaa, että pumpun roottori pyörii vapaasti. Painakaa START- painonappia kaksi kertaa, jolloin pumppu käynnistyy.

## ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

Αυτή η συσκευή προορίζεται για επαγγελματική χρήση. Ο χρήστης θα πρέπει να διαβάσει προσεκτικά τις οδηγίες του παρόντος εγχειριδίου και οποιαδήποτε άλλη πρόσθετη πληροφορία που παρέχεται από τη Varian, πριν από τη χρησιμοποίηση της συσκευής. Η Varian δεν φέρει καμία ευθύνη όσον αφορά την ολική ή μερική αθέτηση των οδηγιών, την ακατάλληλη χρήση εκ μέρους ανεκπαίδευτου προσωπικού, αθαίρετες επεμβάσεις ή χρήση που δεν συμφωνεί με τις ειδικές εθνικές διατάξεις. Οι ρυθμιστές της σειράς Turbo-V 1000 ICE E-series είναι μετατροπείς συχνότητας, ελεγχόμενοι από έναν μικροεπεξεργαστή. Είναι κατασκευασμένοι με εξαρτήματα σε στερεά κατάσταση και έχουν αυτοδιαγνωστική και αυτοπροστατευτική ικανότητα. Οι ρυθμιστές οδηγούν τις αντλίες της σειράς Turbo-V 1000 ICE E-series (με μια διαδικασία που διαιρείται σε δέκα στάδια) κατά τη διάρκεια εκκίνησης ελέγχοντας την τάση και το ηλεκτρικό ρεύμα σε σχέση με την ταχύτητα στην οποία θα φτάσει η αντλία. Αυτοί έχουν ενσωματωμένα όλα τα απαραίτητα κυκλώματα για την αυτόματη λειτουργία των αντλιών της σειράς Turbo-V 1000 ICE E-series. Διαμέσου βοηθητικών συνδετήρων διατίθενται οι εντολές για την εκκίνηση και τη στάση της αντλίας εξ'αποστάσεως, τα σήματα που δείχνουν την κατάσταση λειτουργίας της αντλίας, οι χειρισμοί εκκίνησης και σταματήματος της αντλίας προ - κενού, τα σήματα μπλοκαρίσματος (για διακόπτες πίεσης, διακόπτες ελέγχου της ροής του νερού, κλπ.), τα σήματα ελέγχου του θερμαντικού μάντα (heater jacket), τα σήματα ελέγχου του μετρητή ροής και αυτά για τη διαχείριση της βαλβίδας καθαριότητας (purge valve). Στις επόμενες παραγράφους αναφέρονται όλες οι απαραίτητες πληροφορίες που εγγυούνται την ασφάλεια του χειριστή κατά τη διάρκεια της χρησιμοποίησης της συσκευής. Λεπτομερείς πληροφορίες παρέχονται στο παράρτημα "Technical Information".

Αυτό το εγχειρίδιο χρησιμοποιεί τις ακόλουθες συμβάσεις:



**ΚΙΝΔΥΝΟΣ**

Οι ενδείξεις κινδύνου προσελκύουν την προσοχή του χειριστή σε μια διαδικασία ή σε μια ειδική εργασία η οποία εάν δεν εκτελεστεί σωστά, θα μπορούσε να προκαλέσει σοβαρές προσωπικές βλάβες.



**ΠΡΟΣΟΧΗ**

Οι ενδείξεις προσοχής εμφανίζονται πριν από τις διαδικασίες οι οποίες εάν δεν εκτελεστούν με προσοχή, θα μπορούσαν να προκαλέσουν ζημιές στη συσκευή.

**ΣΗΜΕΙΩΣΗ**

Οι σημειώσεις περιέχουν σημαντικές πληροφορίες που έχουν αποσπαστεί από το κείμενο.

## ΑΠΟΘΗΚΕΥΣΗ

Κατά τη διάρκεια της μεταφοράς και της αποθήκευσης των ρυθμιστών πρέπει να τηρούνται οι ακόλουθες περιβαλλοντικές συνθήκες:

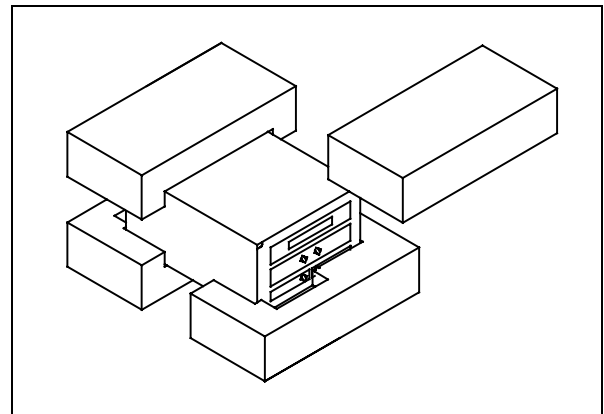
- θερμοκρασία: -20 °C ως + 70 °C
- σχετική υγρασία: 0 - 95% (ασυμπίκνωτη)

## ΠΡΟΕΤΟΙΜΑΣΙΑ ΓΙΑ ΤΗΝ ΕΓΚΑΤΑΣΤΑΣΗ

Ο ρυθμιστής είναι εξοπλισμένος με μία ευρύχωρη προστατευτική συσκευασία. Αν υπάρχουν ενδείξεις βλάβης που θα μπορούσαν να έχουν προκληθεί κατά τη διάρκεια της μεταφοράς, συμβουλευτείτε το τοπικό τμήμα πωλήσεων.

Κατά τη διάρκεια του ανοίγματος της συσκευασίας, δώστε ιδιαίτερη προσοχή έτσι ώστε να μην πέσει και να μην χτυπηθεί ο ρυθμιστής.

Μην εγκαταλείπετε τη συσκευασία στο περιβάλλον. Το υλικό ανακυκλώνεται πλήρως και ανταποκρίνεται στην Οδηγία της Ε.Ο.Κ. 85/399 για τη διαφύλαξη του περιβάλλοντος.



Συσκευασία των ρυθμιστών

Κάθε ρυθμιστής βγαίνοντας από την Varian έχει μία συγκεκριμένη τάση τροφοδότησης:

- το μοντέλο 969-9464 220 Vac
- το μοντέλο 969-9564 120 Vac

Ελέγξτε αν επιλέχθηκε η σωστή τάση και συνδέστε το καλώδιο τροφοδότησης.

**ΕΓΚΑΤΑΣΤΑΣΗ**



**ΚΙΝΔΥΝΟΣ**

Ο ρυθμιστής είναι εφοδιασμένος με τριπολικό καλώδιο τροφοδότησης με μία πρίζα που έχει εγκριθεί διεθνώς. Να χρησιμοποιείτε πάντα αυτό το καλώδιο τροφοδοσίας και να το βάζετε σε πρίζα που να διαθέτει την κατάλληλη γείωση έτσι ώστε να αποφεύγονται ηλεκτρικές εκκενώσεις.

Στο εσωτερικό του ρυθμιστή αναπτύσσονται υψηλές τάσεις που μπορούν να προκαλέσουν σοβαρούς τραυματισμούς ή και το θάνατο. Πριν εκτελέσετε οποιαδήποτε εργασία εγκατάστασης ή συντήρησης του ρυθμιστή αποσυνδέστε τον από την πρίζα τροφοδότησης.

**ΣΗΜΕΙΩΣΗ**

Ο ρυθμιστής μπορεί να τοποθετηθεί επάνω σε ένα τραπέζι ή στο εσωτερικό μίας κατάλληλης θήκης. Σε οποιαδήποτε περίπτωση είναι αναγκαίο ο αέρας να κυκλοφορεί ελεύθερα στο εσωτερικό της συσκευής. Μην τοποθετείτε, ούτε να χρησιμοποιείτε τον ρυθμιστή σε χώρους εκτεθειμένους στις καιρικές συνθήκες (βροχή, πάγο, χιόνι, σκόνες, αέρια, σε χώρους όπου υπάρχει κίνδυνος έκρηξης ή πυρκαγιάς).

Κατά τη διάρκεια της λειτουργίας πρέπει να τηρούνται οι ακόλουθες περιβαλλοντικές συνθήκες:

- θερμοκρασία: 0 °C - + 40 °C
- σχετική υγρασία: 0 - 95 % (ασυμπύκνωτη).

Για τη σύνδεση του ρυθμιστή με την αντλία χρησιμοποιήστε το αντίστοιχο καλώδιο του ρυθμιστή.

Για τις άλλες συνδέσεις και για την εγκατάσταση των επιπλέον εξαρτημάτων, βλέπε το παράρτημα "Technical Information".

**ΧΡΗΣΗ**

Σ' αυτήν την παράγραφο αναφέρονται οι κυριότερες διαδικασίες λειτουργίας. Για περισσότερες λεπτομέρειες και για διαδικασίες που απαιτούν ιδιαίτερες συνδέσεις ή αξεσουάρ, αναφερθείτε στην παράγραφο Χρήσης του παραρτήματος "Τεχνικές Πληροφορίες". Πριν χρησιμοποιήσετε τον ρυθμιστή κάντε όλες τις συνδέσεις ηλεκτρικές και αέρος με βάση το εγχειρίδιο της αντλίας σύνδεσης.



**ΚΙΝΔΥΝΟΣ**

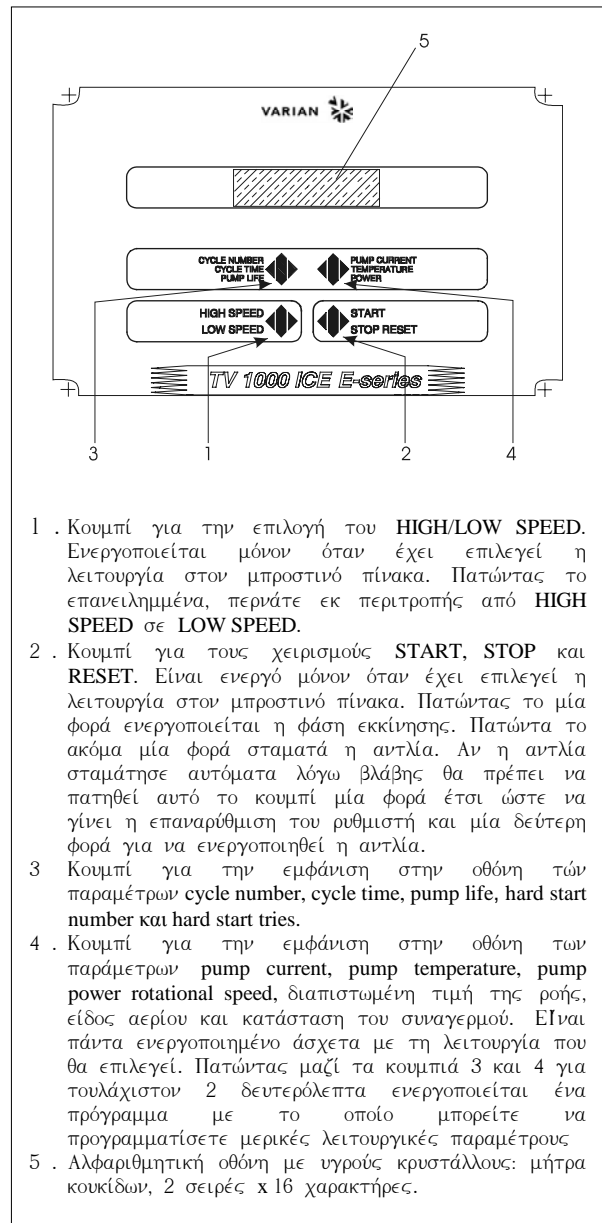
Για να αποφύγετε βλάβες σε άτομα ή στη συσκευή, όταν η αντλία είναι τοποθετημένη σε ένα τραπέζι σιγουρευτείτε ότι είναι καλά σταθεροποιημένη. Μην θέτετε σε λειτουργία την αντλία αν η φλάντζα εισόδου δεν είναι συνδεδεμένη στο σύστημα ή αν δεν είναι κλειστή με την φλάντζα κλεισίματος.

**ΣΗΜΕΙΩΣΗ**

Ο συνδετήρας J1 θα πρέπει να αφηθεί συνδεδεμένος με τη γέφυρα αν δεν γίνεται καμμία εξωτερική σύνδεση. Η αντλία προ - κενού και η αντλία Turbo-V μπορούν να ενεργοποιηθούν προσωρινά.

**Χειριστήρια, ενδείξεις και συνδετήρες του Ρυθμιστή**

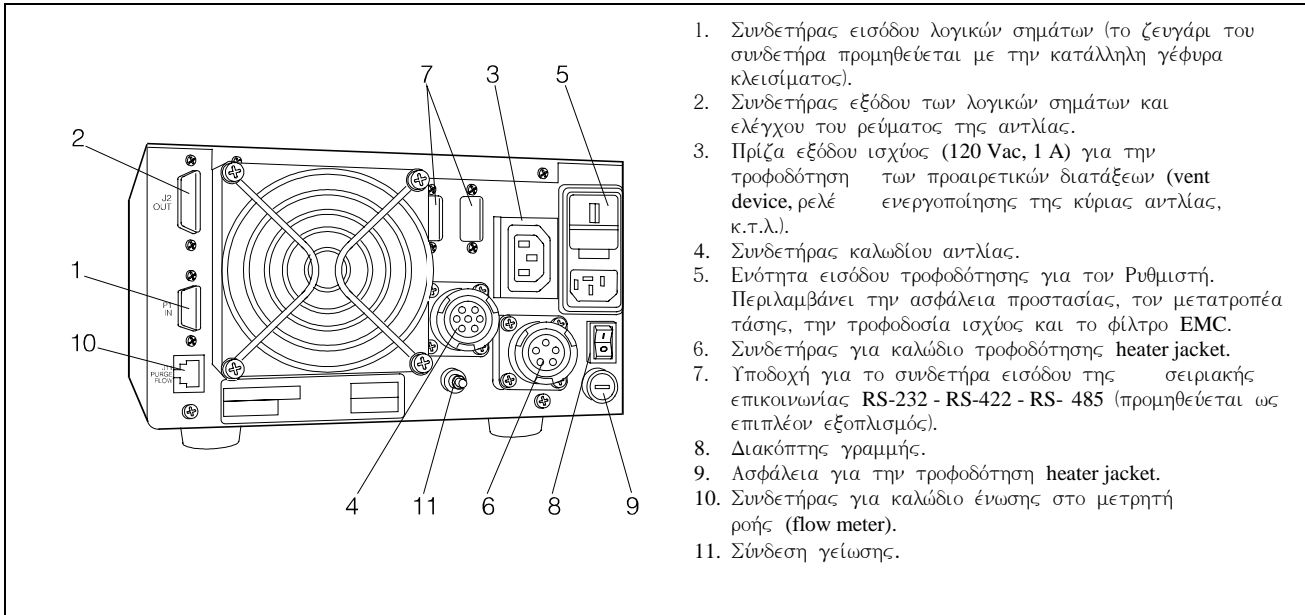
Στη συνέχεια παρουσιάζονται ο πίνακας ελέγχου του ρυθμιστή και οι πίνακες σύνδεσης. Για περισσότερες λεπτομέρειες αναφερθείτε στο παράρτημα "Technical Information".



