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# ***Turbo-V 70 Controller***

**Model 969-9506**

*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 70 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<br>_____                                                                                                                                     | COMPANY<br>_____ | FUNCTION<br>_____ |
| ADDRESS :<br>_____                                                                                                                                |                  |                   |
| TEL. N° : _____                                                                                                                                   |                  | FAX N° : _____    |
| E-MAIL : _____                                                                                                                                    |                  |                   |
| PROBLEM / SUGGESTION :<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____                                                                      |                  |                   |
| REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.) :<br>_____<br>_____<br>_____<br>_____ |                  |                   |
|                                                                                                                                                   |                  | DATE _____        |

|                                                       |              |
|-------------------------------------------------------|--------------|
| CORRECTIVE ACTION PLAN / ACTUATION<br>(by VARIAN VTT) | LOG N° _____ |
| _____<br>_____<br>_____<br>_____<br>_____<br>_____    |              |

XXXX = Code for dialing Italy from your country ( es. 01139 from USA; 00139 from Japan, etc.)

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## INFORMAZIONI GENERALI

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Varian prima dell'utilizzo dell'apparecchiatura. La Varian si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche. Il controller della serie Turbo-V 70 è un convertitore di frequenza, controllato da un microprocessore, realizzato con componenti a stato solido e con capacità di autodiagnostica e autoprotezione. Il controller pilota le pompe della serie Turbo-V 70 (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. Esso incorpora tutta la circuiteria necessaria per il funzionamento automatico delle pompe della serie Turbo-V 70.

Tramite un connettore ausiliario 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, segnali di bloccaggio (per interruttori a pressione, interruttori di controllo del flusso dell'acqua, ecc.)

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.*

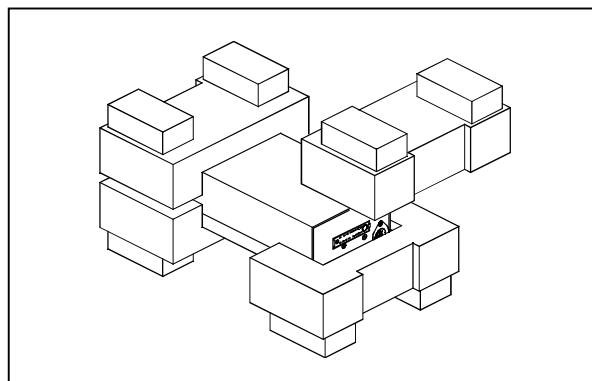
## IMMAGAZZINAMENTO

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% (non condensante).

## PREPARAZIONE PER L'INSTALLAZIONE

Il controller viene fornito in un imballo protettivo speciale; se si presentano segni di danni, che potrebbero essersi verificati durante il trasporto, contattare l'ufficio vendite locale. Durante l'operazione di disimballaggio, prestare particolare attenzione a non lasciar cadere 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 del controller*

Il Controller modello 969-9506 giunge dalla Varian predisposto per una tensione di alimentazione di 120 Vac.

Nel caso in cui fosse necessario cambiare la tensione di alimentazione, eseguire la procedura seguente:

- Scollegare il cavo dal connettore P17 del controller.
- Selezionare la tensione di alimentazione desiderata sul pannello sinistro.
- Verificare che sia stata selezionata la tensione corretta e quindi ricollegare il cavo al connettore P17.

## INSTALLAZIONE



### PERICOLO!

Il collegamento alla rete elettrica di alimentazione deve essere eseguito nel rispetto delle leggi vigenti. Collegare sempre il filo di massa 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 una tavola o all'interno di un apposito rack. In ogni caso occorre che l'aria di raffreddamento possa circolare liberamente intorno all'apparato. Non installare e/o utilizzare il controller in ambienti esposti ad agenti atmosferici (pioggia, gelo, neve), polveri, gas aggressivi, in ambienti esplosivi o con elevato rischio di incendio.*

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

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

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

### NOTA

*Il controller modello 969-9506 è fornito senza cavo di collegamento alla pompa. Il cavo può essere richiesto come accessorio alla Varian; per ulteriori dettagli consultare il paragrafo "Accessories and spare parts" dell'appendice "Technical Information". Esso va collegato da un lato al connettore J16 del controller e dall'altro all'apposito connettore della pompa. I connettori presenti ai due capi del cavo hanno forma tale per cui non è possibile collegare il cavo stesso in modo errato.*

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". Alcune delle istruzioni riportate nel seguito sono possibili sul controller modello 969-9506 solo se allo stesso è collegato l'accessorio "Hand held terminal". Prima di usare il controller effettuare tutti i collegamenti elettrici e pneumatici e fare riferimento al manuale della pompa collegata.



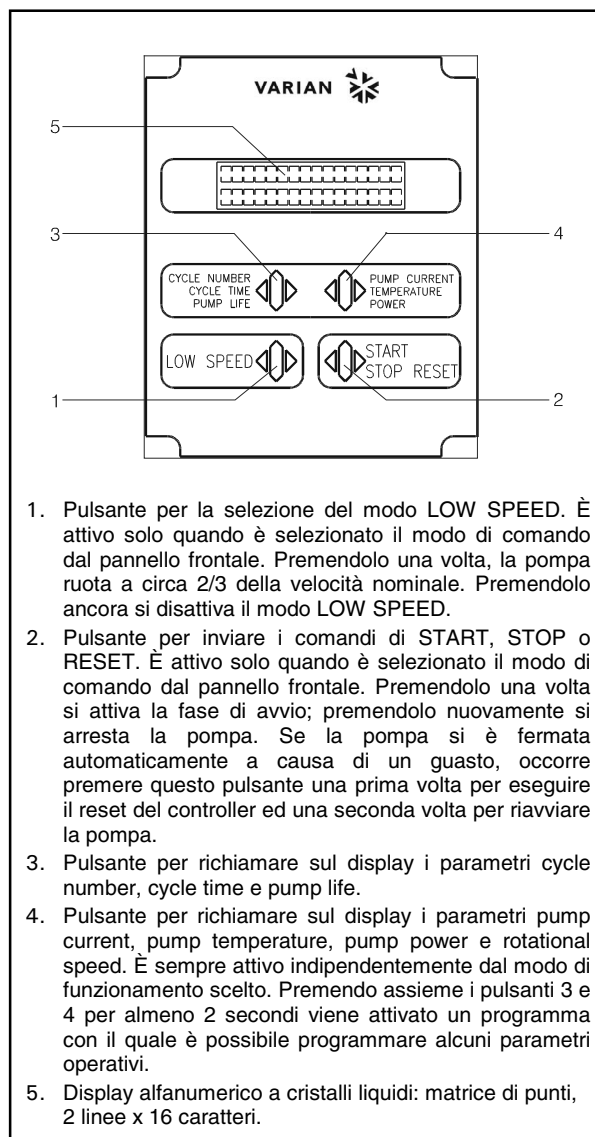
### PERICOLO!

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 far funzionare mai la pompa se la flangia di ingresso non è collegata al sistema o non è chiusa con la flangia di chiusura.

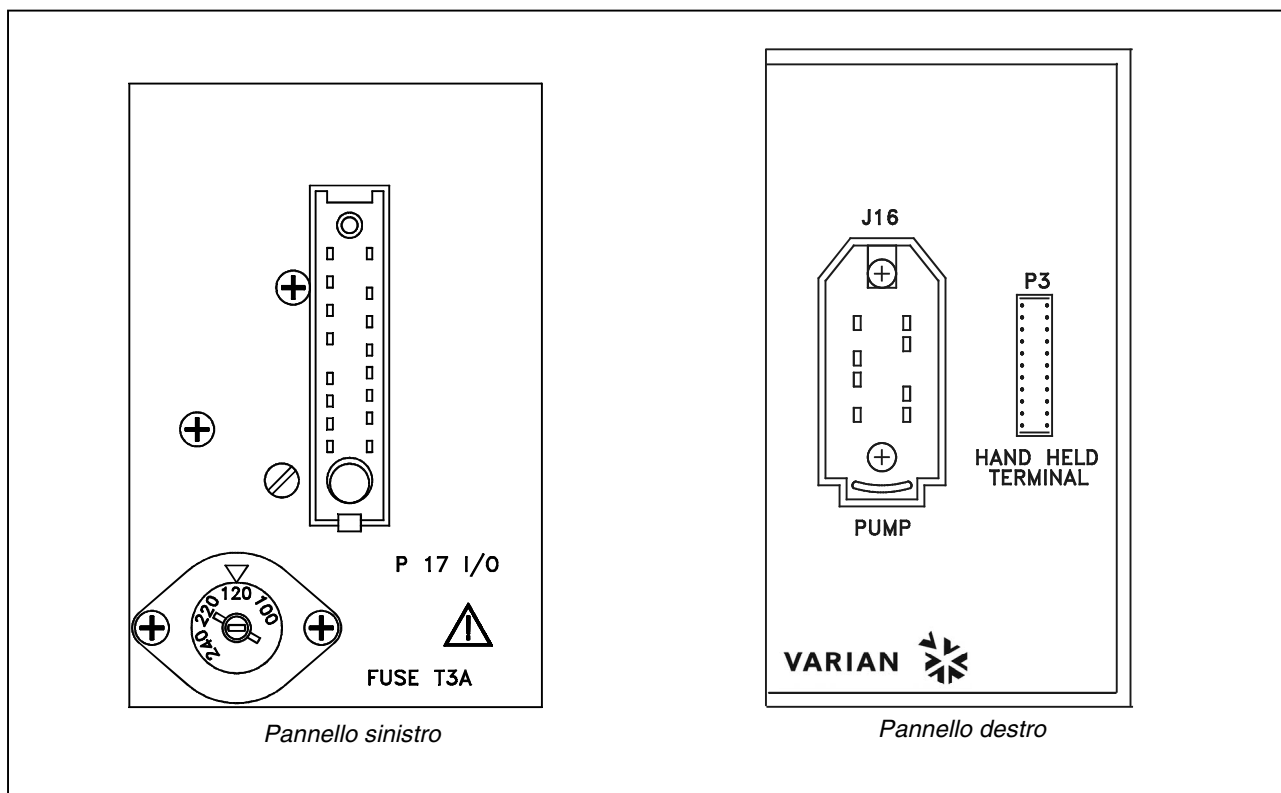
### Comandi, indicatori e connettori del Controller

Di seguito sono illustrati il pannello di comando dell'hand held terminal, ed i pannelli di interconnessione.

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



*Pannello frontale dell'Hand Held Terminal*



Pannelli destro e sinistro del Controller 969-9506

## PROCEDURE DI USO

### Accensione del Controller

Per accendere il controller ed avviare la pompa è sufficiente applicare la tensione di alimentazione al connettore P17.

### Arresto della Pompa

Per arrestare la pompa occorre ponticellare b7-a5 sul connettore P17 oppure premere il pulsante STOP dell'Hand Held Terminal se il controller è configurato in FRONT Mode.

## MANUTENZIONE

I controller della serie Turbo-V 70 non richiedono alcuna manutenzione. Qualsiasi intervento deve essere eseguito da personale autorizzato.

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



**PERICOLO!**

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

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 seguente.

I messaggi di errore sono presentati solo se è installata l'opzione "hand held terminal".

| 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>FAULT: OVERTIME SX</b>                | Durante l'avvio della pompa nel modo "soft start", la pompa non ha raggiunto la velocità prevista ad ogni passo entro 15 minuti. (X può valere da 0 a 9 ed indica il passo non superato). | Verificare che il sistema non presenti delle perdite.<br>Premere due volte il pulsante START per riavviare la pompa.                                                                                         |
| <b>FAULT: PUMP OVERTEMP.</b>             | La temperatura del cuscinetto superiore o della pompa ha superato i 60 °C.                                                                                                                | Attendere che la temperatura ritorni al di sotto della soglia.<br>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.<br>Premere due volte il pulsante START per riavviare la pompa.                                                                                |
| <b>FAULT: TOO HIGH LOAD</b>              | Durante il funzionamento normale (dopo la fase di avvio) la corrente assorbita dalla pompa è maggiore di quella programmata (1,5 A).                                                      | Verificare che il rotore della pompa abbia la possibilità di ruotare liberamente.<br>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 2,2 A).                                             | Verificare i collegamenti tra pompa e controller.<br>Premere due volte il pulsante START per riavviare la pompa.                                                                                             |
| <b>FAULT: R2 DELAY OVER</b>              | La velocità di rotazione della pompa è scesa al di sotto del valore di soglia programmato, il controller è in OFF ed R2 è diseccitato.                                                    | Verificare che non ci siano eventuali perdite nel sistema, o verificare le condizioni di carico del gas.<br>Applicare al pin <b>b8</b> del connettore <b>P17</b> il segnale di reset 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.<br>Se il messaggio si ripresenta rivolgersi in Varian per la manutenzione.                                                                       |
| <b>CONTROLLER FAILURE</b>                | Interruzione fusibile sul secondario di potenza.                                                                                                                                          | Rivolgersi alla Varian per la Manutenzione.                                                                                                                                                                  |

## 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 70 sind mikroprozessorgesteuerte Frequenzwandler. Sie sind mit Festkörperbauteilen gefertigt und verfügen über ein Selbstdiagnose- und ein Selbstschutzsystem. Die Controller steuern die Pumpen der Serie Turbo-V 70 (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 70 erforderlichen Schaltungen. Mittels Hilfsverbinder sind die Fernsteuerungen für Pumpenstart- und stopp, die Signale für die Anzeige des Pumpenzustands, die Start- und Stoppsteuerungen der Vorvakuumumpen, sowie die Sperrsignale (für Druckschalter, Wasserstrom-Kontrollschalter, etc.) 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 werden vor Prozeduren visualisiert, die bei Nichtbeachtung Schäden an der Anlage verursachen könnten.

## ANMERKUNG

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

## LAGERUNG

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

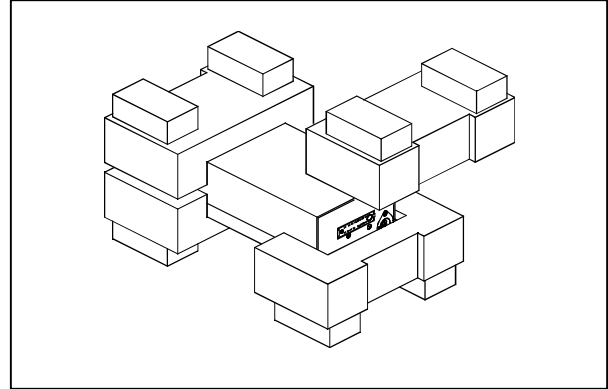
- Temperatur: von -20 °C bis +70 °C
- Relative Luftfeuchtigkeit: 0-95 % (nicht kondensierend).

## 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 des Controllers*

Das Controller-Modell 969-9506 ist für eine Anschlußspannung von 120 Vws ausgelegt.

Soll die Anschlußspannung geändert werden, ist folgendes zu tun:

- Das Kabel aus dem Controller-Verbinder P17 ziehen.
- Die gewünschte Anschlußspannung auf der linken Tafel wählen.
- Sicherstellen, daß die richtige Spannung gewählt wurde. Dann das Kabel wieder an den Verbinder P17 anschließen.

## INSTALLATION



**GEFAHR!**

Der Anschluß an das Stromnetz muß unter Einhaltung der gültigen gesetzlichen Vorschriften erfolgen. Den Erdungsdraht immer anschließen, und den Stecker in eine korrekt geerdete Steckdose stecken, 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.

### ANMERKUNG

*Das Controller-Modell 969-9506 wird ohne Netzkabel geliefert. Es kann bei der Firma Varian als lieferbares Zubehör bestellt werden. Für weitere Hinweise siehe Kapitel "Accessoires and spare parts" im Anhang zu "Technical Information". Das Kabel muß auf der einen Seite an den Verbinder J16 des Controllers und auf der anderen an den Pumpenverbinder angeschlossen werden. Die Verbinder an den beiden Kabelenden sind von der Form her so ausgelegt, daß ein falscher Anschluß unmöglich ist.*

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". Einige der nachstehenden Gebrauchshinweise lassen sich beim Controller-Modell 969-9506 nur dann ausführen, wenn das als Zubehör lieferbare mobile Taschenterminal "handheld terminal" angeschlossen ist. Vor Benutzung des Controllers sämtliche elektrischen und pneumatischen Anschlüsse ausführen, und die Betriebsanleitung der angeschlossenen Pumpe durchlesen.