1. Κομπι για την επιλογή του HIGH/LOW SPEED. Ενεργοποιείται μόνον όταν έχει επιλεγεί η λειτουργία στον μπροστινό πίνακα. Πατώντας το επανειλημμένα, περνάτε εκ περιτροπής από HIGH SPEED σε LOW SPEED.
2. Κομπι για τους χειρισμούς START, STOP και RESET. Είναι ενεργό μόνον όταν έχει επιλεγεί η λειτουργία στον μπροστινό πίνακα. Πατώντας το μία φορά ενεργοποιείται η φάση εκκίνησης. Πατώντας το ακόμα μία φορά σταματά η αντλία. Αν η αντλία σταμάτησε αυτόματα λόγω βλάβης θα πρέπει να πατηθεί αυτό το κομπι μία φορά έτσι ώστε να γίνει η επαναρύθμιση του ρυθμιστή και μία δεύτερη φορά για να ενεργοποιηθεί η αντλία.
3. Κομπι για την εμφάνιση στην οθόνη των παραμέτρων cycle number, cycle time, pump life, hard start number και hard start tries.
4. Κομπι για την εμφάνιση στην οθόνη των παραμέτρων pump current, pump temperature, pump power rotational speed, διαπιστωμένη τιμή της ροής, είδος αερίου και κατάσταση του συναγερμού. Είναι πάντα ενεργοποιημένο άσχετα με τη λειτουργία που θα επιλεγεί. Πατώντας μαζί τα κομπιά 3 και 4 για τουλάχιστον 2 δευτερόλεπτα ενεργοποιείται ένα πρόγραμμα με το οποίο μπορείτε να προγραμματίσετε μερικές λειτουργικές παραμέτρους
5. Αλφαριθμητική οθόνη με υγρούς κρυστάλλους: μήτρα κουκίδων, 2 σειρές x 16 χαρακτήρες.

Μπροστά πίνακας του Ρυθμιστή (Controller)  
969-9464 και 969-9564





Εμπρόσθιος πίνακας του Ρυθμιστή 969-9464 και 969-9564

## ΔΙΑΔΙΚΑΣΙΕΣ ΣΧΕΤΙΚΑ ΜΕ ΤΗ ΧΡΗΣΗ

### Αναμμα του Ρυθμιστή

Για να ανάψει ο ρυθμιστής είναι αρκετό να βάλετε το καλώδιο τροφοδότησης στην πρίζα του δικτύου και θέτετε το διακόπτη της γραμμής στη θέση 1.

### Εκκίνηση της Αντλίας

Για να τεθεί σε κίνηση η αντλία θα πρέπει να πατήσετε το κουμπί **START** του εμπρόσθιου πίνακα.

### Σταμάτημα της Αντλίας

Για να σταματήσει η αντλία αρκεί να πατήσετε το κουμπί **STOP** του εμπρόσθιου πίνακα.

## ΣΥΝΤΗΡΗΣΗ

Οι ρυθμιστές της σειράς Turbo-V 1000 ICE E-series δεν απαιτούν καμία συντήρηση. Οποιαδήποτε επέμβαση θα πρέπει να πραγματοποιηθεί από εγκεκριμένο προσωπικό.

1. Συνδετήρας εισόδου λογικών σημάτων (το ζευγάρι του συνδετήρα προμηθεύεται με την κατάλληλη γέφυρα κλεισίματος).
2. Συνδετήρας εξόδου των λογικών σημάτων και ελέγχου του ρεύματος της αντλίας.
3. Πρίζα εξόδου ισχύος (120 Vac, 1 A) για την τροφοδότηση των προαιρετικών διατάξεων (vent device, ρελέ ενεργοποίησης της κύριας αντλίας, κ.τ.λ.).
4. Συνδετήρας καλωδίου αντλίας.
5. Ενότητα εισόδου τροφοδότησης για τον Ρυθμιστή. Περιλαμβάνει την ασφάλεια προστασίας, τον μετατροπέα τάσης, την τροφοδοσία ισχύος και το φίλτρο EMC.
6. Συνδετήρας για καλώδιο τροφοδότησης heater jacket.
7. Υποδοχή για το συνδετήρα εισόδου της σειριακής επικοινωνίας RS-232 - RS-422 - RS- 485 (προμηθεύεται ως επιπλέον εξοπλισμός).
8. Διακόπτης γραμμής.
9. Ασφάλεια για την τροφοδότηση heater jacket.
10. Συνδετήρας για καλώδιο ένωσης στο μετρητή ροής (flow meter).
11. Σύνδεση γείωσης.

Σε περίπτωση βλάβης μπορείτε να χρησιμοποιήσετε την υπηρεσία επισκευών της Varian ή το "Varian advance exchange service", που σας δίνει τη δυνατότητα να έχετε έναν καθαρισμένο ρυθμιστή σε αντικατάσταση του χαλασμένου.



**ΚΙΝΔΥΝΟΣ**

Πριν κάνετε οποιαδήποτε επέμβαση στον Ρυθμιστή αποσυνδέστε το καλώδιο τροφοδότησης.

Για την καταστροφή του ρυθμιστή ακολουθήστε ότι αναφέρετε στους εθνικούς κανονισμούς.

## ΜΗΝΥΜΑΤΑ ΛΑΘΟΥΣ

Σε ορισμένες περιπτώσεις βλάβης τα κυκλώματα αυτοδιάγνωσης του ρυθμιστή παρουσιάζουν ορισμένα μηνύματα λάθους τα οποία παρουσιάζονται στον πίνακα που ακολουθεί.

ΜΗΝΥΜΑ	ΠΕΡΙΓΡΑΦΗ	ΔΙΟΡΘΩΣΗ
<b>CHECK CONNECTION TO PUMP</b>	Κακή λειτουργία στη σύνδεση αντλίας και ρυθμιστή	Ελέγξτε αν το καλώδιο σύνδεσης μεταξύ αντλίας και ρυθμιστή είναι καλά σταθεροποιημένο και στα δύο άκρα και ότι δεν υπάρχει διακοπή. Πατήστε δύο φορές το κουμπί <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία.
<b>PUMP WAITING INTERLOCK</b>	Έχει ενεργοποιηθεί το σήμα <b>interlock</b> που βρίσκεται στον συνδετήρα <b>P1</b> λόγω διακοπής του βραχυκυκλώματος μεταξύ του πιν 3 και του πιν 8 του συνδετήρα <b>J1</b> , ή λόγω ανοίγματος του σήματος του εξωτερικού <b>interlock</b> .	Επαναφέρατε το βραχυκύκλωμα μεταξύ του πιν 3 και του πιν 8 του συνδετήρα <b>J1</b> , κλείστε το σήμα του εξωτερικού <b>interlock</b> .
<b>FAULT: PUMP OVERTEMP.</b>	Η θερμοκρασία του άνω κουζινέτου της αντλίας ξεπέρασε τους 60/80 °C.	Περιμένετε ώσπου η θερμοκρασία να κατεβεί κάτω από το ανώτατο επιτρεπτό σημείο.  Πατήστε δύο φορές το κουμπί <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	Η θερμοκρασία του μετασχηματιστή ξεπέρασε τους 90 °C.	Περιμένετε ώσπου η θερμοκρασία να κατεβεί κάτω από το ανώτατο επιτρεπτό σημείο.  Πατήστε δύο φορές το κουμπί <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία.
<b>FAULT: TOO HIGH LOAD</b>	Κατά την κανονική λειτουργία (μετά τη φάση εκκίνησης) το απορροφούμενο ρεύμα από την αντλία είναι μεγαλύτερο από το προγραμματισμένο (8 A).	Ελέγξτε αν ο ρότορας της αντλίας μπορεί να περιστραφεί ελεύθερα.  Πατήστε δύο φορές το κουμπί <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία.
<b>FAULT: SHORT CIRCUIT</b>	Κατά την κανονική λειτουργία (μετά τη φάση εκκίνησης) η σύνδεση εξόδου έχει βραχυκυκλώσει (ρεύμα εξόδου μεγαλύτερο από 16 A)	Ελέγξτε τις συνδέσεις μεταξύ αντλίας και ρυθμιστή.  Πατήστε δύο φορές το κουμπί <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία.
<b>OVERVOLTAGE</b>	Πραγματοποιήθηκε μία βλάβη στο τμήμα τροφοδότησης του <b>controller</b> , ή ο <b>controller</b> έλαβε ένα μη αναγνωρίσιμο σήμα.	Πατήστε δύο φορές το κουμπί <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία. Αν ξαναπαρουσιάζεται αυτό το μήνυμα αποταθείτε στη <b>Varian</b> για τη συντήρηση.
<b>FLOW METER ALARM</b>	Συναγερμός σχετικός με τη ροή ακαθαρσίας. Η τιμή της ροής παρέμεινε σε μία τιμή κατώτερη από το όριο που είχε τεθεί, για ένα χρόνο ίσο ή μεγαλύτερο από 10 δευτερόλεπτα.	Ελέγχετε τη σωστή λειτουργία του κυκλώματος τροφοδότησης του αερίου.
<b>HIGH POWER START FAIL</b>	Ο ρυθμιστής στη φάση του <b>Start</b> έχει πραγματοποιήσει 5 εκκινήσεις υψηλής ζεύξης χωρίς επιτυχή εκκίνηση της αντλίας.	Βεβαιωθείτε ότι ο ρότορας της αντλίας είναι ελεύθερος να περιστραφεί. Πατήστε δύο φορές το κουμπί <b>start</b> για να ξεκινήσει η αντλία.

**GENERAL INFORMATION**

This equipment has been designed to be used by professionals. The user should read this instruction manual and any other additional information supplied by Varian before operating the equipment. Varian will not be held responsible for any events occurring due to non-compliance, even partial, with these instructions, improper use by untrained people, unauthorized interference with the equipment or any action contrary to that provided for by specific national standards. The Turbo-V 1000 ICE E-series controllers are microprocessor-controlled, solid-state, frequency converters with self-diagnostic and self-protection features.

The controllers drive (within ten steps) the Turbo-V 1000 ICE E-series pump during the starting phase by controlling the voltage and current respect to the speed reached by the pump. They incorporate all the facilities required for the automatic operation of the Turbo-V 1000 ICE E-series.

Remote start/stop commands, pump status signals, forepump start/stop commands, interlock control signals (for pressure switch, water flow switch), heater jacket control signals, flow meter control signals and purge valve management signals are provided via auxiliary connectors. The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment. Detailed information is supplied in the appendix "Technical Information".

**This manual uses the following conventions:**



**WARNING!**

The warning messages attract the operator's attention to a particular procedure or practice that could lead to serious injury if not followed correctly.



**CAUTION!**

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

**NOTE**

The notes contain important information taken from the text.

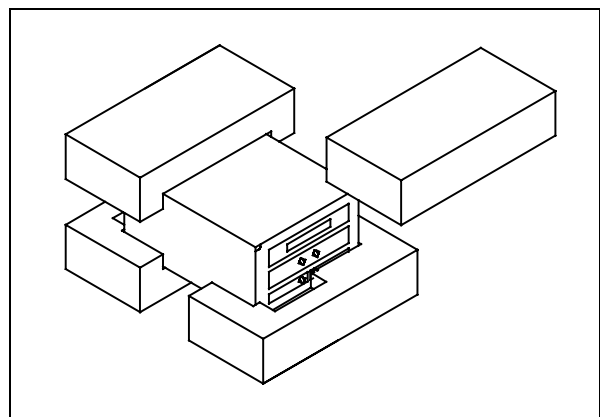
**STORAGE**

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

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

**PREPARATION FOR INSTALLATION**

The controller is supplied in special protective packing. If this shows signs of damage that may have occurred during transport, contact your local sales office. When unpacking the controller ensure that it is not dropped or subjected to any form of impact. Do not dispose of the packing materials in an unauthorized manner. The material is 100% recyclable and complies with EEC Directive 85/399.



*Controllers Packing*

Each controller is factory set for a specific power supply:

- model 969-9464 is factory set for 220 Vac operation
- model 969-9564 is factory set for 120 Vac operation

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

**INSTALLATION**



**WARNING!**

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

**NOTE**

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

During operation, the following environmental conditions must be respected:

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

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

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

**USE**

This paragraph describes the fundamental operating procedures. Detailed information and operating procedures that involve optional connection or option are supplied in the paragraph "USE" of the appendix "Technical Information". Make all vacuum manifold and electrical connections and refer to Turbo-V pump instruction manual before operating the Turbo-V controller.



**WARNING!**

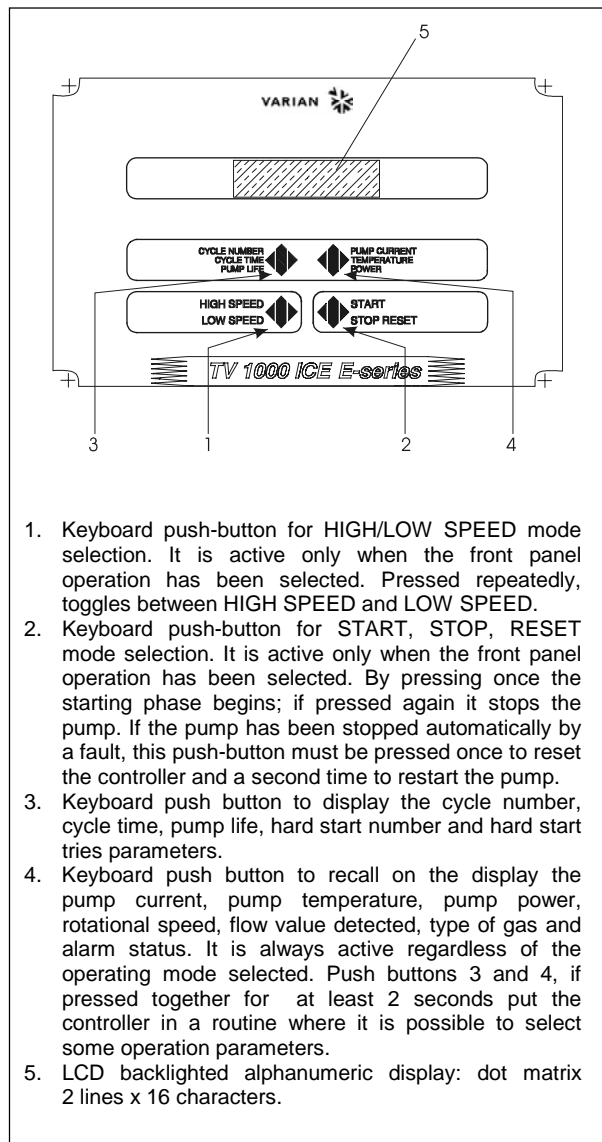
To avoid injury to personnel and damage to the equipment, if the pump is lying on a table make sure it is steady. Never operate the Turbo-V pump if the pump inlet is not connected to the system or blanked off.