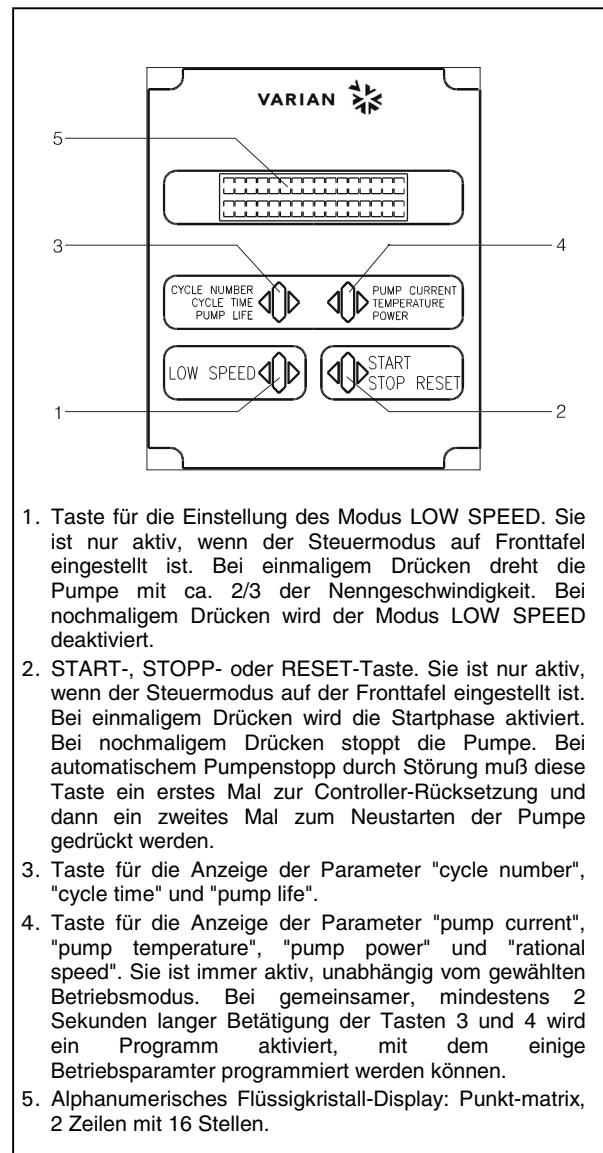


**GEFAHR!**

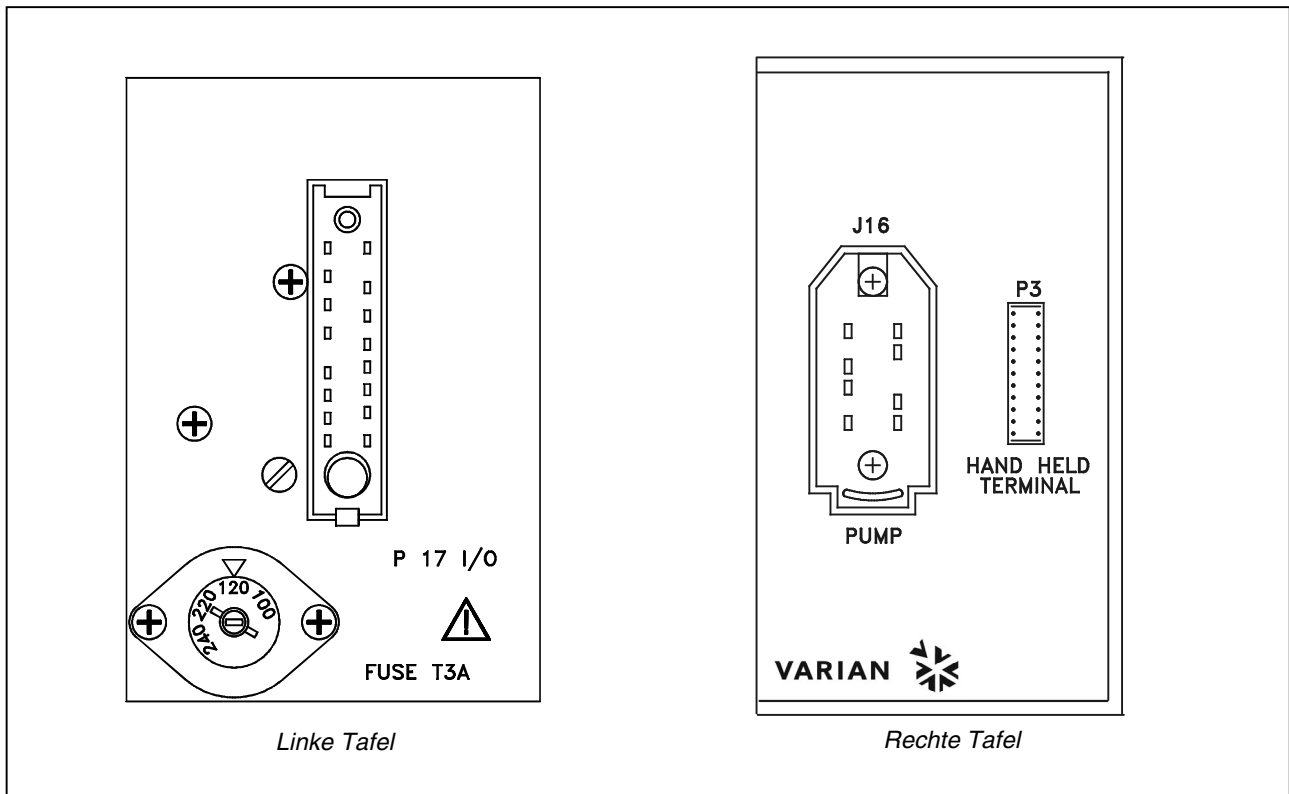
Steht die Pumpe auf einem Tisch, muß auf den stabilen Stand geachtet werden, da sonst die Gefahr von Personen- und Geräteschäden besteht. Die Pumpe nie einschalten, wenn der Eingangsflansch nicht am System angeschlossen bzw. nicht mit dem Schließflansch abgedeckt ist.

### Steuerungen, Anzeigen und Verbinder des Controllers

Nachstehend werden die Steuertafel des "handheld terminals" und die Verbindungstafeln beschrieben. Für weitere Einzelheiten siehe "Technical Information".



Frontpaneel des "Hand Held Terminals"



Rechte und linke Tafel des Controllers 969-9506

## BEDIENUNG

### Einschalten des Controllers und Pumpenstart

Zum Einschalten des Controllers und starten der Pumpe muß der Verbinder P17 an das Stromnetz angeschlossen werden.

### Pumpenstopp

Zum Anhalten der Pumpe b7 - a5 auf dem Stecker P17 überbrücken oder die Stopptaste des Programmierhandgeräts drücken, wenn die Steuereinheit im FRONT-Modus konfiguriert ist

## WARTUNG

Die Controller der Serie Turbo-V 70 sind wartungsfrei. Eventuell erforderliche Eingriffe müssen von dazu befugtem Fachpersonal ausgeführt werden. Bei einem Defekt kann der Varian-Reparaturdienst bzw. der "Varian advanced exchange service" in Anspruch genommen werden, der für die Erneuerung defekter Controller sorgt.



**GEFAHR!**

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. Die Störungsmeldungen werden nur angezeigt, wenn die als Option lieferbare "handheld terminal" installiert ist.

| MELDUNG                                  | BESCHREIBUNG                                                                                                                                                                                                   | BEHEBUNG                                                                                                                                                                                                          |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Fehlfunktion der Pumpen-Controller Verbindung.                                                                                                                                                                 | Sicherstellen, daß das Verbindungs-kabel zwischen Pumpe und Controller an beiden Seiten korrekt befestigt ist und keine Unterbrechung vorliegt. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten. |
| <b>FAULT: OVERTIME SX</b>                | Beim Pumpenstart im Modus "soft start" hat die Pumpe die bei jedem Schritt vorgesehene Geschwindigkeit inner-halb von 15 Minuten nicht erreicht (X kann 0-9 sein und zeigt den nicht überwundenen Schritt an). | Sicherstellen, daß das System keine Leckagen aufweist. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.                                                                                          |
| <b>FAULT: PUMP OVERTEMP.</b>             | Die Temperatur des oberen Lagers bzw. der Pumpe hat 60 °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 (1,5 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 (Ausgangs-strom größer als 2,2 A).                                                                              | Die Verbindung zwischen Pumpe und Controller prüfen. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.                                                                                            |
| <b>FAULT: R2 DELAY OVER</b>              | Die Rotationsgeschwindigkeit der Pumpe ist unter den Schwellenwert gesunken. Der Controller befindet sich im OFF-Zustand und R2 ist aberregt.                                                                  | Sicherstellen, daß es keine Leckagen im System gibt bzw. die Gasladebedingungen prüfen. An pin <b>b8</b> des Verbinders <b>P17</b> das Resetsignal für den Pumpenneustart anlegen.                                |
| <b>OVERVOLTAGE</b>                       | Defekt im Versorgungsbereich des Controllers bzw. der Controller hat ein falsches Signal erhalten.                                                                                                             | Die Pumpe durch zweimalige Betätigung der START-Taste neustarten. Erscheint die Meldung wieder sollte der Varian-Wartungs-dienst gerufen werden.                                                                  |
| <b>CONTROLLER FAILURE</b>                | Unterbrechung der Schmelzsicherung am sekundären Leistungsstromkreis.                                                                                                                                          | Zur Instandhaltung an Varian wenden.                                                                                                                                                                              |

## 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 l'utilisation de l'appareil. Varian décline par conséquent toute responsabilité en cas d'inobservation totale ou partielle des instructions données, d'utilisation incorrecte de la part d'un personnel non formé, d'opérations non autorisées ou d'un emploi contraire aux réglementations nationales spécifiques. Le contrôleur de la série Turbo-V 70 est un convertisseur de fréquence, contrôlé par un microprocesseur, réalisé avec des éléments à l'état solide et ayant des capacités d'autodiagnostic et d'auto-protection. Le contrôleur pilote les pompes de la série Turbo-V 70 (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. Il incorpore l'ensemble de circuits nécessaire au fonctionnement automatique des pompes de la série Turbo-V 70. Un connecteur auxiliaire permet 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 interrupteurs à pression, interrupteurs de contrôle du flux de l'eau, etc.). 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 manœuvre spéciale qui, si elle n'est pas effectuée correctement, risque de provoquer de graves lésions.



**ATTENTION!**

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

### NOTE

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

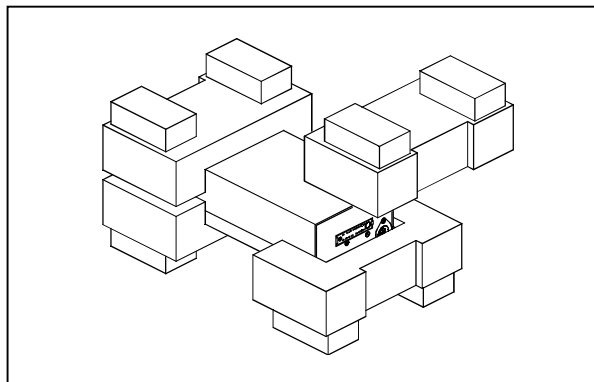
## EMMAGASINAGE

Pendant le transport et l'emménagement 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 83/399 en matière de protection de l'environnement.



*Emballage du contrôleur*

Le Contrôleur modèle 969-9506 est fourni par Varian déjà pré-équipé pour une tension d'alimentation de 120 Vca.

S'il est nécessaire de changer la tension d'alimentation, procéder de la façon suivante:

- Débrancher le câble du connecteur P17 du contrôleur.
- Sélectionner la tension d'alimentation voulue sur le tableau gauche.
- S'assurer que la tension correcte a été sélectionnée, puis reconnecter le câble au connecteur P17.

## INSTALLATION



**DANGER!**

La connexion au réseau électrique d'alimentation doit être effectuée conformément aux lois en vigueur. Connecter toujours le fil de la masse et introduire la fiche dans une prise ayant une connexion de la masse appropriée, 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 un plateau d'appui 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.

### NOTE

Le contrôleur modèle 969-9506 n'est pas doté du câble d'alimentation à la pompe. Ce câble peut être demandé comme accessoire à Varian. Pour tous autres détails, se reporter au paragraphe "Accessories and spare parts" de l'appendice "Technical informations". Il doit être connecté d'un côté au connecteur J16 du contrôleur et de l'autre au connecteur de la pompe prévu à cet effet. La forme des connecteurs se trouvant aux deux extrémités du câble empêche de toute façon la connexion erronée du câble.

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". Quelques-unes des instructions données ci-après ne sont possibles sur le contrôleur modèle 969-9425 que si l'accessoire "Hand held terminal" est connecté à ce contrôleur. 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 un plateau d'appui s'assurer que ce dernier est stable. Ne jamais faire fonctionner la pompe si la bride d'entrée n'est pas connectée au système ou n'est pas fermée à l'aide de la bride de fermeture.