**NOTE**

The input signal J1 connector should be left in position including the shipping links if no external connections are made. The forepump and Turbo-V pump can be switched on at the same time.

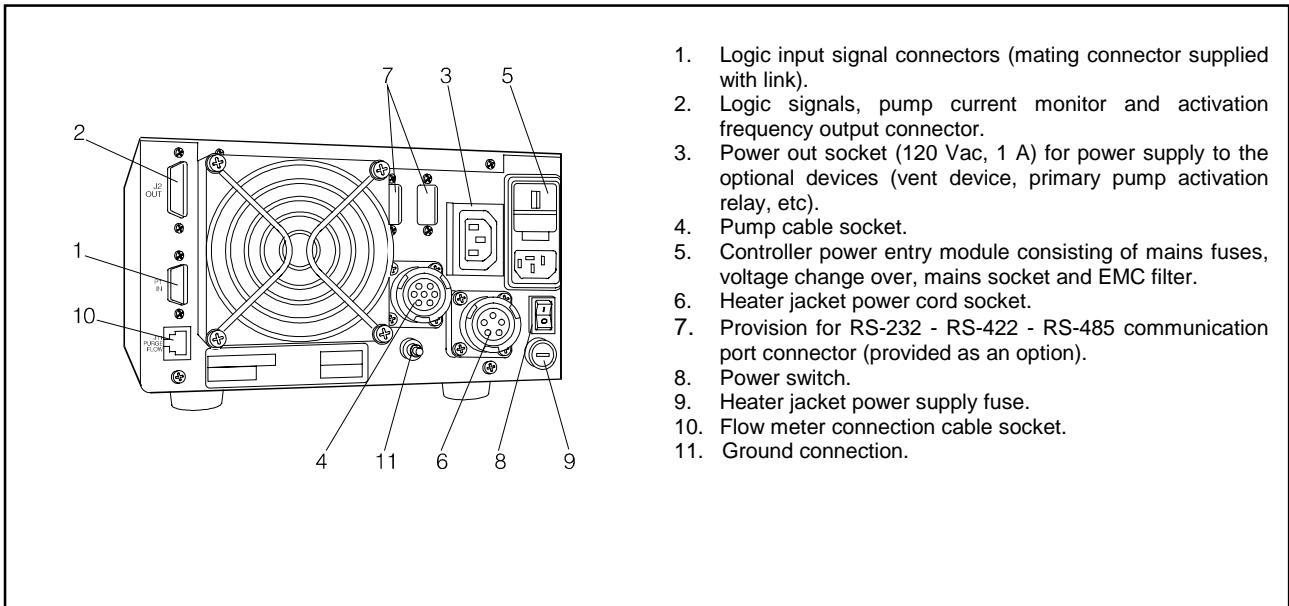
**Controller Controls, Indicators and Connectors**

The following paragraph illustrates the Controller control panel and interconnection panel. More details are contained in the appendix "Technical Information".



1. Keyboard push-button for HIGH/LOW SPEED mode selection. It is active only when the front panel operation has been selected. Pressed repeatedly, toggles between HIGH SPEED and LOW SPEED.
2. Keyboard push-button for START, STOP, RESET mode selection. It is active only when the front panel operation has been selected. By pressing once the starting phase begins; if pressed again it stops the pump. If the pump has been stopped automatically by a fault, this push-button must be pressed once to reset the controller and a second time to restart the pump.
3. Keyboard push button to display the cycle number, cycle time, pump life, hard start number and hard start tries parameters.
4. Keyboard push button to recall on the display the pump current, pump temperature, pump power, rotational speed, flow value detected, type of gas and alarm status. It is always active regardless of the operating mode selected. Push buttons 3 and 4, if pressed together for at least 2 seconds put the controller in a routine where it is possible to select some operation parameters.
5. LCD backlighted alphanumeric display: dot matrix 2 lines x 16 characters.

Controller 969-9464 and  
969-9564 Front Panel



*Controller 969-9464 and 969-9564 Rear Panel*

**USE PROCEDURE**

**Controller Startup**

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

**Starting the pump**

To start the pump press the START push-button on the controller front panel.

**Pump Shutdown**

To shutdown the pump press the STOP push-button on the controller front panel.

**MAINTENANCE**

The Turbo-V 1000 ICE E-series controller does not require any maintenance. Any work performed on the controller must be carried out by authorized personnel.

When a fault has occurred it is possible to use the Varian repair service. Replacement controllers are available on an advance exchange basis through Varian.



**WARNING!**

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

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

**ERROR MESSAGES**

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

<b>MESSAGE</b>	<b>DESCRIPTION</b>	<b>REPAIR ACTION</b>
<b>CHECK CONNECTION TO PUMP</b>	Wrong connection between the pump and the controller.	Check connection between controller and pump. Press the START push-button twice to start the pump.
<b>PUMP WAITING INTERLOCK</b>	The interlock signal of P1 connector is activated by an interruption of the link between pin 3 and 8 of J1 connector, or because the external interlock signal is open.	Reset the short circuit between pin 3 and pin 8 of J1 connector, or close the external interlock signal.
<b>FAULT: PUMP OVERTEMP.</b>	The pump upper bearing temperature exceeded 60 °C. The pump lower bearing temperature exceeded 80 °C.	Wait until the temperature decrease below threshold value. Press the START push-button twice to start the pump.
<b>FAULT: CONTROLLER OVERTEMPERATURE</b>	The controller transformer temperature exceeded 90 °C.	Wait until the temperature decrease below threshold value. Press the START push-button twice to start the pump.
<b>FAULT: TOO HIGH LOAD</b>	In normal operation, the current drawn by the pump is higher than programmed (8 A).	Check that the pump rotor is free to rotate. Press the START push-button twice to start the pump.
<b>FAULT: SHORT CIRCUIT</b>	In normal operation (after the starting phase) the output connection is shorted (output current higher than 16 A).	Check connections and shortages between pump and controller. Press the START push-button twice to start the pump.
<b>OVERVOLTAGE</b>	A failure has occurred in the controller power supply section, or the controller has received a spurious signal.	Press the START button twice to start the pump again. If the message is redisplayed, contact Varian for maintenance.
<b>FLOW METER ALARM</b>	Alarm relating to the purge flow. The flow value remained at less than the set threshold for 10 seconds or more.	Check the correct operation of the gas supply circuit.
<b>HIGH POWER START FAIL</b>	During the Start phase, the controller performed 5 start sequences in high torque mode without being able to start the pump.	Be sure that the pump rotor turns freely. Press the Start push-button twice to start the pump.

**TURBO-V 1000 ICE E-SERIES CONTROLLER DESCRIPTION**

The controller is available in two versions:

- Model 969-9464 (220 Vac, 50-60 Hz)
- Model 969-9564 (120 Vac, 50-60 Hz)

The models are provided with a front panel with an LCD alphanumeric display to indicate the operating conditions/parameters of the Turbo-V pump and a keyboard, and a rear panel with input/output connectors.

The following figure is a picture of the Turbo-V controllers. The controller is a solid-state frequency converter which is driven by a single chip microcomputer and is composed of:

- Power transformer
- Front panel display and keyboard
- Rear panel with input/output connectors

- PCB including: power supply analog and input/output section, microprocessor and digital section, display and keyboard circuits. The power supply converts the single phase (50-60 Hz) AC mains supply into a 3-phase, low voltage, medium frequency output which is required to power the Turbo-V pump.

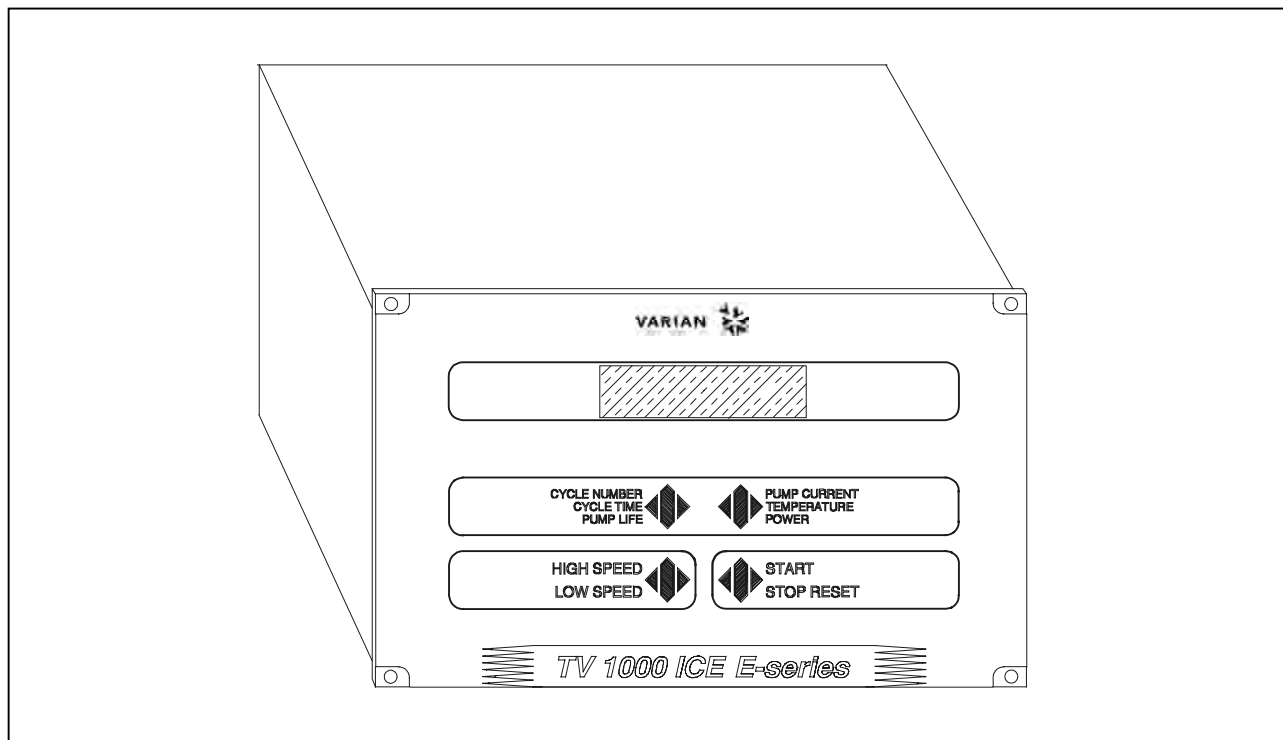
The microcomputer generates the variable output frequency and controls the 3-phase output voltage according to the software and the gas load condition of the pump.

Moreover, it manages signals from sensors, input/output connection information to be displayed, and gives outputs for a fully automatic operation. The heater jacket and flow meter are also handled.

An EEPROM internal to the microprocessor is used to store pump operating parameters and the input/output programmed information.

The controller can be operated via:

- Front panel switches
- Remote signals via rear panel connectors
- RS 232/485/422 serial link (option).



*Turbo-V 1000 ICE E-series controllers*

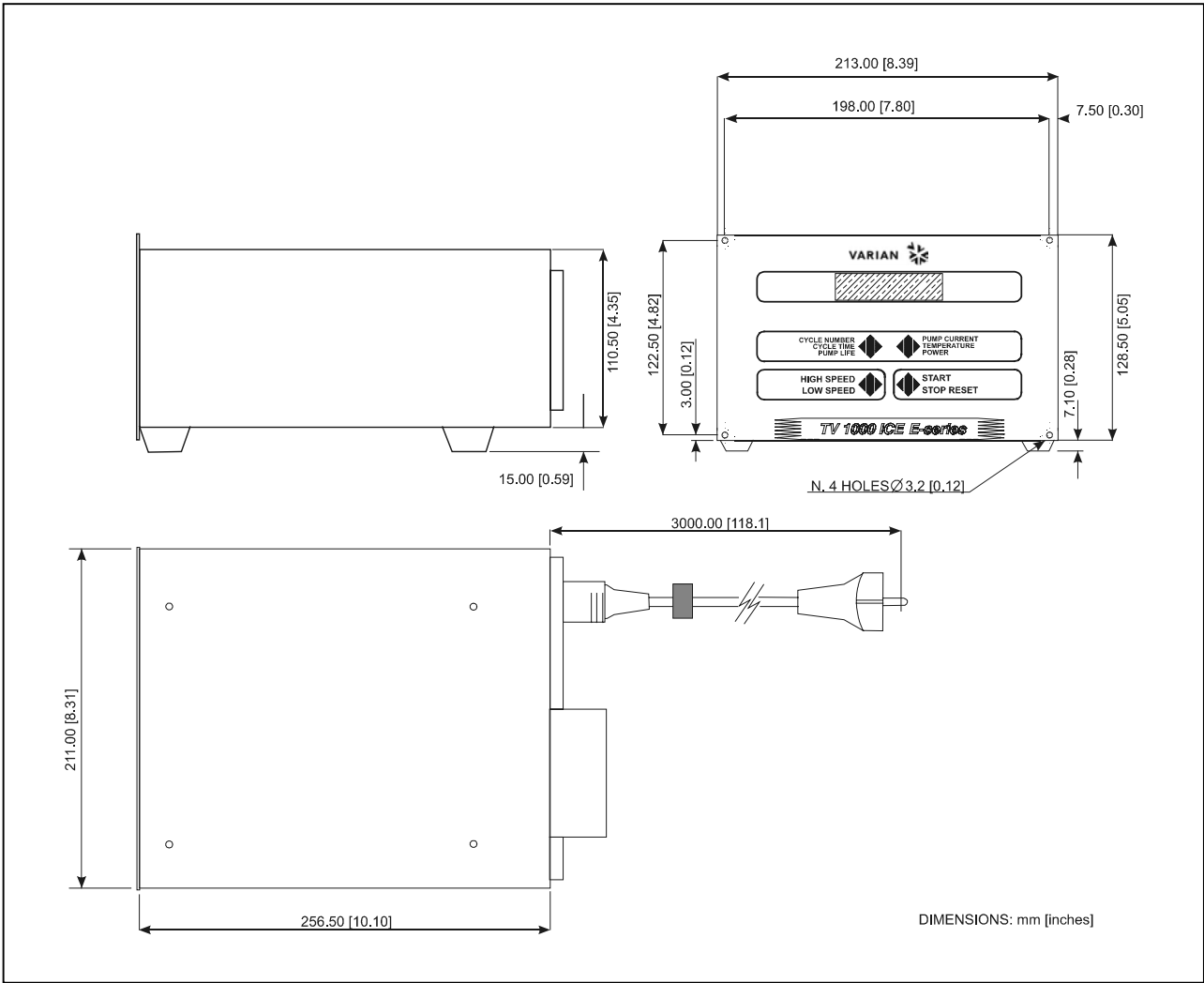
**CONTROLLER SPECIFICATIONS**

Input:	
Voltage	100, 120, 220, 240 Vac, 1-phase
Frequency	50 to 60 Hz
Power	1400 VA maximum
Output for pump:	
Voltage	54 Vac nominal $\pm 10\%$
Frequency	633 Hz $\pm 2\%$
Power	450 W maximum
water cooling	400 W
air cooling	300 W
Operating temperature	0 °C to +40 °C
Storage temperature	-20 °C to +70 °C
Fuse:	
• Mains	2 x T5A(slow blow) for 220 or 240 input Voltage 2 x T10A(slow blow) for 100 or 120 input Voltage
• Heater Jacket (F4)	T3.15A (slow blow)
P1 optoisolator input	Minimum ON 3mA                      Maximum 5mA
J2 optoisolator output	24 Vdc, 60 mA
J7 output (fan, forepump coil, etc.)	120 Vac, 1A disregarding the mains
J11 purge flow connector	12 Vdc power supply output and signal input
J12 heater jacket connector	120 Vac 2A power supply output
In compliance with norms	EN 55011 class A group 1 EN 61010-1 IEC1000-4-2,1000-4-3, 1000-4-4
Auxiliary connectors	
P1	External INPUT signals (pins)
J2	OUTPUT signals (sockets)
J7	Output fan Voltage and Valve, forepump socket
J14, J13	RS 232/422/485 connection (optional)
Interconnecting cables	Mains cable (3-wire, 3-meter long) Pump cable (6-wire, 5-meter long)
Weight (both models)	13,5 kg (29.8 lbs)



CONTROLLER OUTLINE

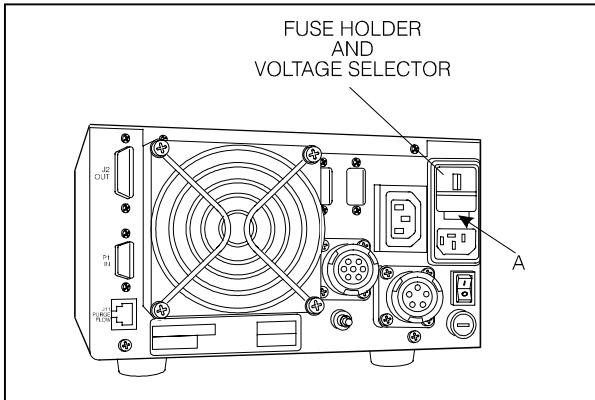
The outline dimensions for the Turbo-V 1000 ICE E-series controllers are shown in the following figures:



Controller models 969-9464 and 969-9564 outline

**FUSE HOLDER AND VOLTAGE CHANGER ASSEMBLY**

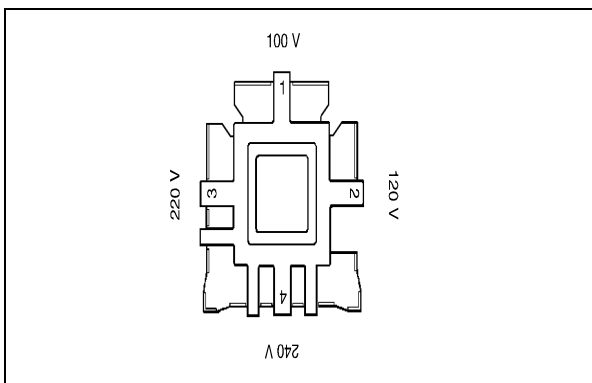
The following figure shows the location of this assembly.



Rear panel

Proceed as follows to replace one or both fuses:

- Remove the assembly by levering in position **A** with a small screwdriver.
- Replace the fuse.  
Use only T-type fuses of the following characteristics:
  - 100/120 Vac      10 A
  - 220/240 Vac      5 A

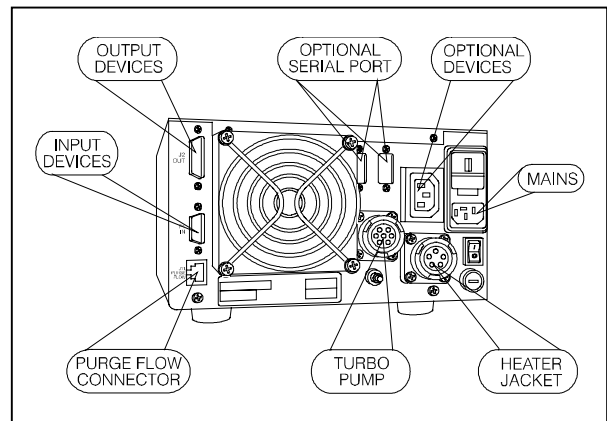


Voltage Changer

To change the power supply voltage rating after having removed the assembly as explained above, extract the voltage changer and then reposition it to view the desired voltage rating.

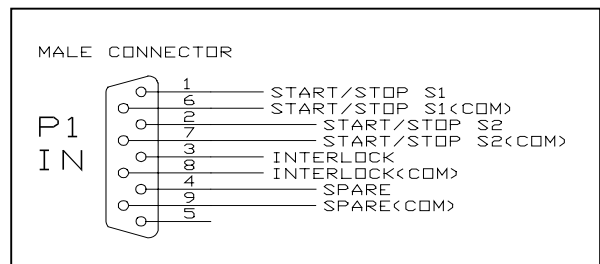
**INTERCONNECTIONS**

The following figure shows the Controller interconnections.



Controller models 969-9464 and 969-9564 interconnection

**Connection P1  
Logic Input Interconnections**



P1 input connector

All the logic input to the controller must be connected at J1 mating connector. With the provided J1 mating connector (shipped with pin 3 and pin 8 shorted) make the connections with AWG 24, (0.24 mm<sup>2</sup>) or smaller wire to the pins indicated in the figure to obtain the desired capability. The following table describes the signals available on the connector.

PIN	DESCRIPTION
1-6	Remote START/STOP S1 optically isolated from the internal circuit, requires a permanently closed contact (relay contact, transistor, etc.). When the contact closes the turbopump starts at high speed and when the contact opens, the turbopump is stopped. With the remote mode operation selected, the front panel push-button is inoperative.
2-7	Remote START/STOP S2 optically isolated from the internal circuit, requires a permanently closed contact (relay contact, transistor, etc.). When the contact closes the turbopump starts at low speed and when the contact opens, the turbopump is stopped. With the remote mode operation selected, the front panel push-button is inoperative.
3-8	INTERLOCK optically isolated from the internal circuit, this signal can be used to delay the starting of the turbopump. It requires a permanent closed contact before starting the turbopump.
4-9	SPARE.

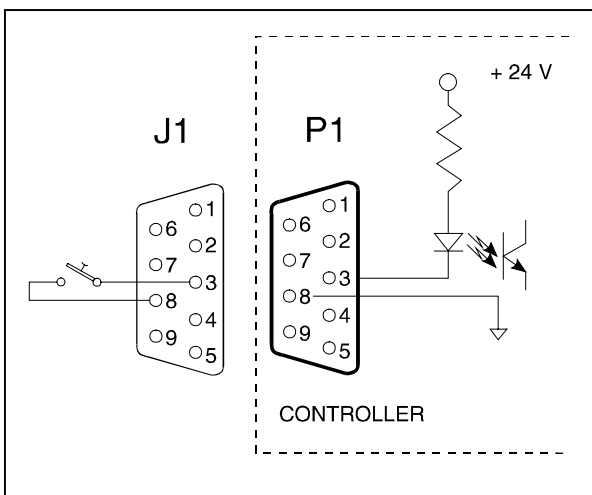
**NOTE**

In the presence of both S1 and S2 signals, the one that reaches the processor first is executed.

**NOTE**

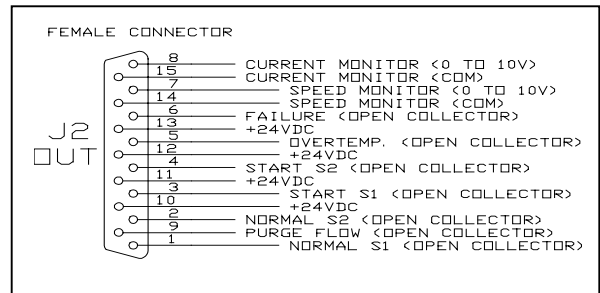
Pin 3-8 must be shorted to allow the Turbo-V 1000 ICE E-series pump to start if no interlock contact is connected. If after starting the pump, the interlock contact opens, it has no effect on the operation and the pump continues to turn.

The following figure shows a typical contact logic input connection and the related simplified circuit of the controller.



Typical logic input connection

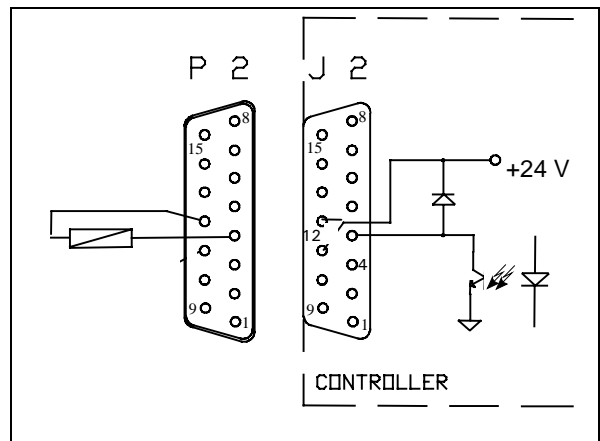
**Connection J2  
Logic Output Interconnections**



Logic output connector

All the logic output from the controller must be connected at P2 mating connector. With the optional P2 mating connector make the connection with AWG 24 (0.25 mm<sup>2</sup>) or smaller wire to the pins indicated in the figure to obtain the desired capability. The following table describes the signals available on the connector.

The following figure shows a typical logic output connection (relay coil) but any other device may be connected e.g. a LED, a computer, etc., and the related simplified circuit of the controller.



Typical output connection open collector

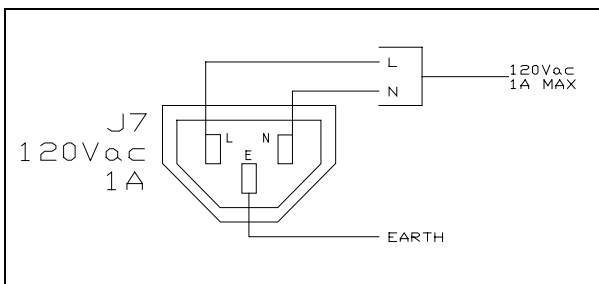
PIN	DESCRIPTION
1-10 *	Normal S1 signal 24 V 60 mA, optically isolated output (pin 10 positive, pin 1 negative). The output Voltage will be present when the rotational speed of the pump is higher than the selected high speed threshold.
2-10 *	Normal S2 signal 24 V 60 mA, optically isolated output (pin 10 positive, pin 2 negative). The output Voltage will be present when the rotational speed of the pump is higher than the selected low speed threshold.



PIN	DESCRIPTION
3-11 *	START S1 signal 24 V, 60 mA, optically isolated output (pin 11 positive, pin 3 negative).  The output Voltage will be present when the START push-button on front panel is pressed or the remote start is present. or the function has been requested by RS 232/422/485, until NORMAL operation is reached.
4-12 *	START S2 signal 24 V, 60 mA, optically isolated output (pin 12 positive, pin 4 negative).  The output Voltage will be present when the START push-button on front panel is pressed or the remote start is present. or the function has been requested by RS 232/422/485, until NORMAL operation is reached.
5-13 *	OVERTEMP. signal 24 V, 60 mA, optically isolated output (pin 13 positive pin 5 negative).  The output Voltage will be present when a fault condition is displayed on the front panel display, with only in an overtemp condition
6-13 *	FAULT signal 24 V, 60 mA, optically isolated output (pin 13 positive pin 6 negative).  The output Voltage will be present when a fault condition is displayed on the front panel display, with exception of an overtemp condition
7-14	Analog output voltage (0 - 10 V) of pump speed (pin 7 positive, pin 14 negative).
8-15	Analog output Voltage of DC current drawn by the turbopump (pin 8 positive, pin 15 negative). 1 Vdc proportional to 1 A.
9-10 *	Flow meter alarm, the flow value remained below the threshold for 10 seconds or more.

\* Open collector type contacts

**Connection J7  
Accessories and Options Interconnections**



J7 connectors

**CAUTION!**

The output voltage of the connector J7 is 120 Vac and the maximum current is 1A. Do not connect this plug to a device with a leakage current greater than 1.75 mA.

The 120 Vac, 1 A maximum (independent of line Voltage) output Voltage is present when the main power switch is set to 1 position and after START push-button is pressed and will remain present until a fault condition is displayed on the front panel display or the turbopump is stopped.

The connector J7 is for vent device, forepump connector coils, pump cooling fan etc.

To make connections, remove the plug and wire the pins (maximum wire size 18 AWG, 1 mm<sup>2</sup>) as indicated in the figure to obtain the desired capability.

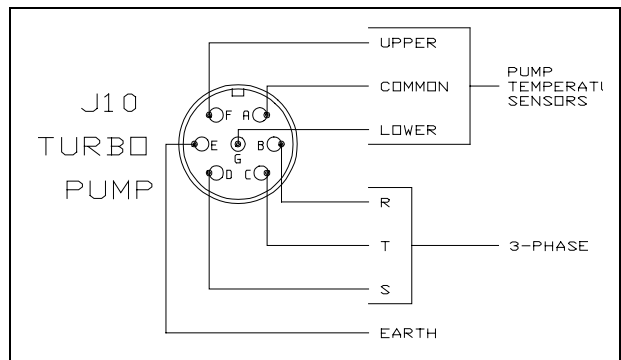
**NOTE**

Forepump relay coil is an independent user supplied item.