### Commandes, indicateurs et connecteurs du Contrôleur

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

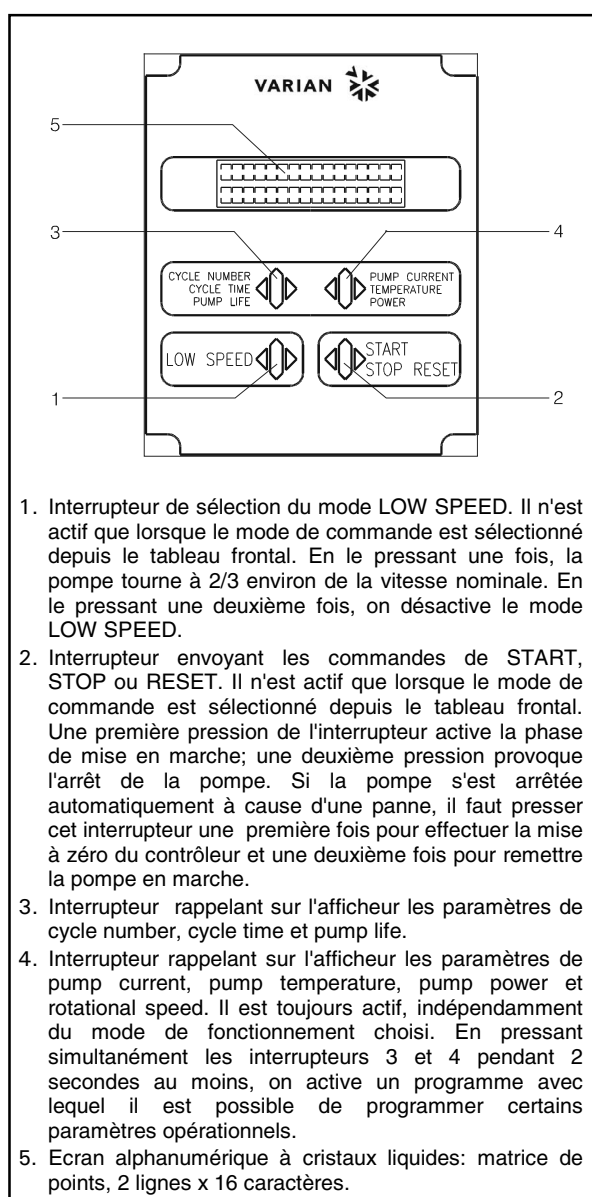
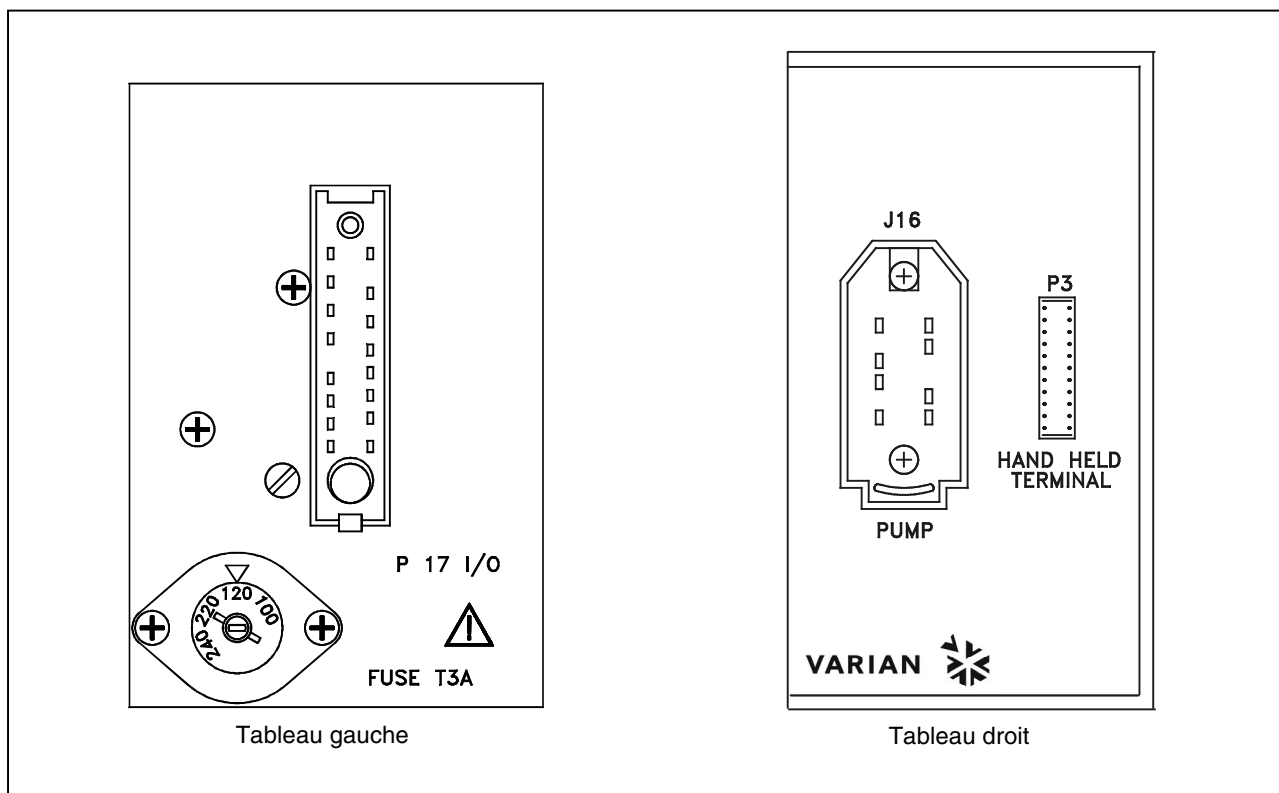


Tableau avant du "Hand Held Terminal"



Tableaux droit et gauche du Contrôleur 969-9506

## PROCEDURES D'UTILISATION

### **Allumage du Contrôleur et Mise en marche de la Pompe**

Pour allumer le contrôleur et mettre la pompe en marche, il suffit d'appliquer la tension d'alimentation au connecteur P17.

### **Arrêt de la Pompe**

Pour arrêter la pompe il faut mettre un cavalier entre b7-a5 sur le connecteur P17 ou appuyer sur le bouton STOP de "Hand Held Terminal" si le contrôleur est configuré en mode "FRONT".

## ENTRETIEN

Les contrôleurs de la série Turbo-V 70 n'exigent aucun entretien. Toute opération doit être effectuée par un personnel agréé. 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 de la pompe, 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. Les messages d'erreur ne sont affichés que si l'option "hand held terminal" est installée.

| MESSAGE                                  | DESCRIPTION                                                                                                                                                                                         | INTERVENTION                                                                                                                                                                                                     |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Dysfonctionnement de la connexion entre la pompe et le contrôleur.                                                                                                                                  | S'assurer que le câble de connexion entre la pompe et le contrôleur 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>FAULT: OVERTIME SX</b>                | Pendant la mise en marche de la pompe dans le mode soft start", la pompe n'a pas atteint la vitesse prévue à chaque pas dans les 15 minutes (X peut valoir de 0 à 9 et indique le pas non franchi). | S'assurer que le système ne présente pas de fuites. Presser deux fois l'interrupteur START pour remettre la pompe en marche.                                                                                     |
| <b>FAULT: PUMP OVERTEMP.</b>             | La température du palier supérieur ou de la a dépassé 60 °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>              | Pendant le fonctionnement normal (après la phase de mise en marche), le courant absorbé par la pompe est plus grand que celui qui a été programmé (1,5 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>              | Pendant le fonctionnement normal (après la phase de mise en marche), la connexion de sortie est en court-circuit (courant de sortie plus grand que 2,2 A).                                          | Vérifier les connexions entre la pompe et le contrôleur. Presser deux fois l'interrupteur START pour remettre la pompe en marche.                                                                                |
| <b>FAULT: R2 DELAY OVER</b>              | La vitesse de rotation de la pompe est descendue au-dessous de la valeur de seuil programmée, le contrôleur est en OFF et R2 est désexcité.                                                         | S'assurer qu'il n'y a pas de fuites dans le système ou vérifier les conditions de charge du gaz. Appliquer au pin <b>b8</b> du connecteur <b>P17</b> le signal de reset pour remettre la pompe en marche.        |
| <b>OVERVOLTAGE</b>                       | Il s'est produit une panne de la section d'alimentation du contrôleur, ou bien le contrôleur a reçu un faux signal.                                                                                 | Presser deux fois l'interrupteur START pour remettre la pompe en marche. Si le message se présente à nouveau, s'adresser à Varian pour l'entretien.                                                              |
| <b>CONTROLLER FAILURE</b>                | Interruption du fusible sur le secondaire de puissance.                                                                                                                                             | Contacteur Varian pour l'entretien.                                                                                                                                                                              |

## 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 70 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 70 (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 70. Mediante un conector auxiliar 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, señales de control del caudal del agua, etc.). 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.*

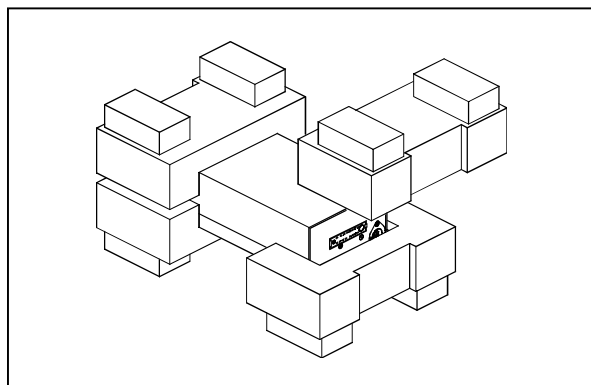
## ALMACENAMIENTO

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 del Controlers*

El controler modelo 969-9506 llega de la Varian preparado para una tensión de alimentación de 120 Vac.

En caso de que sea necesario cambiar la tensión de alimentación, efectuar el procedimiento siguiente:

- Desconectar el cable del conector P17 del controler.
- Seleccionar la tensión de alimentación deseada en el panel izquierdo.
- Comprobar que se ha seleccionado la tensión correcta y por tanto volver a conectar el cable al conector P17.

## INSTALACIÓN



**¡PELIGRO!**

La conexión a la red eléctrica ha de realizarse respetando las leyes vigentes. Conectar siempre el hilo de masa 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.