**Connection J10  
Controller-to-Pump Connection**

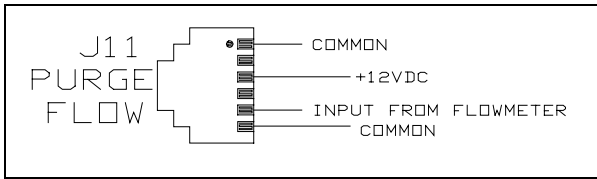
A five-meter long cable is provided to connect the controller to the pump. The following figures show the controller output connector configuration where pins:

- A-F = upper bearing sensor
- B-C-D = 54 Vac 3-phase output to pump motor stator
- E = ground
- A-G = lower bearing sensor



Controller-to-pump connector  
(applicable to model 969-9464 and 969-9564)

**Connection J11**  
**Purge flow meter connector**



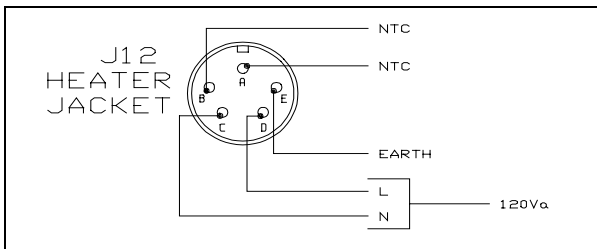
J11 connectors

PIN	DESCRIPTION
1-3	Flow meter power supply: 12 Vdc, 10 mA, (pin 1 negative - pin 3 positive).
5-6	Analog signal with a voltage value proportional to the flow. Between 0 and 3 V it is linearly proportional to between 0 and 100 sccm (pin 6 negative, pin 5 positive).

**CAUTION!**

Use this connector (J11) only with the Varian solid state flowmeter model 969-9114 or 969-9115. Any other connection could lead to serious injury.

**Connection J12**  
**Heater jacket connector**



J12 connectors

- **A-B** heater jacket temperature sensor
- **C-D** 120 Vac 2 A, output to heater jacket
- **E** Ground (Earth)



**WARNING!**

On the connector J12 is present an Hazardous voltage. Connect on the connector only the Varian Heating Jacket.

**OPTIONAL SERIAL PORT**

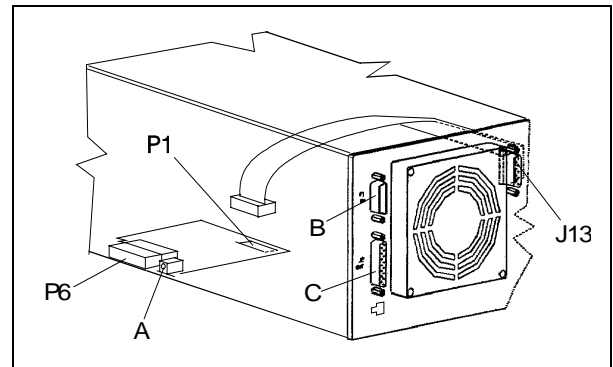
**NOTE**

The Controller can be read when set in the Front/Remote mode, (read window only enabled), while it can be written to and read when set in the Serial mode (write window enabled).

**Serial Port Installation**

An optional RS 232/422/485 kit is available for both models. To install it, proceed as follows:

- Switch off the power and disconnect the power cord.
- Unscrew the cover screws and remove the cover.
- On rear panel, remove the connector plate, and then secure connectors J13 and J14 to the frame using the turrets provided.
- On rear panel, remove the fixing turrets of connectors **B** and **C** and then remove the controller.
- Attach the interface board connector to connector P6 on the controller and then secure it in place using screw **A** (3x6), which is not provided.
- Insert the flat cable through the rear panel and plug it into the socket **P1** located on the Interface board.
- Restore the main board into its original position.
- Install and tighten the connector screws and turrets.
- Replace the cover.



Serial port connector installation

**Serial Communication Port J13 and J14**

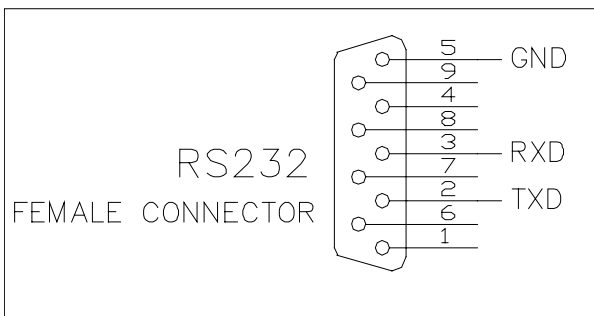
Communication serial port connections and minimum connection configuration are shown in the following figures. The communication port mating connector is supplied with the RS 232 PCB (AMP/Cannon or equivalent 9-pin "D" type male connector). The external cable (not supplied) between the host computer and the controller does not require crossed wires so that signals are connected correctly.

For example, the Transmit data signal from controller (pin 2) must be connected to the host computer's Receive data line (pin 2) and vice versa. Consult the host computer's instruction manual for its serial port connections.

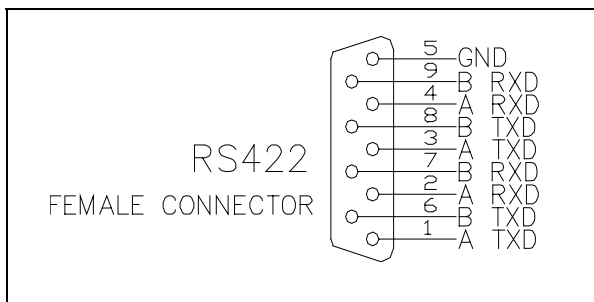
**NOTE**

Varian cannot guarantee compliance with FCC regulations for radiated emissions unless all external wiring is shielded, with the shield being terminated to the metal shroud on the O-subconnector. The cable should be secured to the connector with screws.

**RS 232-422 Communication Descriptions**



Communication RS 232 serial port connections



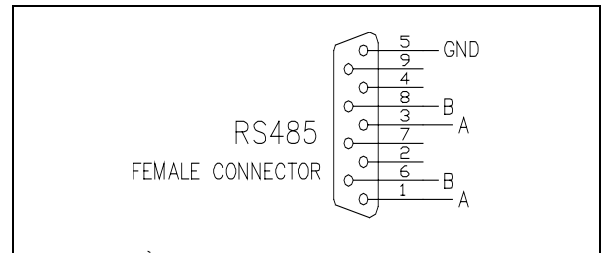
Communication RS 422 serial port connections

**Transmission Channel Characteristics**

levels: RS 232/RS 422  
 baud rate: 9600/4800/2400/1200/600 programmable  
 character length: 8 bits  
 parity: none  
 stop bit: 1 bit  
 protocol: master (PC) / slave (converter)

In this case the value to be assigned to the ADDRESS field must be 80 hex (for RS 232 and 422 only).

**RS 485 Communication Description**



Communication RS 485 serial port connections

**Transmission Channel Characteristics**

levels: RS 485  
 baud rate: 9600/4800/2400/1200/600 programmable  
 character length: 8 bits  
 parity: none  
 stop bit: 1 bit  
 protocol: master (PC) / slave (converter)  
 max. devices: 32

**Message Structure**

(request and answer have the same format)

The master system (PC) starts every session sending the following message to the slave units connected:

<STX> / <ADDR> + <WINDOW> + <COMMAND> + <DATA> + <ETX> + <CRC>

where:

- <STX> = 0x02
- <ADDR> = 0x80 (for RS 232 and RS 422 only)
- <ADDR> = 0x80 + device number (0...31)  
0xFF: broadcasting command (recognized by all the devices, it doesn't implicate any answer) (for RS 485 only)
- <WINDOWS>= ' 000 '...' 999' window number the meaning of the window depends to the device type
- <COMMAND>= 0x30: window value reading  
0x31: window writing
- <DATA> = alphanumeric ASCII string containing, in the case of writing operation, the parameter to input into the window addressed by the field <WINDOW> This field may have variable length according to the data type contained in the window where you are working in. In the case of Reading request of a window, the data field doesn't exist.
- <ETX>= 0x03
- <CRC>= XOR among all the characters following <STX>= (with exception of <STX>), including the end character <ETX> hexadecimally encoded by two ASCII characters.

1) When a slave device is addressed by the master: In case of reading request of the value contained in a window, the slave answers a string equal to the one sent by the master but in addition there is the field <DATA> containing the value of the window. The format of the field <DATA> depends to the window type.

The different types are:

	Length	Characters Permitted
Logic (L)	1	'0'=OFF '1'=ON
Numeric (N)	6	'0'...'9' (Justified to the right with '0')
Alphanumeric (A)	max 10	' '...' ' _

**EXAMPLES:**

Command : START  
Source : PC  
Destination : Inverter

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

Source : Inverter  
Destination : PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command : STOP  
Source : PC  
Destination : Inverter

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

Source : Inverter  
Destination : PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command : SOFT-START (ON)  
Source : PC  
Destination : Inverter

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

Source : Inverter  
Destination : PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command : SOFT-START (OFF)  
Source : PC  
Destination : Inverter

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

Source : Inverter  
Destination : PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

**TECHNICAL INFORMATION**

Command : LOW SPEED (ON)  
 Source : PC  
 Destination : Inverter

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

Source : Inverter  
 Destination : PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command : LOW SPEED (OFF)  
 Source : PC  
 Destination : Inverter

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

Source : Inverter  
 Destination : PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command : CURRENT  
 Source : PC  
 Destination : Inverter

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

Source : Inverter  
 Destination : PC

02	80	32	30	30	30	30	2E	30	30	03	39	46
STX	ADD	WINDOW	RD	000.00				ETX	CRC			

Command : FREQUENCY  
 Source : PC  
 Destination : Inverter

02	80	32	30	33	30	03	38	32
STX	ADDR	WINDOW			RD	ETX	CRC	

Source : Inverter  
 Destination : PC

02	80	32	30	33	30	30	30	30	33	38	03	38	39
STX	ADD	WINDOW	RD	000038						ETX	CRC		

Command : ERR-CODE  
 Source : PC  
 Destination : Inverter

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

Source : Inverter  
 Destination : PC

02	80	32	30	36	30	30	30	30	30	03	38	37	
STX	ADD	WINDOW	RD	000000						ETX	CRC		

**NOTE**

Using the RS 485 interface, the message structure remains identical to the one used for the RS 232/422 interface, the only difference being that the value assigned to the ADDRESS <ADDR> field in this case can be any hex value, while for the RS 232/422 this value must be set to 80 hex.



**Window-Based Protocol**

The following table, valid for the RS 232, RS 422 and RS 485 interfaces, describes each single window used in the protocol.

WIN	R	W	T	Description
000	X	X	L	START/STOP
001	X	X	L	SPEED SELECTION ACTIVE [0=HS / 1=LS]
100	X	X	L	SOFT START [0=NO / 1=YES]
102	X	X	L	WATER COOLING [0=NO / 1=YES]
107	X	X	N	MODE (0, 1, 2) [FRONT, REMOTE, SERIAL]
108	X	X	N	BAUD_RATE (0-4) [600, 1200, 2400, 4800, 9600]
109		X	L	PUMP LIFE RESET, FLOW METER ALARMS (TYPE "ON" TO RESET) AND HIGH POWER START RESET
110	X	X	N	THRESHOLD HS [Krpm]
111	X	X	N	THRESHOLD LS [Krpm]
112	X	X	L	HEATER JACKET ENABLE [0=ON / 1=OFF]
113	X	X	N	HEATER JACKET TEMPERATURE SETTING [Degrees]
114	X	X	L	GAS TYPE [0=N <sub>2</sub> / 1=Ar]
115	X	X	N	THRESHOLD FLUSSIMETRO [sccm]
116	X	X	N	HIGH SPEED ADJUST [Krpm]
117	X	X	N	LOW SPEED ADJUST [Krpm]
118	X	X	L	LOWER BEARING TEMPERATURE MEASUREMENT ENABLE [0=NO / 1=YES]
119	X	X	L	HOST / PRINTER MODE [0=HOST / 1=PRINTER]
200	X		N	CURRENT [A]
201	X		N	VOLTAGE [V]
202	X		N	POWER [W]
203	X		N	FREQUENCY [Krpm]
205	X		N	PUMP STATE (0-6) [STOP, WAITING INTERLOCK, STARTING, NORMAL, HIGH LOAD, FAILURE, APPROACHING]
206	X		N	ERROR CODE (0-7) [NO ERROR, OVERVOLTAGE, SHORT CIRCUIT,CHECK CONNECTION, TOO HIGH LOAD, OVERRIDE, PUMP OVERTEMP, CONTROLLER OVERTEMP]
207	X		L	STATE S1 [0=OFF / 1=ON]
208	X		L	STATE S2 [0=OFF / 1=ON]
209	X		N	UPPER BEARING TEMPERATURE [0-99 °C]
210	X		N	LOWER BEARING TEMPERATURE [0-99 °C]
211	X		N	FLOW READ [0-100 sccm]
212	X		L	STATUS OUTPUT FLOW METER [0=OFF / 1=ON]
213	X		N	FLOW METER ALARM TIME RELATING TO THE LAST EVENT
214	X		N	FLOW METER ALARM CYCLE NUMBER RELATING TO THE LAST EVENT
215	X		N	FLOW METER ALARM EVENT NUMBER
300	X		N	CYCLE TIME (0-999.999) IN MINUTES
301	X		N	CYCLE NUMBER (0- 65.535) IN COUNTS
302	X		N	PUMP LIFE (0-999.999) IN HOURS
303	X		N	HIGH POWER START NUMBER (0- 65.535)
304	X		A	HIGH POWER START TRIES
400	X		A	CRC PROGRAM LISTING
402	X		A	CRC PARAMETER LISTING

**WIN** = Window  
**R** = Read  
**W** = Write

**T** = Type:  
**L** = Logical  
**N** = Numeric  
**A** = Alphanumeric

**USE**

**General**

Make all vacuum manifold and electrical connections and refer to Turbo-V ICE pump instruction manual before to operating the Turbo-V ICE controller.



**WARNING!**

To avoid injury to personnel and damage to the equipment, if the pump is laying on a table make sure it is steady. Never operate the Turbo-V ICE pump if the pump inlet is not connected to the system or blanked off.

**NOTE**

The input signal P1 connector should be left in position including the shipping links if no external connections are made. The forepump and the Turbo-V ICE pump can be switched on at the same time.

**NOTE**

When the Turbo-V 1000 ICE E-series pump is baked by a membrane pump, the Soft Start mode should be deselected.

**Startup**

- Plug the controller power cable into a suitable power source.
- The display lights, and shows:

				A	U	T	O	T	E	S	T			
				C	H	E	C	K						

**NOTE**

The above message is only displayed when a board with optional serial ports is installed.

				A	U	T	O	T	E	S	T			
								O	K					

R	E	A	D	Y		F	O	R		L	O	C	A	L
S	O	F	T		S	T	A	R	T				H	S

The controller with the Soft Start mode allows the pump to ramp-up to Normal Speed slowly with a minimum ramp-up time of 30 minutes and a maximum of about 55 minutes. The Soft Start mode is always operative as default mode. If it is necessary to deselect this mode refer to the following paragraph.

If the Soft Start mode is deselected, the ramp- up will be done within 360 seconds and the display changes as follows:

P	U	M	P		R	E	A	D	Y	:		P	U	S	H	
		S	T	A	R	T		B	U	T	T	O	N		H	S

If the soft start mode is deselected, the hard start routine is activated on the controller. This means that during pump startup an higher torque is applied (10 times greater than the standard one) only if the pump is not able to start. The total number of hard starts and the number of trials at every pump startup for the last 9 starts are stored in the microprocessor.

**NOTE**

If the pump is not connected, the display will be as shown :

C	H	E	C	K		C	O	N	N	E	C	T	I	O	N
				T	O		P	U	M	P				H	S

**NOTE**

After pressing the START push-button, if the P1 connector is not in place with the link or the external interlock connection are open, the display will be as shown in the following figure.

P	U	M	P		W	A	I	T	I	N	G			
I	N	T	E	R	L	O	C	K						

Unplug the controller power cable and verify the P1 connection according to paragraph "Interconnections".

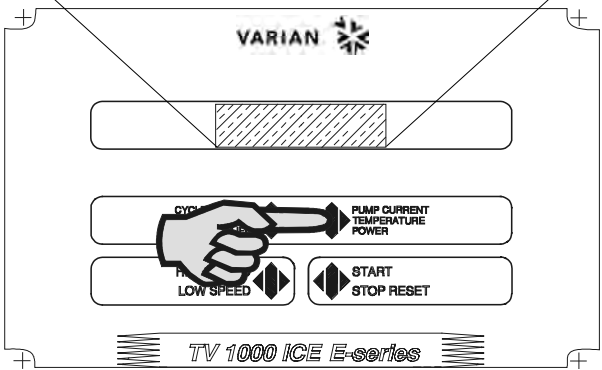
- Press the PUMP CURRENT push-button and the display shows (e.g.):

When there is only one temperature sensor

X	X		K	R	P	M			P	=	X	X	X	W	
T	1	=	X	X	°	C			I	=	X	X	.	X	A

When there are two temperature sensors

X	X		K	R	P	M			P	=	X	X	X	W	
T	1	=	X	X	°	C			T	2	=	X	X	°	C



where:

- **I** = is the DC current drawn by the pump range (0.00 to 10.0 Ampere)
- **P**= is the DC power drawn by the pump (range 0 to 999 Watt)
- **KRPM** = is the theoretical rotational speed of the pump as a function of the controller output frequency (range 3 to 38 KRPM)
- **T1** = is the temperature of the outer ring of the upper bearing (range 00 to 99°C)
- **T2** = is the temperature of the outer ring of the lower bearing (range 00 to 99°C)

- Press the PUMP CURRENT push-button and the display shows

X	X		K	R	P	M			P	=	X	X	X	W	
T	1	=	X	X	°	C			I	=	X	X	.	X	A

- Press the PUMP CURRENT push-button and the display shows

X	X		K	R	P	M			P	=	X	X	X	W	
N	2	=		X	X	X			S	C	C	M			

where:

- **N2** = Gas flow (Nitrogen or Argon) expressed in SCCM (Standard cubic centimeters per minute)

- Press the PUMP CURRENT push-button and the display shows

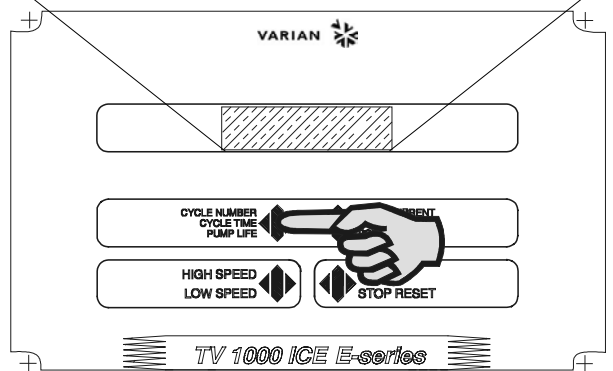
L	A	S	T		A	L	A	R	M	:	X	X	X	X	X
T	=	X	X	X	X	X	h		C	=	X	X	X	X	X

where:

- **Last alarm** = number of alarms sounded
- **T** = Pump life span relating to the last alarm
- **C** = Cycle during which the last alarm occurred

- Press the CYCLE NUMBER push-button twice and the display shows:

X	X	X	X	C	Y	C	L	E		X	X	X	X	X	m
P	U	M	P		L	I	F	E		X	X	X	X	X	h



where:

- **CYCLE** = are the cycles performed (range 0 to 9999)
- **m** = is the elapsed time related to the cycle number displayed (range 0 to 99999 minutes)
- **PUMP LIFE** = is the total operation time of the pump (range 0 to 99999 hours).

- Press the CYCLE NUMBER push-button and the following is displayed:

H	I	G	H		P	O	W	E	R		S	T	A	R	T
							X								

where:

- **X** = is the total number of high power start sequences performed by the controller.

- Press the CYCLE NUMBER push-button and the following is displayed:

H	P	S		:	1	2	3	4	5	6	7	8	9	
T	R	I	E	S	:	A	B	C	D	E	F	G	H	I

where:

- HPS** = shows the last 9 high power start sequences (1 is the last sequence performed by the controller, 2 is the second-to-last, and so on)
- A** = is the number of high-torque sequences performed during the last start sequence
- B** = is the number of high-torque sequences performed during the Start sequence immediately before the last one
- I** = is the number of high torque sequences during the oldest Start sequence stored in the controller

On the position A, B..., H and I can be stored also two characters:

- X** = indicates that the pump was not able to start after the high power start routine (same meaning of "High power start fail")
- S** = indicates that the controller was stopped during the high power start routine.

### Front / Remote / Serial Selection

Press CYCLE NUMBER and PUMP CURRENT pushbuttons together for at least 2 seconds and the processor enters a routine where it is possible to program the controller.

In this routine, the CYCLE push-button is used for choosing/changing the value or condition; the PUMP CURRENT push-button is used to enter and confirm the value.

At any time it is possible to exit this routine by pressing the CYCLE and PUMP CURRENT pushbuttons at the same time for at least 2 seconds.

The display shows:

C	O	N	F	I	G	U	R	A	T	I	O	N		
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--

S	O	F	T	W	A	R	E		V	E	R	S	I	O	N
		Q	E	X	X	X	X	X	X	X	X	X	X		

H	I	G	H		S	P	E	E	D					
S	E	T	T	I	N	G	:		X	X	K	R	P	M

where:

- XX = 24 ÷ 38 KRPM

Confirm the flashing digit by pressing the PUMP CURRENT key

L	O	W			S	P	E	E	D					
S	E	T	T	I	N	G	:		X	X	K	R	P	M

where:

- XX = 16 ÷ 38 KRPM

Confirm the flashing digit by pressing the PUMP CURRENT key

H	.	S	.		T	H	R	E	S	H	O	L	D	
S	E	T	T	I	N	G	:		X	X	K	R	P	M

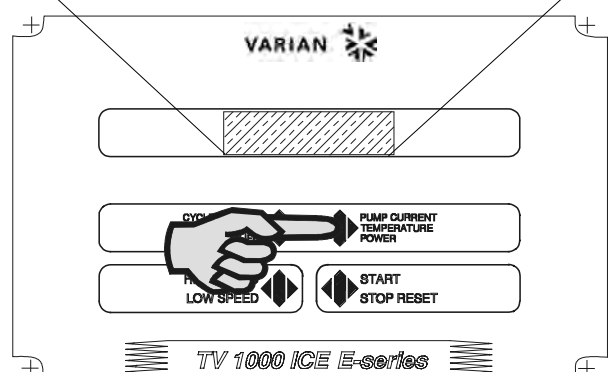
where: **XXKRPM** = is the switch point of relay S1 at the preset turbopump speed, adjustable from 00 to 38 KRPM. The speed threshold will condition the S1 and S2 operation (see the following cycle diagram) and it is factory-set to 36 KRPM. Press the CYCLE NUMBER push-button to select the first number.

L	.	S	.		T	H	R	E	S	H	O	L	D	
S	E	T	T	I	N	G	:		X	X	K	R	P	M

where: **XXKRPM** = is the switch point of relay S1 at the preset turbopump speed, adjustable from 00 to 38 KRPM. The speed threshold will condition the S1 and S2 operation (see the following cycle diagram) and it is factory-set to 22 KRPM. Press the CYCLE NUMBER push-button to select the first number.

- Press the PUMP CURRENT push-button and the display shows

		P	U	R	G	E		F	L	O	W			
S	E	T	:		X	X	X	S	C	C	M			



Gas flow alarm threshold under which an alarm signal is given (Flow meter alarm). The default value is set to 20 sccm, the variability range is 0 - 100.

- Press the PUMP CURRENT push-button and the display shows

G	A	S	T	Y	P	E						
S	E	L	E	C	T	I	O	N	:	N	2	

Select the type of purge gas, the default is Nitrogen. Argon can be selected if needed.

- Press the PUMP CURRENT push-button and the display shows:

H	E	A	T	E	R	J	A	C	K	E	T	
S	E	L	E	C	T	I	O	N	:	O	N	

Heater Jacket power ON or OFF: setting ON powers on the Heater Jacket, setting OFF powers it off.

The Heater Jacket automatically switches to OFF when the controller is in the Failure State.

- Press the PUMP CURRENT push-button and the display shows:

H	E	A	T	J	A	C	K	E	T	T	E	M	P
S	E	T	T	I	N	G	:	X	X	°	C		

Heater jacket operating temperature selection. The range is 40-90 °C, set to 65 °C by default.

- Press the PUMP CURRENT push-button and the display shows:

L	O	W	E	R	B	E	A	R	I	N	G	
T	2	S	E	N	S	O	R	:	O	F	F	

Detection of the pump's lower bearing temperature. OFF will always be indicated if there is no sensor on this bearing.

and then:

S	O	F	T	S	T	A	R	T	M	O	D	E
S	E	L	E	C	T	I	O	N	:	X	X	X

where: **XXX** = YES or NO.

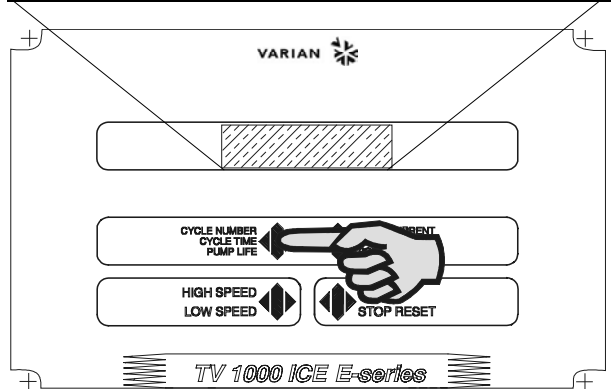
If YES is selected, the Soft Start mode allows the pump to rump-up the Normal speed within ten steps. When NO is selected, the Soft Start mode is deselected and the rump-up of the pump will be done within 360 seconds. The controller is factory set to YES.

**NOTE**

The Soft Start mode may be deselected/selected only when the pump is stopped.

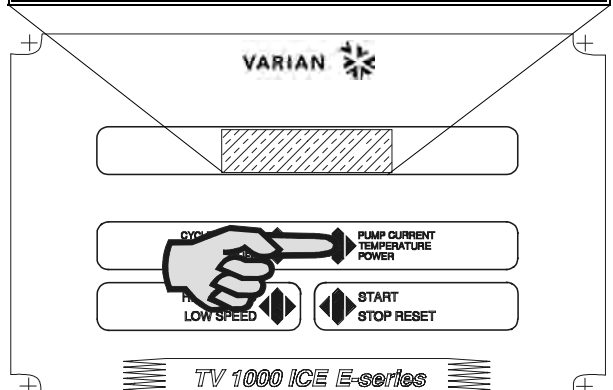
- Press CYCLE NUMBER push-button to select YES or NO

S	O	F	T	S	T	A	R	T	M	O	D	E
S	E	L	E	C	T	I	O	N	:	Y	E	S



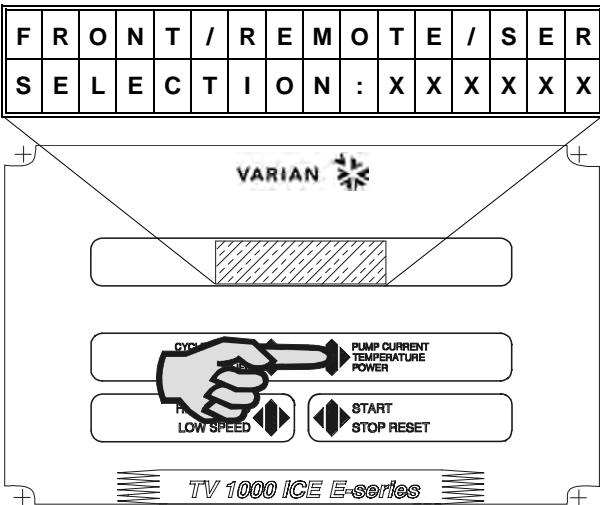
- Press PUMP CURRENT push-button and the display shows:

W	A	T	E	R	C	O	O	L	I	N	G	?
					N	O						



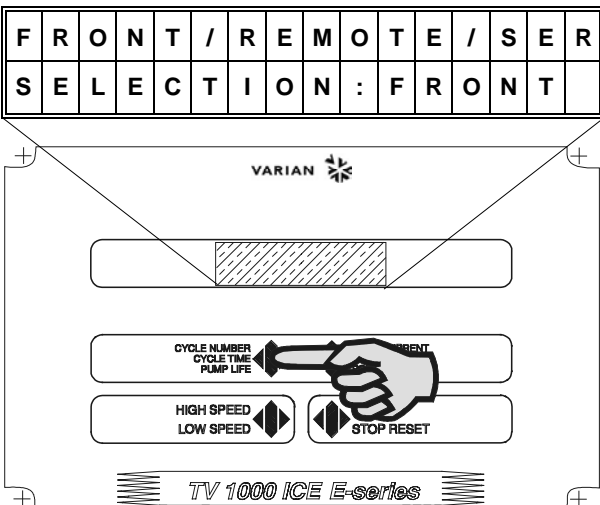
If necessary press CYCLE NUMBER to select YES or NO. The controller is factory set to NO.