### NOTA

*El controler modelo 969-9506 se suministra sin cable de conexión a la bomba. El cable puede solicitarse como accesorio a Varian; para más detalles consultar el apartado "Accessories and spare parts" del anexo "Technical Information". Éste va conectado por un lado al conector J16 del controler y por el otro al conector específico de la bomba. Los conectores que están en las dos puntas del cable tiene una forma especial por lo que no es posible conectar el cable de manera incorrecta.*

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 Information".

Algunas de las instrucciones citadas a continuación pueden realizarse en el Controler modelo 969-9506 sólo si al mismo va conectado el accesorio "Hand held terminal". Antes de usar el controler efectuar todas las conexiones eléctricas y neumáticas y consultar el manual de la bomba conectada.



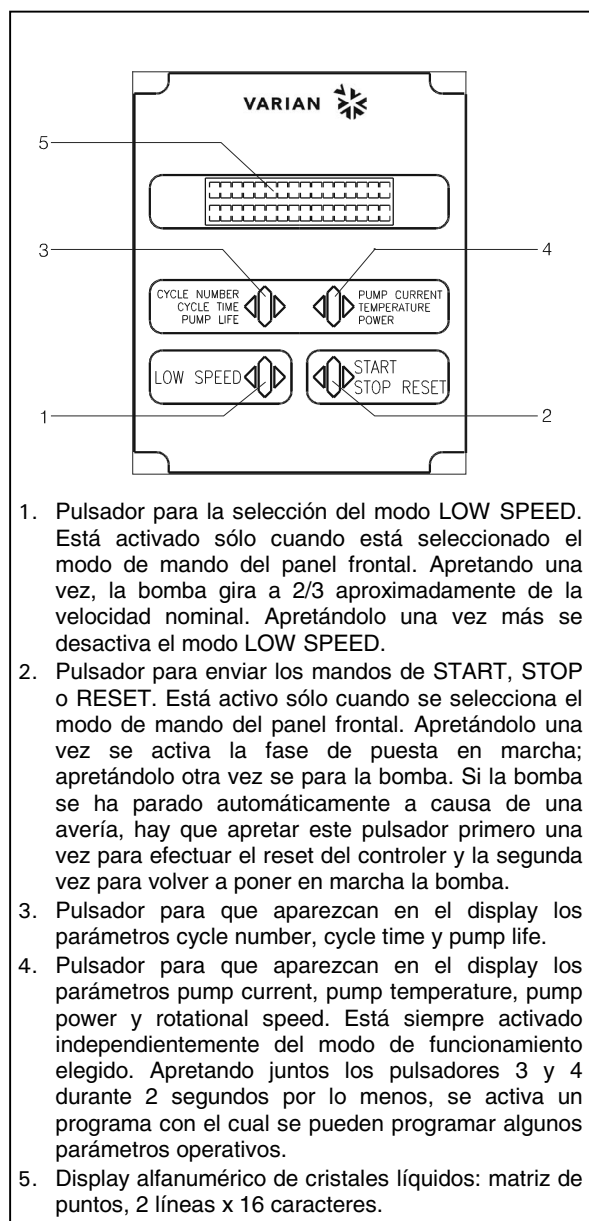
**¡PELIGRO!**

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.

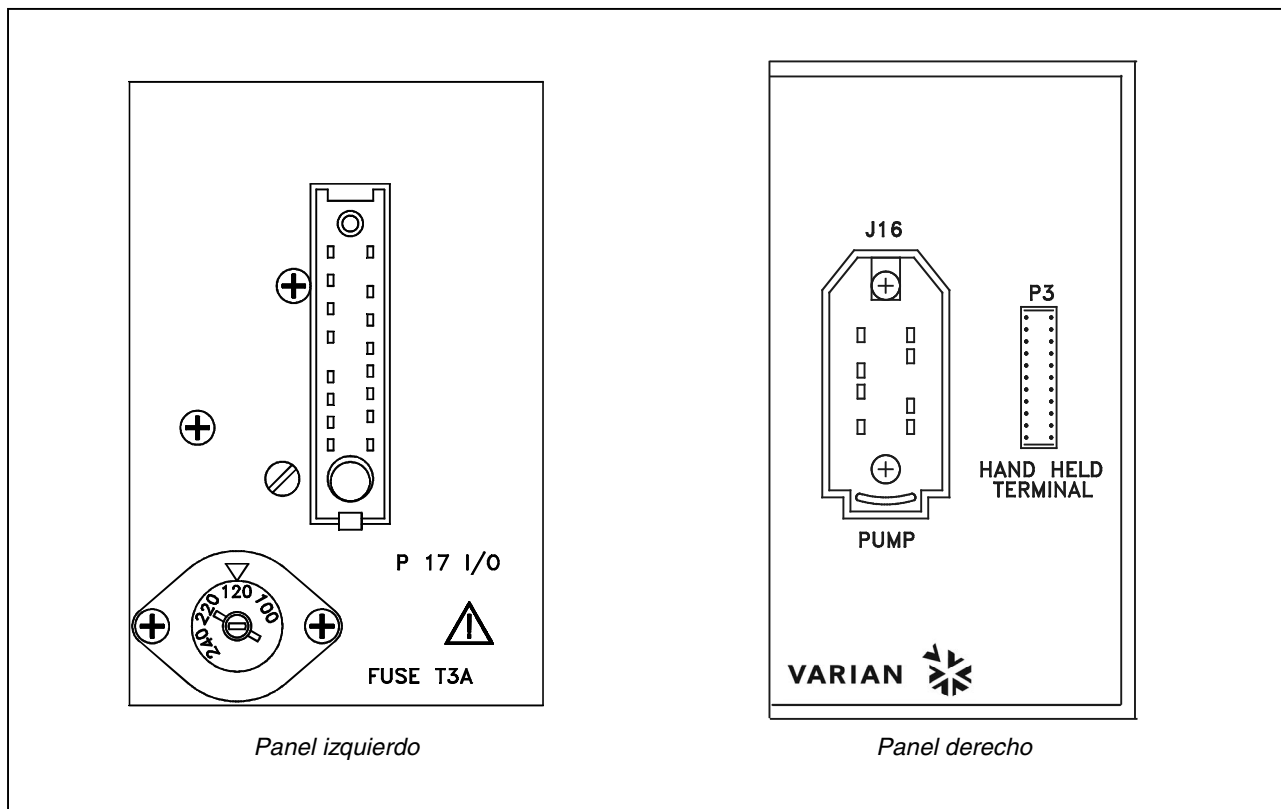
### Mandos, indicadores y conectores del controler

A continuación se ilustran el panel de mando de la hand held terminal y los paneles de interconexión.

Para más detalles consultar la sección "Technical Information".



Panel frontal del "Hand Held Terminal"



## PROCEDIMIENTOS DE USO

### **Encendido del controler y puesta en marcha de la bomba**

Para encender el controler y poner en marcha la bomba es suficiente aplicar la tensión de alimentación al conector P17.

### **Detención de la bomba**

Para apagar la bomba, hay que poner las grapillas b7-a5 sobre el conector P17, o bien apretar el pulsador STOP sobre el Hand Held Terminal si el controler está configurado en FRONT Mode.

## MANTENIMIENTO

Los controlers de la serie Turbo-V 70 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.



**¡PELIGRO!**

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 autodiagnóstico del controlador presentan algunos mensajes de error detallados en la tabla siguiente.

Los mensajes de error aparecen sólo si está instalada la opción "hand held terminal".

| MENSAJE                                  | DESCRIPCIÓN                                                                                                                                                                                            | ACCIÓN CORRECTIVA                                                                                                                                                                                                      |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Mal funcionamiento en la conexión entre la bomba y el Controlador.                                                                                                                                     | Comprobar que el cable de conexión entra en la bomba y el controlador 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>FAULT: OVERTIME SX</b>                | Durante la puesta en marcha de la bomba en el modo "soft start" la bomba no ha alcanzado la velocidad prevista a cada paso antes de 15 minutos. (X puede valer de 0 a 9 e indica el paso no superado). | Comprobar que el sistema no presenta pérdidas.<br>Apretar dos veces el pulsador START para volver a poner en marcha la bomba.                                                                                          |
| <b>FAULT: PUMP OVERTEMP.</b>             | La temperatura del rodamiento superior o de la bomba ha superado los 60 °C.                                                                                                                            | Esperar a que la temperatura vuelva por debajo del umbral.<br>Apretar dos veces el pulsador START para volver a poner en marcha la bomba.                                                                              |
| <b>FAULT: CONTROLLER OVERTEMPERATURE</b> | La temperatura del transformador del controlador ha superado los 90 °C.                                                                                                                                | Esperar a que la temperatura vuelva por debajo del umbral.<br>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 (1,5 A).                                                           | Comprobar que el rotor de la bomba tiene la posibilidad de girar libremente.<br>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 2,2 A).                                                       | Comprobar las conexiones entre la bomba y el controlador.<br>Apretar dos veces el pulsador START para volver a poner en marcha la bomba.                                                                               |
| <b>SYSTEM OVERRIDE</b>                   | La bomba ha sido parada por una señal de emergencia procedente de un contacto remoto.                                                                                                                  | Desenchufar el cable de alimentación del controlador y corregir la causa de la emergencia.<br>Volver a conectar el cable de alimentación y apretar dos veces el pulsador START para volver a poner en marcha la bomba. |
| <b>FAULT: R2 DELAY OVER</b>              | La velocidad de rotación de la bomba ha bajado por debajo del valor de umbral programado, el controlador está en OFF y R2 está desexcitado.                                                            | Comprobar que no hay posibles pérdidas en el sistema, o comprobar las condiciones de carga del gas.<br>Aplicar al pin <b>b8</b> del conector <b>P17</b> la señal de reset para volver a arrancar la bomba.             |
| <b>OVERVOLTAGE</b>                       | Se ha producido una avería en la sección de alimentación del controlador o el controlador ha recibido una señal espurio.                                                                               | Apretar dos veces el pulsador START para volver a poner en marcha la bomba.<br>Si el mensaje se vuelve a presentar dirigirse a Varian para el mantenimiento.                                                           |
| <b>CONTROLLER FAILURE</b>                | Interrupción del fusible sobre el secundario de potencia.                                                                                                                                              | Contactar Varian para el Mantenimiento.                                                                                                                                                                                |

## 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 70 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 70 (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 70. A través de um conector auxiliar 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.). 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.*

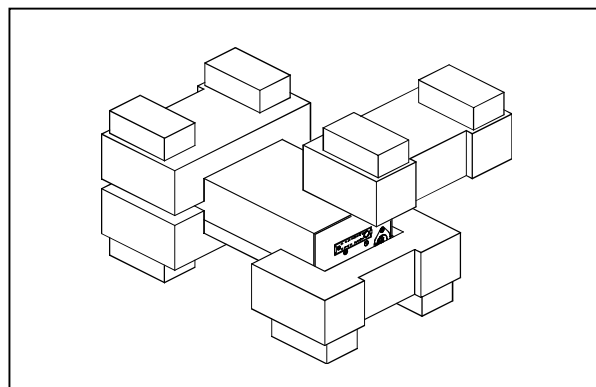
## ARMAZENAGEM

Durante o transporte e a armazenagem do controller, devem ser satisfeitas as seguintes condições ambientais:

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

## PREPARAÇÃO PARA A INSTALAÇÃO

O controller é fornecido numa embalagem protectora especial; se apresentarem 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 directrizes CEE 85/399 para a protecção do meio ambiente.



*Embalagem do controllers*

O Controller modelo 969-9506 chega à Varian predisposto para uma tensão de alimentação de 120 Vac.

Caso seja necessário mudar a tensão de alimentação, executar o procedimento a seguir:

- Desligar o cabo do conector P17 do controller.
- Seleccionar a tensão de alimentação desejada no painel esquerdo.
- Verificar se foi seleccionada a tensão correcta e, a seguir, ligar novamente o cabo ao conector P17.

## INSTALAÇÃO



**PERIGO!**

A ligação à rede eléctrica deve ser efectuada respeitando as leis em vigor. Ligar sempre o fio de massa e inserir a tomada com uma adequada ligação de massa para evitar descargas eléctricas. No interior do controller desenvolvem-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 explosivos 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 condensadora).

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

### NOTA

*O controller modelo 969-9506 é fornecido sem cabo de alimentação à bomba. O cabo pode ser solicitado como acessório à Varian; para maiores detalhes consultar o parágrafo "Accessories and spare parts" do apêndice "Technical Information". Este deve ser ligado, de um lado, ao conector J16 do controller e, do outro lado, ao conector específico da bomba. Os conectores existentes nas duas extremidades do cabo possuem uma forma específica que impede a ligação errada do cabo.*

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". Algumas das instruções descritas a seguir são possíveis no controller modelo 969-9506 só se estiver, ligado ao mesmo, o acessório "Hand held terminal". Antes de usar o controller efectuar todas as ligações eléctricas e pneumáticas e consultar o manual da bomba ligada.



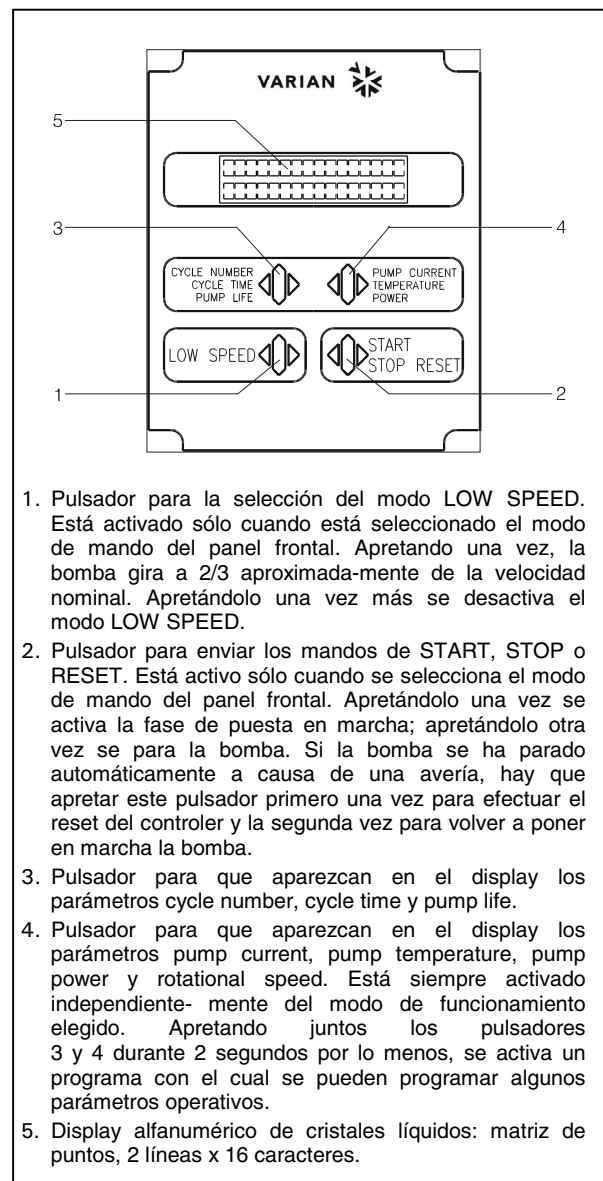
**PERIGO!**

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 está ligado ao sistema ou não está fechado com o flange de fecho.

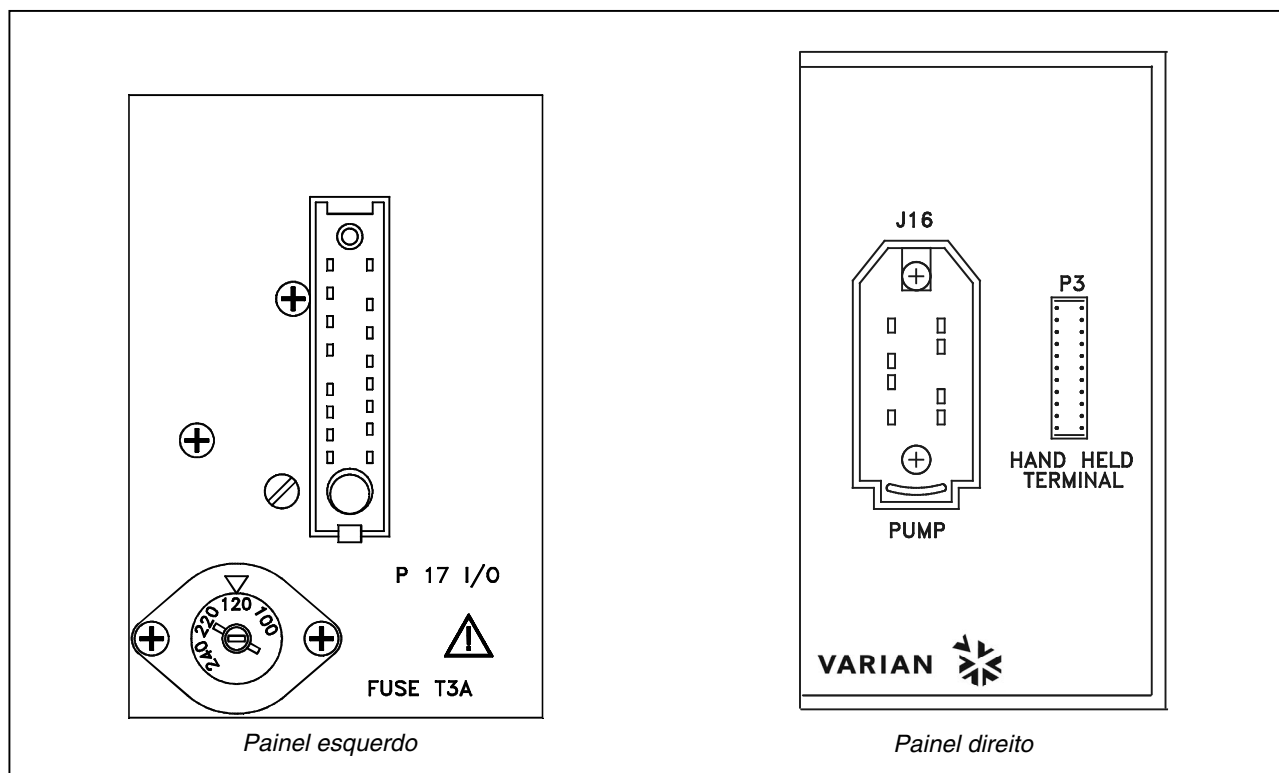
## Comandos, Indicadores e Conectores do Controller

A seguir, estão ilustrados o painel de comando do hand held terminal e os painéis de interconexão.

Para maiores detalhes, consultar a secção "Technical Information".



Painel frontal del "Hand Held Terminal"



Painéis direito e esquerdo do Controller 969-9506

## PROCEDIMENTOS DE USO

### Acendimento do Controller e Activação da Bomba

Para ligar o controller e activar a bomba é suficiente aplicar a tensão de alimentação ao conector P17.

### Paragem da bomba

Para parar a bomba efectuar uma ligação volante entre b7 e a5 no conector P17, ou, se o controller está configurado em FRONT Mode, premer o botão STOP do Hand Held Terminal.

## MANUTENÇÃO

Os controllers da série Turbo-V 70 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!**

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.