- Enter the selection by pressing the PUMP CURRENT push-button, and the display shows:

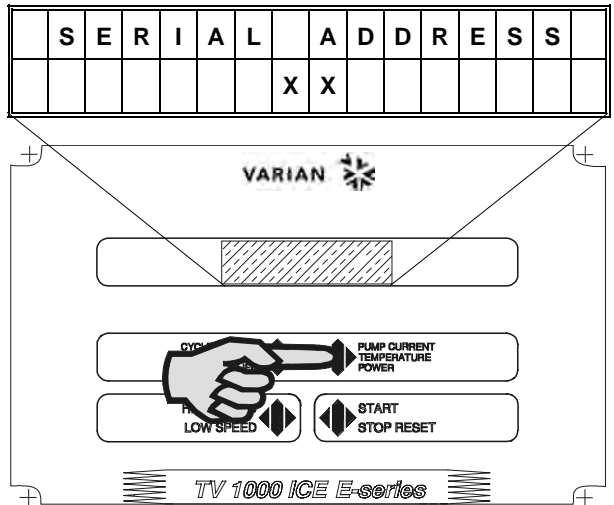


where: **XXXXXX** = means the word FRONT, REMOTE, or SER depending on the last selection. The controller is factory-set for FRONT panel operation. SER will only be displayed if the optional serial card is installed.

- Choose the desired selection by pressing the CYCLE push-button.



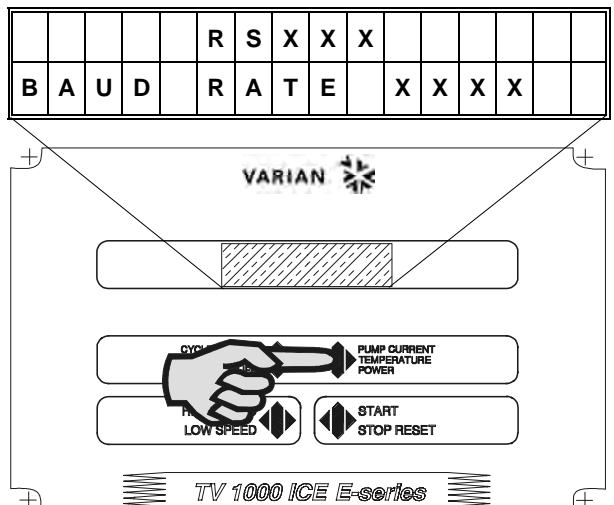
- Press PUMP CURRENT push-button and the display shows



This message will only be displayed if the RS 485 module is installed.

where: **XX** = 00 ÷ 31 is the unit address

- Press the PUMP CURRENT push-button to enter the value and, if the serial option is installed, the display shows:

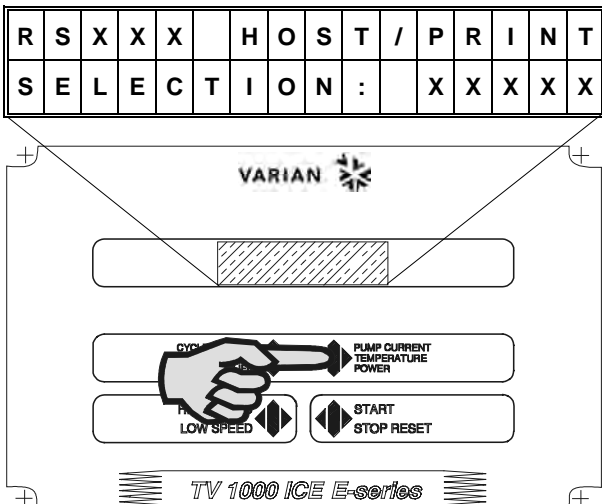


where:

- **BAUD RATE XXXX** = means 600, 1200, 2400, 4800, 9600 baud rate for the host computer or printer communication. The controller is factory-set for 9600 baud rate operation.

The value which corresponds to the board installed will be assigned to RSXXX.

- If the RS 232 is installed, enter the value by pressing the PUMP CURRENT push-button and, if the serial option is installed, the display shows:



This message will only be displayed if the RS232 interface is present.

where:

- **SELECTION: XXXXX** = means HOST or PRINT.

The controller is factory-set to HOST.

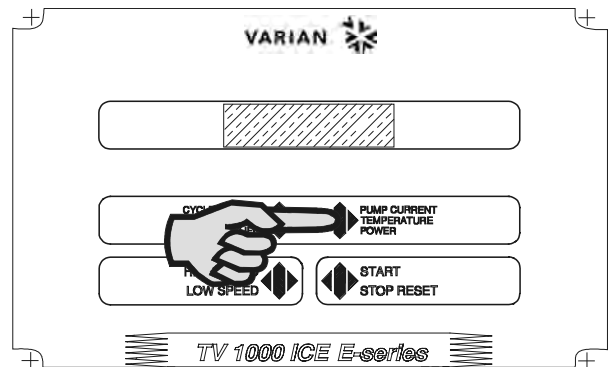
With the RS 232/422/485 connected, a bi-directional communication is established by selecting HOST. Data are sent to an external computer every time the external computer asks for the values. The available data are listed in the read mode in the serial protocol table.

**NOTE**

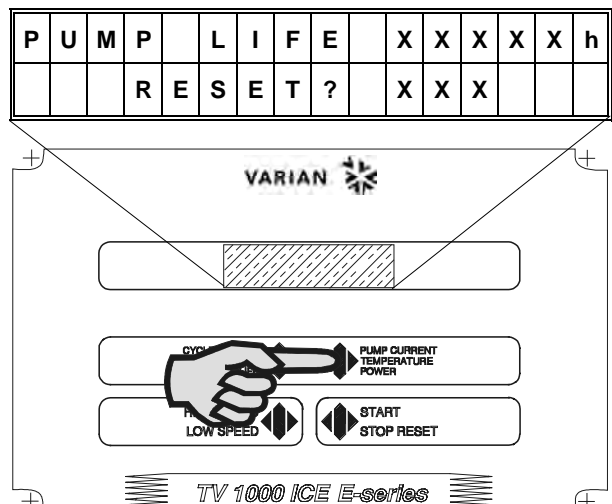
With the serial module installed, the data can also be read in the FRONT or REMOTE mode.

If PRINT is selected and a printer is connected on RS 232/422 line, an unidirectional communication is established and every minute the data are sent to the printer, even if the pump is not running. The set of data available are:

- Pump speed KRPM
- Pump temperature
- Pump current A
- Pump power W
- S1 condition
- S2 condition
- Confirm the selection by pressing the PUMP CURRENT push-button.
- In this way you enter into an operating phase named "Monitor Relay Programming" described later.
- Enter the value by pressing the PUMP CURRENT push-button.



- Press PUMP CURRENT to confirm. and the display shows:



where:

- **PUMP LIFE** = is the elapsed operating time range 000 to 99999 hours.
- **RESET XXX** = YES or NO.

The controller is factory-set to NO.

- If YES is selected, the pump life span, the high power start total number, the high power start tries and number of events (flow meter alarm) shall be reset to 000.

After selecting YES, press the PUMP CURRENT push-button and the display shows:

R	E	A	D	Y		F	O	R		L	O	C	A	L		
S	O	F	T			S	T	A	R	T					H	S

or

P	U	M	P		R	E	A	D	Y	:		P	U	S	H	
		S	T	A	R	T		B	U	T	T	O	N		H	S

and the controller is ready to restart (see paragraph "Startup").

**NOTE**

When PUMP LIFE is reset to 000, the CYCLE number is also reset to 000.

**Starting the Pump**

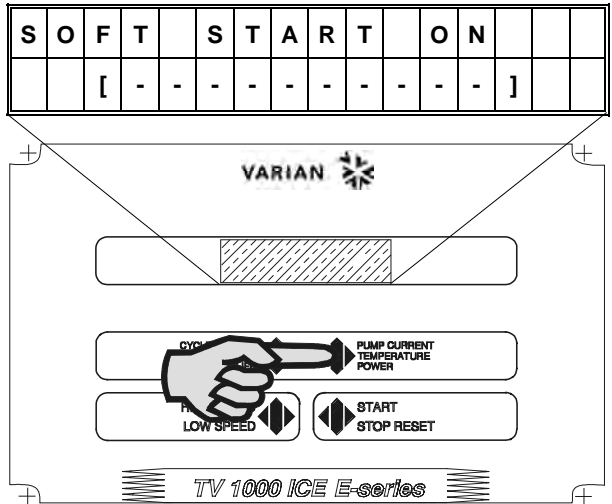
If the forepump and vent device are not operated by the controller, close the vent valve and switch on the forepump.

**NOTE**

Before starting the pump the cooling mode must be selected.

**NOTE**

With the FRONT panel operation selected, the REMOTE and RS 232/422/485 operations are inoperative; conversely, the CYCLE NUMBER and PUMP CURRENT push-buttons are always active, even when the operating mode selected is REMOTE or RS 232/422/485.



Where the sign minus (-) become a square (•) when the pump finish the ramp-up step. The active step is indicated by a flashing square (•).

As the ten steps are fully covered, the pump will reach the Normal operation. If during the Soft Start mode the power drawn by the pump exceed 200 W the speed of the pump is decreased to maintain the maximum power allowable (200 W).



- If the Soft Start mode has been deselected the display will change and shows:

P	U	M	P		I	S		S	T	A	R	T	I	N	G
1	2		X	X		K	R	P	M		H	J		H	S

where:

**1 2** = contrast inverted identifies the set point condition:

- **1** is displayed when relay S1 is energized and the related output is 24 V.
- **2** is displayed when relay S2 is energized and the related output is 24V.

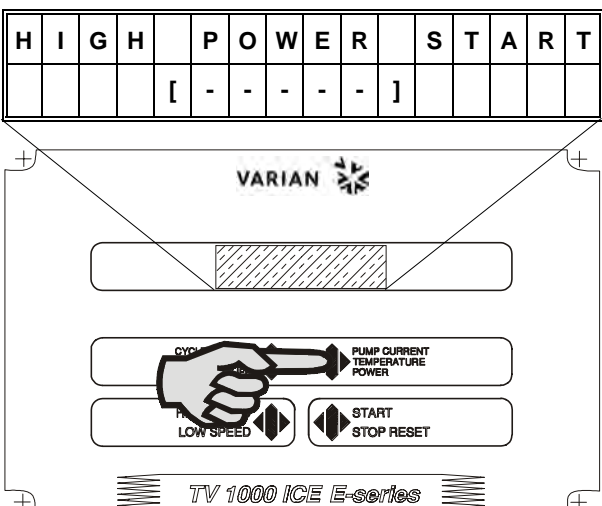
**XX KRPM** = indicates the actual theoretical rotational speed of the pump as a function of the controller output frequency (range 3 to 38 KRPM).

**HJ** = displayed only when the heater jacket is active.

**HS/HL** = indicates that the pump is working in the High speed or Low speed mode.

After START command, frequency output will be at the maximum level, then the frequency will decrease to a value proportional to the pump rotational speed (about 3 KRPM if the pump is completely stopped).

- At this point if there are some deposits inside the pump and the rotor is blocked, the controller switches to the Hard Start routine and the following is displayed:



where:

- the minus sign becomes a square (■) when the pump finishes its high-torque step. A flashing square (■) indicates the active step.

The controller finishes the Hard Start routine as soon as the pump starts to rotate.

The pump will accelerate to its normal rotational speed.

- During acceleration of the pump or during any operating condition, it is always possible to select the other parameters to be displayed pressing the PUMP CURRENT or the CYCLE NUMBER pushbuttons.
- After the run up time and when the normal rotational speed is reached, the display will be as follows, even if any previous display selection was made, and the normal condition has been reached.

N	O	R	M	A	L		O	P	E	R	A	T	I	O	N
1	2		X	X		K	R	P	M		H	J		H	S

where: **XX** = indicates the rotational speed (36 KRPM for high speed, or 22 KRPM for low speed).

**Monitor Relay Programming**

- The display shows:

H	.	S	.	T	H	R	E	S	H	O	L	D		
S	E	T	T	I	N	G	;		X	X	K	R	P	M

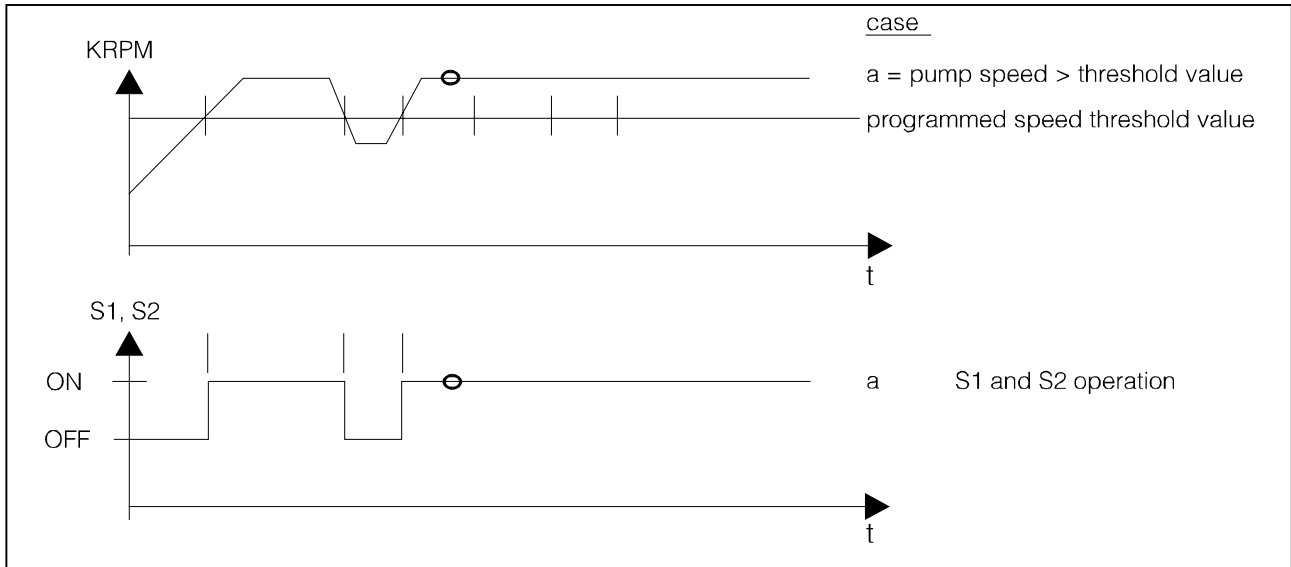
where: **XXKRPM** = is the switch point of relay S1 at the preset turbopump speed, adjustable from 00 to 38 KRPM. The speed threshold will condition the S1 operation (see the following cycle diagram) and it is factory-set to 36 KRPM. The speed threshold will condition the S2 operation (see the following cycle diagram) and it is factory-set to 24 KRPM.