As mensagens de erro apresentam-se só se estiver instalada a opção "hand held terminal".

| MENSAGEM                                 | DESCRIÇÃO                                                                                                                                                                          | ACÇÃO CORRECTIVA                                                                                                                                                                          |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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. Premir duas vezes o botão START para reactivar a bomba.     |
| <b>FAULT: OVERTIME SX</b>                | Durante o accionamento da bomba no modo "soft start", a bomba não atingiu a velocidade prevista a cada passo em 15 minutos. (X pode valer de 0 a 9 e indica o passo não superado). | Verificar se o sistema não apresenta perdas. Premir duas vezes o botão START para reactivar a bomba.                                                                                      |
| <b>FAULT: PUMP OVERTEMP.</b>             | A temperatura do rolamento superior ou da bomba superou os 60 °C.                                                                                                                  | Aguardar até que a temperatura volte ao limite estabelecido. Premir 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. Premir duas vezes o botão START para reactivar a bomba.                                                                      |
| <b>FAULT: TOO HIGH LOAD</b>              | Durante o funcionamento normal (após a fase de accionamento) a corrente absorvida pela bomba é maior do que a programada (1,5 A).                                                  | Verificar se o rotor da bomba pode rodar livremente. Premir 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 2,2 A).                                        | Verificar as ligações entre a bomba e o controller. Premir duas vezes o botão START para reactivar a bomba.                                                                               |
| <b>FAULT: R2 DELAY OVER</b>              | A velocidade de rotação da bomba desce abaixo do valor limite programado, o controller está em OFF e o R2 está desexcitado.                                                        | Verificar se não existem eventuais perdas no sistema ou verificar as condições de carga do gás. Aplicar ao pin <b>b8</b> do connector <b>P17</b> o sinal de reset para reactivar a bomba. |
| <b>OVERVOLTAGE</b>                       | Verificou-se um defeito na secção de alimentação do controller, ou o controller recebeu um sinal falso.                                                                            | Premir duas vezes o botão START para reactivar a bomba. Se a mensagem se reapresentar, dirigir-se à Varian para a manutenção.                                                             |
| <b>CONTROLLER FAILURE</b>                | Interrupção fusível no secundário de potência.                                                                                                                                     | Contactar a Varian para a manutenção.                                                                                                                                                     |

## 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 70 serie zijn frequentieomzetters die gestuurd worden door een microprocessor, zijn gemaakt van halfgeleiderelementen en zijn in staat om zelfdiagnose en zelfbescherming uit te voeren. De controllers sturen de pompen van de serie Turbo-V 70 (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 70. Via een hulpconnector 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 druk-schakelaars, regelschakelaars van de waterstroom, enz.). 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.*

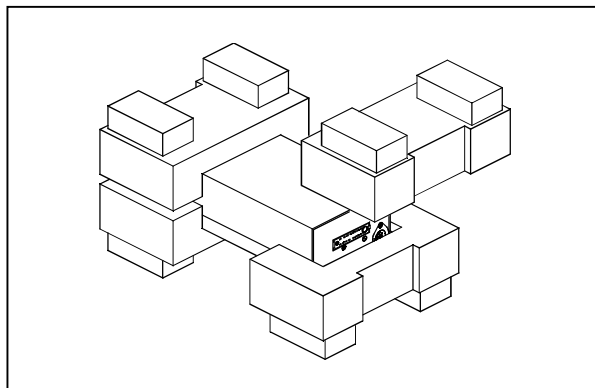
## OPSLAG

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 milieurechtlijn 85/399.



*Verpakking van de controller*

Varian heeft het controllermodel 969-9506 voorbereid voor een voedingsspanning van 120 Vac.

Mocht het nodig zijn de voedingsspanning te veranderen, de volgende procedure volgen:

- Koppel de voedingskabel van de connector P17 van de controller af.
- Kies de gewenste voedingsspanning op het linker paneel.
- Controleer of de juiste spanning is gezocht en sluit de kabel weer op connector P17 aan.

## INSTALLATIE



**GEVAAR!**

De aansluiting op het elektrische net moet overeenkomstig de geldende voorschriften geschieden. Sluit altijd de aardingsdraad aan 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).

### OPMERKING

*De controller 969-9506 wordt zonder deze verbindingkabel geleverd. De kabel kan als accessoire bij Varian worden besteld: raadpleeg voor meer informatie de paragraaf "Accessories and spare parts" van de bijlage "Technical Information". De kabel wordt aan de ene kant verbonden met de J16 connector van de controller en aan de andere kant met de speciale connector van de pomp. De connectoren aan beide uiteinden van de kabel hebben een dusdanige vorm dat het niet mogelijk is om de kabel verkeerd aan te sluiten.*

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 Information". Enkele hier vermelde instructies zijn alleen van toepassing op het controllermodel 969-9506 indien hierop het accessoire "Hand held terminal" is aangesloten. 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.

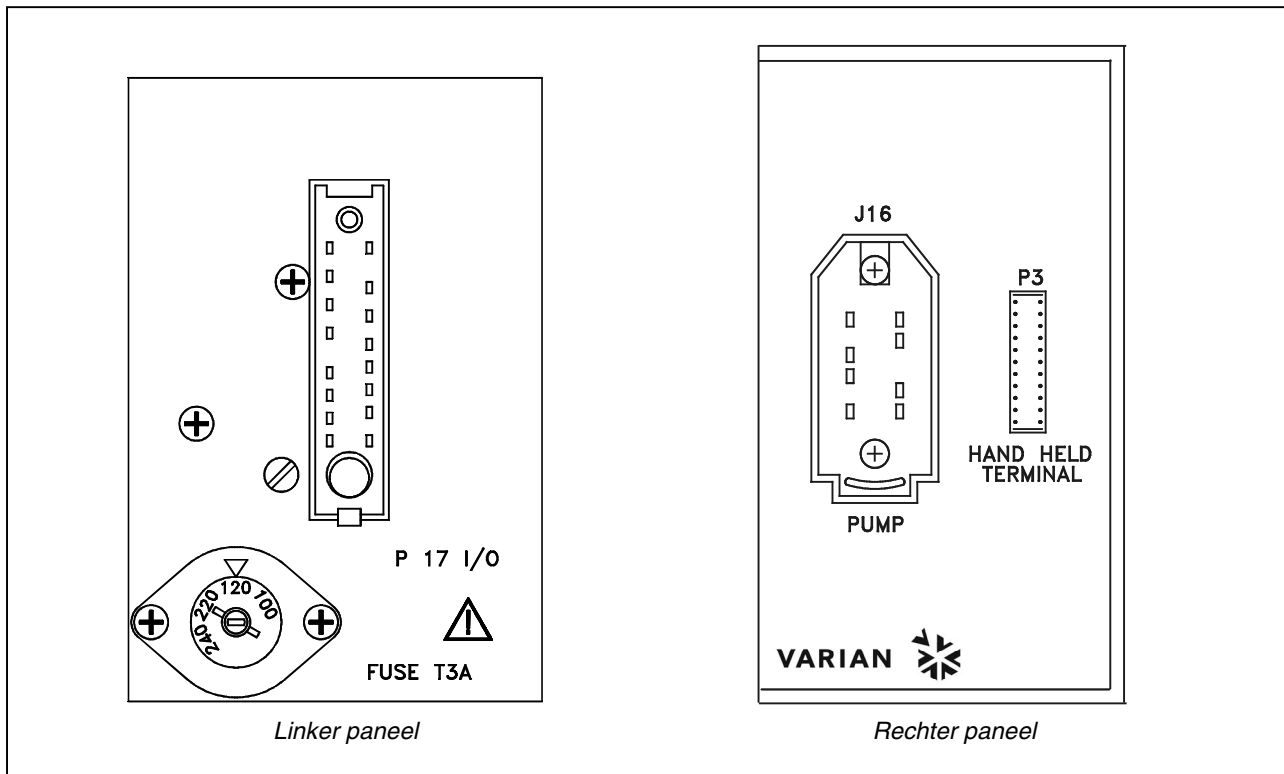
### Bedieningsorganen, controlelampjes en connectoren van de controller

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



1. Drukknop voor selectie van de bedrijfswijze LOW SPEED. Is alleen actief wanneer de bedrijfswijze op het frontpaneel wordt geselecteerd. Door de knop een maal in te drukken, draait de pomp op circa 2/3 van de nominale snelheid. Door de knop opnieuw in te drukken, wordt LOW SPEED geïnactiveerd.
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 en pump life.
4. Drukknop voor weergave op het display van de parameters pump current, pump temperature, pump power en rotational speed. 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. Alfnumeriek display met vloeibare kristallen (LCD): puntjespatroon, 2 lijnen x 16 karakters.

Frontpaneel van de "hand terminal"



Rechter en linker paneel van de Controller 969-9506

## GEBRUIKSPROCEDURES

### **Inschakelen van de controller en starten van de pomp**

Om de controller in te schakelen en de pomp te starten hoeft men slechts voedingsspanning op connector P17 te zetten.

### **Stoppen van de pomp**

Om de pomp te stoppen moet een brugverbinding worden aangebracht tussen b7-a5 op de connector P17 of de STOP drukknop van de Hand Held Terminal worden bediend als de controller in de FRONT Mode is geconfigureerd.

## ONDERHOUD

De controllers van de serie Turbo-V 70 zijn onderhoudsvrij. Eventuele werkzaamheden moeten door bevoegd personeel worden uitgevoerd. 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 storingen wekt het zelfdiagnose-circuit van de controller enkele foutmeldingen op die in de volgende tabel zijn omschreven.

De foutmeldingen worden alleen getoond als de optie "hand-held terminal" is geïnstalleerd.

| BOODSCHAP                                | OMSCHRIJVING                                                                                                                                                                                               | REMEDIË                                                                                                                                                                                             |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Foutieve verbinding tussen pomp en controller.                                                                                                                                                             | Controleren of de verbindingkabel tussen pomp en controller aan beide uiteinden goed bevestigd is en geen onderbrekingen vertoont. Bedien twee maal de START-knop om de pomp weer op te starten.    |
| <b>FAULT: OVERTIME SX</b>                | Tijdens de "soft start" van de pomp, heeft de pomp niet binnen 15 minuten de snelheid die voor elke stap is voorzien bereikt (X kan waarde tussen 0 en 9 aannemen en geeft de niet overschreden stap aan). | Controleer of het systeem geen lekkage vertoont. Bedien twee maal de START-knop om de pomp weer op te starten.                                                                                      |
| <b>FAULT: PUMP OVERTEMP.</b>             | De temperatuur van het bovenste pomplager bedraagt meer dan 60 °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 (na startfase) ligt de door de pomp geabsorbeerde stroom hoger dan de geprogrammeerde waarde (1,5 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 2,2 A).                                                                                         | Controleer de verbindingen tussen pomp en controller. Bedien twee maal de START-knop om de pomp weer op te starten.                                                                                 |
| <b>FAULT: R2 DELAY OVER</b>              | De rotatiesnelheid van de pomp is onder de geprogrammeerde drempel-waarde gezakt, de controller staat op OFF en R2 is niet bekrachtigt.                                                                    | Controleer of het systeem geen lekkage vertoont of controleer de laadtoestand van het gas.<br>Sluit op pin <b>b8</b> van connector <b>P17</b> het reset-sigitaal aan om de pomp weer op te starten. |
| <b>OVERVOLTAGE</b>                       | Er is een storing opgetreden in de voedingssectie 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>CONTROLLER FAILURE</b>                | Doorgebrande zekering in secundaire hoofdstroomkring.                                                                                                                                                      | Zich tot Varian voor het onderhoud wenden.                                                                                                                                                          |

## 9 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 70-serien er mikroprocessorstyrede frekvens-omformere, der består af komponenter med fast tilstand. Styreenhederne er udstyrede med selvdiagnose- og selvbeskyttelsesfunktioner.