**Pump Shutdown**

Press the front panel STOP push-button or remove the remote signal; the power from the turbopump will be removed and the pump will begin to slow down.

**Power Failure**

In the event of a power failure (momentary or long term), the Turbo-V ICE controller will stop the turbopump and all the interconnected pumps/devices. The Turbo-V ICE vent valve device, if used, will vent the turbopump only if the power failure is longer than the preset delay time. When power is restored, the Turbo-V ICE controller automatically restarts the interconnected devices and the turbopump in the proper sequence.



Cycle diagram

**Operating the Pump**

After the starting period, if the system has a vacuum leak or the pressure in the pump chamber is high (from 1 mbar to atmosphere), the pump continues to operate indefinitely. If the gas load at the turbopump inlet flange continues to stay high, the power drawn by the turbopump increases up to the maximum value (450 W with water cooling, or 300 W with air cooling). Then the Turbo-V ICE pump is slowed down in proportion to the gas load at least until it reaches about 4 or 3 KRPM. As soon as the gas load decreases, the pump will automatically accelerate to reach normal operation. The pump can be stopped at any rotational speed and can be restarted at any rotational speed from either the front panel buttons or the remote connections. The controller automatically synchronizes the output to the rotational speed of the pump and then accelerates linearly up to the nominal speed or within steps if the Soft Start has been selected.

The display shows:

P	U	M	P		I	S		S	T	A	R	T	I	N	G
1	2		X	X		K	R	P	M		H	J		H	S

until normal operation achieved.

**Remote Control Mode Operation**

If remote signals are used to operate the controller, it must be programmed for remote operation (see paragraph "Operating parameter selections" and when ready to start, the display shows:

R	E	A	D	Y		F	O	R		R	E	M	O	T	E
S	O	F	T		S	T	A	R	T					H	S

If the Soft Start has been deselected the display shows:

P	U	M	P		R	E	A	D	Y	:		U	S	E	
	R	E	M	O	T	E		S	T	A	R	T		H	S

With or without Soft Start mode selected the START/STOP and LOW SPEED front panel push- buttons are inoperative, while the CYCLE NUMBER and PUMP CURRENT pushbuttons are always active.

**RS 232/422/485 Control Mode Operation**

If the RS 232 option is installed and the controller has been programmed for RS 232 operation, the controller may be driven by a computer and when ready to operate, the display shows:

P	U	M	P		R	E	A	D	Y	:		U	S	E	
	R	S	2	3	2		L	I	N	E				H	S

If the Soft Start has been deselected the display shows:

R	E	A	D	Y		F	O	R		R	S	2	3	2	
S	O	F	T		S	T	A	R	T					H	S

The value which corresponds to the board installed will be assigned to RSXXX

With or without Soft Start mode selected the START/STOP, LOW SPEED functions are under computer control, while the CYCLE NUMBER and PUMP CURRENT front panel pushbuttons are always active.

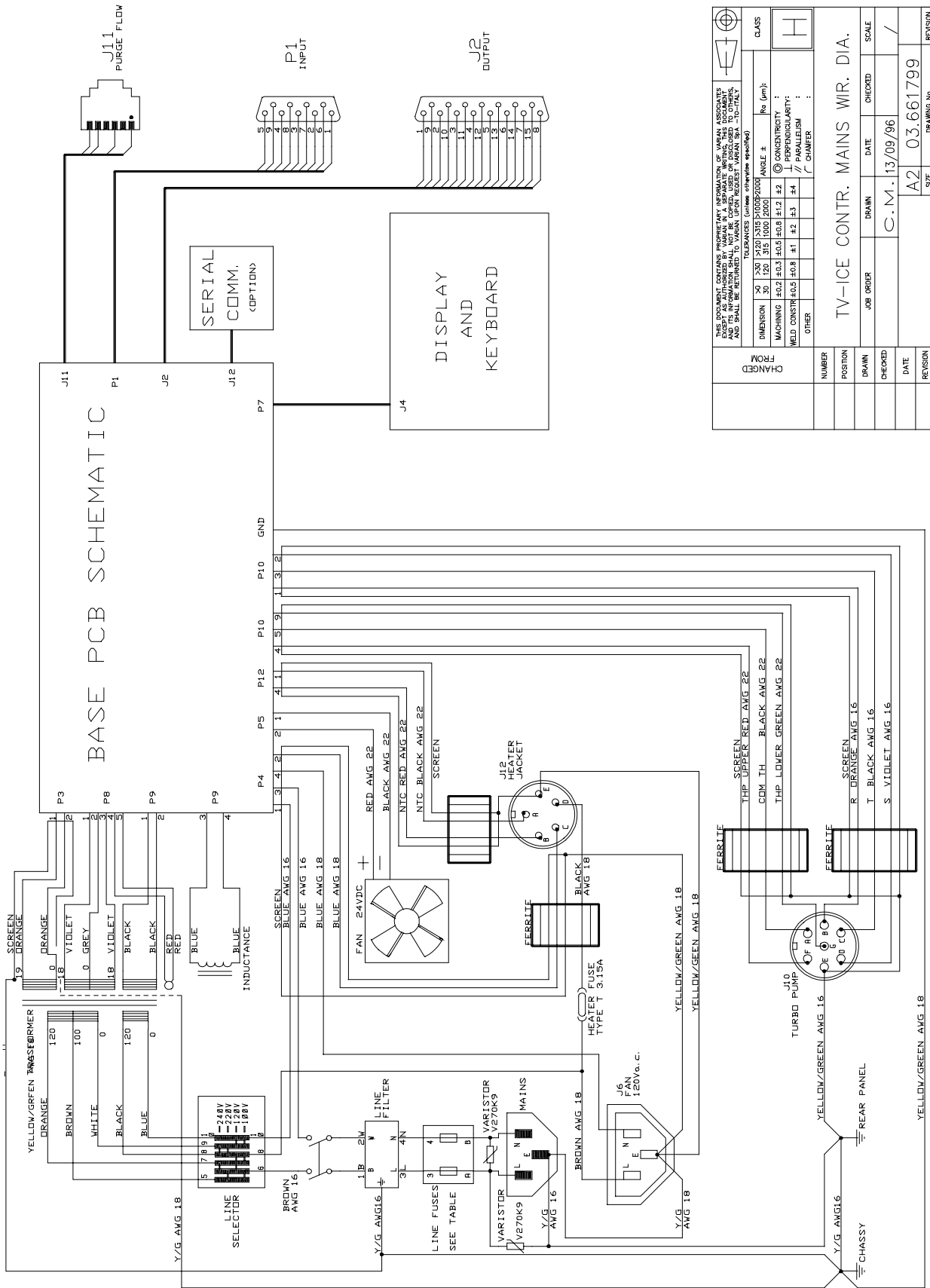
**ACCESSORIES AND SPARE PARTS**

Description	Part number
J1 input mating connector	969-9853
P7 mating plug	969-9854
Pump-controller connection cable	969-9953
Mains cable (European plug, 3 m long)	SR-03-661817-01
Mains cable (American plug, 120 V, 3 m long)	SR-03-661818-02

**OPTIONS**

Description	Part number
RS 485 computer communication kit	969-9856
RS 232 computer communication kit	969-9857
RS 422 computer communication kit	969-9858
P2 output mating connector	969-9852
Flow Meter with swagelok attachment kit	969-9114
Flow Meter with flange attachment kit	969-9115
Heater Jacket	969-9819

MAINTENANCE



THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF VARAN ASSOCIATES AND IS AUTHORIZED BY VARAN TO BE REPRODUCED OR TRANSMITTED IN ANY FORM AND SHALL BE RETURNED TO VARAN UPON REQUEST. VARAN SPA - 10-ITALY

CHANGED FROM

CLASS	H		
DIMENSION	30	250	2000
TOLERANCES (unless otherwise specified)	30	250	2000
MACHINING	+0.2	+0.3	+0.8
WELD CONSTRUCTION	+0.8	+1	+2
OTHER			

CONCENTRICITY :  
PERPENDICULARITY :  
PARALLELISM :  
CHAMFER :

NUMBER					
POSITION					
DRAWN					
CHECKED					
DATE					
REVISION					

TV-ICE CONTR. MAINS WIR. DIA.

JOB ORDER	C.M.	DATE	13/09/96	DRAWN		CHECKED		SCALE	/
REVISION	A2	SIZE	03.661799	DRAWING No.		REVISION			



# Request for Return



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

### North and South America

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

### Europe and Middle East

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

### Asia and ROW

Varian Vacuum Technologies  
 Local Office

### **CUSTOMER INFORMATION**

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

### **PRODUCT IDENTIFICATION**

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

### **TYPE OF RETURN** (check appropriate box)

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

### **HEALTH and SAFETY CERTIFICATION**

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

The equipment listed above (check one):

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

OR

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

Toxic  Corrosive  Reactive  Flammable  Explosive  Biological  Radioactive

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

.....

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

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

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

Do not write below this line

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



Request for Return



FAILURE REPORT

TURBO PUMPS and TURBOCONTROLLERS

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

ION PUMPS/CONTROLLERS

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

VALVES/COMPONENTS

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

LEAK DETECTORS

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

INSTRUMENTS

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

PRIMARY PUMPS

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

DIFFUSION PUMPS

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

FAILURE DESCRIPTION

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

NOTA: Su richiesta questo documento è disponibile anche in Tedesco, Italiano e Francese.

REMARQUE : Sur demande ce document est également disponible en allemand, italien et français.

HINWEIS: Auf Anfrage ist diese Unterlage auch auf Deutsch, Italienisch und Französisch erhältlich.

## Sales and Service Offices

### Argentina

#### Varian Argentina Ltd.

Sucursal Argentina  
Av. Ricardo Balbin 2316  
1428 Buenos Aires  
Argentina  
Tel: (54) 1 783 5306  
Fax: (54) 1 786 5172

### Australia

#### Varian Australia Pty Ltd.

679-701 Springvale Road  
Mulgrave, Victoria ZZ 3170  
Australia  
Tel: (61) 395607133  
Fax: (61) 395607950

### Benelux

#### Varian Vacuum Technologies

Rijksstraatweg 269 H,  
3956 CP Leersum  
The Netherlands  
Tel: (31) 343 469910  
Fax: (31) 343 469961

### Brazil

#### Varian Industria e Comercio Ltda.

Avenida Dr. Cardoso de Mello 1644  
Vila Olimpia  
Sao Paulo 04548 005  
Brazil  
Tel: (55) 11 3845 0444  
Fax: (55) 11 3845 9350

### Canada

#### Central coordination through:

Varian Vacuum Technologies  
121 Hartwell Avenue  
Lexington, MA 02421  
USA  
Tel: (781) 861 7200  
Fax: (781) 860 5437  
Toll Free: (800) 882 7426

### China

#### Varian Technologies - Beijing

Room 1201, Jinyu Mansion  
No. 129A, Xuanwumen Xidajie  
Xicheng District  
Beijing 1000031 P.R. China  
Tel: (86) 10 6608 1530  
Fax: (86) 10 6608 1534

### France and Wallonie

#### Varian s.a.

7 avenue des Tropiques  
Z.A. de Courtaboeuf – B.P. 12  
Les Ulis cedex (Orsay) 91941  
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Tel: (33) 1 69 86 38 13  
Fax: (33) 1 69 28 23 08

### Germany and Austria

#### Varian Deutschland GmbH

Alsfelder Strasse 6  
Postfach 11 14 35  
64289 Darmstadt  
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Tel: (49) 6151 703 353  
Fax: (49) 6151 703 302

### India

#### Varian India PVT LTD

101-108, 1st Floor  
1010 Competent House  
7, Nangal Raya Business Centre  
New Delhi 110 046  
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Tel: (91) 11 5548444  
Fax: (91) 11 5548445

### Italy

#### Varian Vacuum Technologies

Via F.lli Varian, 54  
10040 Leini, (Torino)  
Italy  
Tel: (39) 011 997 9111  
Fax: (39) 011 997 9350

### Japan

#### Varian Vacuum Technologies

Sumitomo Shibaura Building, 8th Floor  
4-16-36 Shibaura  
Minato-ku, Tokyo 108  
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Tel: (81) 3 5232 1253  
Fax: (81) 3 5232 1263

### Korea

#### Varian Technologies Korea, Ltd.

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

### Mexico

#### Varian S.A.

Concepcion Beistegui No 109  
Col Del Valle  
C.P. 03100  
Mexico, D.F.  
Tel: (52) 5 523 9465  
Fax: (52) 5 523 9472

### Taiwan

#### Varian Technologies Asia Ltd.

18F-13 No.79, Hsin Tai Wu Road  
Sec. 1, Hsi Chih  
Taipei Hsien  
Taiwan, R.O.C.  
Tel: (886) 2 2698 9555  
Fax: (886) 2 2698 9678

### UK and Ireland

#### Varian Ltd.

28 Manor Road  
Walton-On-Thames  
Surrey KT 12 2QF  
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Tel: (44) 1932 89 8000  
Fax: (44) 1932 22 8769

### United States

#### Varian Vacuum Technologies

121 Hartwell Avenue  
Lexington, MA 02421  
USA  
Tel: (781) 861 7200  
Fax: (781) 860 5437  
Toll Free: (800) 882 7426

### Other Countries

#### Varian Vacuum Technologies

Via F.lli Varian, 54  
10040 Leini, (Torino)  
Italy  
Tel: (39) 011 997 9111  
Fax: (39) 011 997 9350

### Internet Users:

#### Customer Service & Technical Support:

[vtt.customer.service@varianinc.com](mailto:vtt.customer.service@varianinc.com)

#### Worldwide Web Site:

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

#### Order On-line:

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

Representatives in most countries