Styreenhederne kontrollerer pumperne i Turbo-V 70 serien (med en ti-trins-proces) i forbindelse med start. Spænding og strøm reguleres i forhold til pumpens opnåede hastighed.

Styreenhederne omfatter alle midler, der kræves for automatisk drift af pumperne i Turbo-V 70 serien.

En hjælpekontakt forsyner kontrol til fjernstart og -stop af pumpen, signaler om pumpens tilstand, kontrol til start og stop af førvakuumpumpen, blokeringssignaler (til tryk- og vandføringsafbrydere, osv.). De følgende afsnit indeholder al information der behøves, for at garantere operatørens sikkerhed under anvendelsen. 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.*

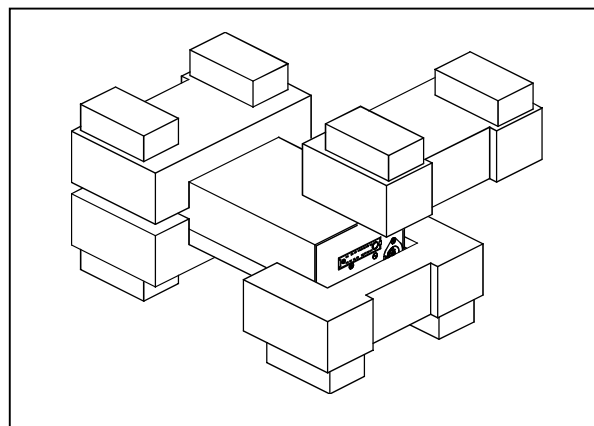
## OPBEVARING

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 969-9506 leveres fra Varian forindstillet til en vis strømforsyning 120 V vekselstrøm.

Hvis strømforsyningen skal ændres, gå således til værks:

- Frakobel strømkablet på styreenhedens bagside.
- Vælg ønskede driftsspænding og sæt modulet og sikringen godt fast igen.
- Kontrollér at den valgte spænding er korrekt. Tilslut P17 strømkablet.

## INSTALLATION



### ADVARSEL!

Tilslutning til elnettet skal udføres efter gældende sikkerhedsbestemmelser. Tilslut altid jordlederen. 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. Frakobel 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. Installer 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 omgivelserforholdene gælder veddrift:

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

### BEMÆRK

Styreenheden model 969-9506 leveres uden kabel til tilslutning af pumpen. Kabel kan bestilles fra Varian som tilbehør. For yderligere information henvises til bilag "Technical Information". Dette kabel skal tilsluttes mellem kontakt J16 på styreenheden og den aktuelle kontakt på pumpen. Kontakterne på kabelenderne er sådanne, at kablet ikke kan tilsluttes forkert.

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". Visse procedurer, der beskrives nedenstående, kan kun udføres på styreenheden model 969-9506, når den er udstyret med tilbehøret "Hand held terminal". Inden styreenheden anvendes, bør samtlige elektriske og pneumatiske tilslutninger udføres. Læs brugsanvisningen før pumpen tilsluttes.

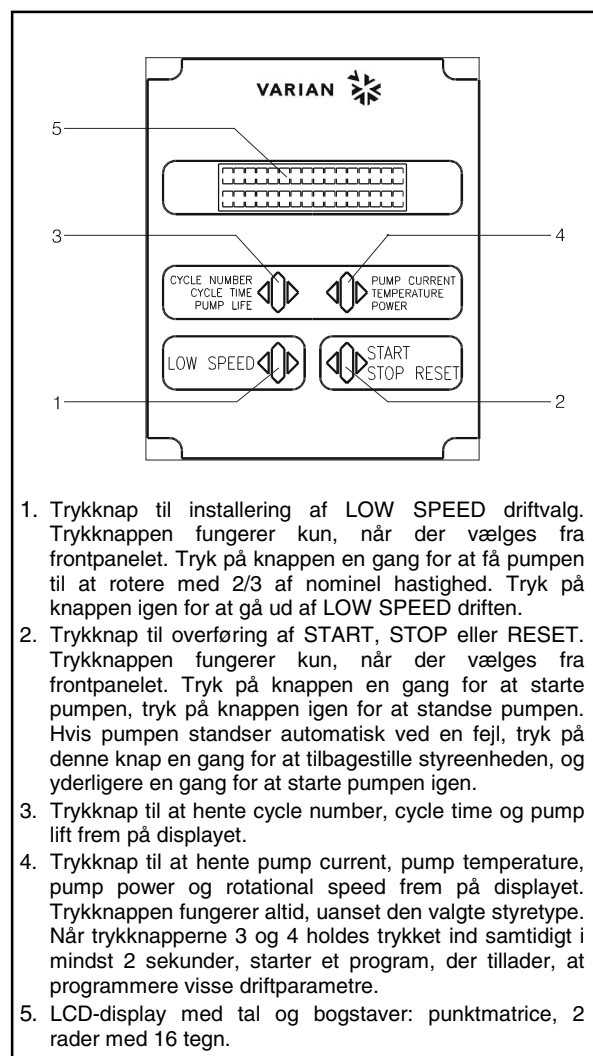


### ADVARSEL!

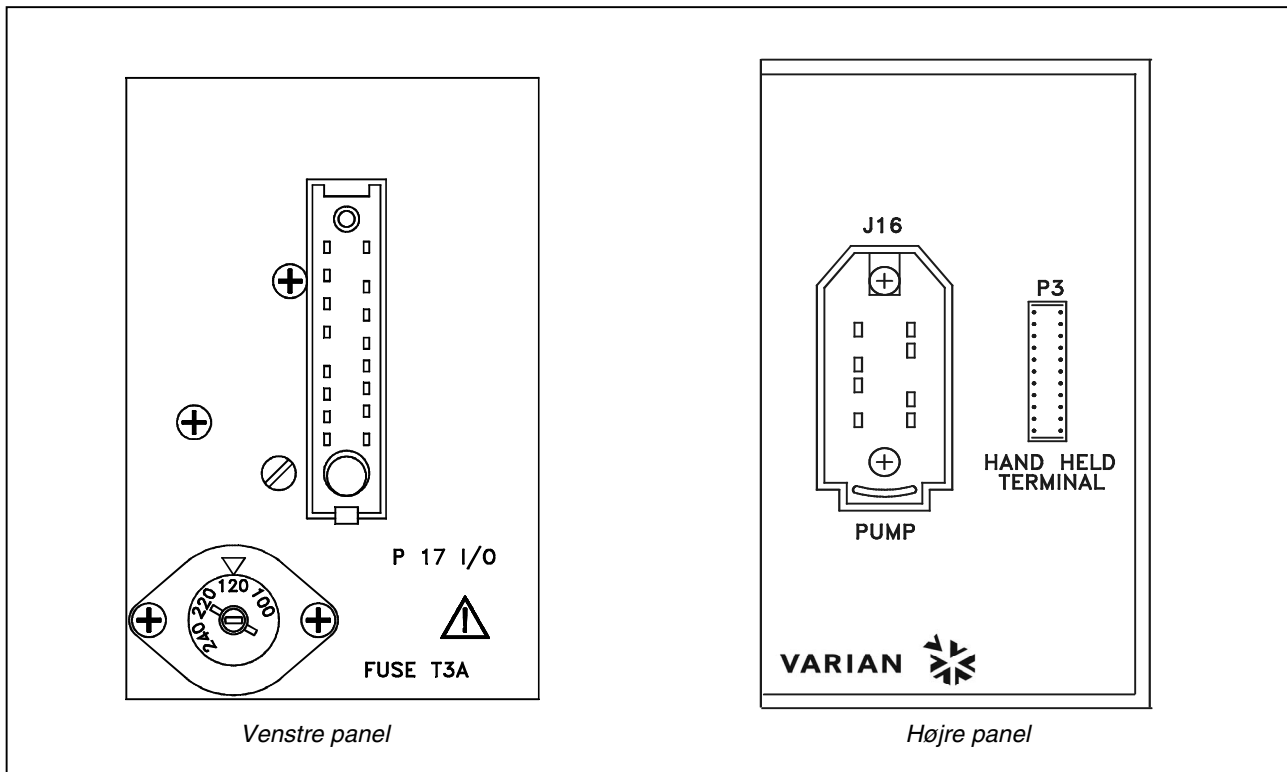
Sørg for, at pumpen står fast, hvis den er installeret på et bord. Dette er for at forebygge skader på apparatet og personer. Start aldrig pumpen, hvis pumpetilløbet ikke er tilsluttet systemet eller er blokeret.

### Kontroller, indikatorer og kontakter på styreenheden

Følgende beskriver manøvrepanelet til hand-held terminalen samt tilslutningspanelerne. For yderligere information henvises til bilag "Technical Information".



Frontpanelet på "Hand-held terminalen"



Venstre og højre panel på Styreenheden 969-9506

## INSTRUKTION

### Start af styreenheden og pumpen

Styreenheden og pumpen startes, ved at føre spænding til P17-kontakten.

### Stop af pumpen

Pumpen standses ved at broforbinde b7-a5 på stikdåsen P17. Pumpen kan endvidere standses ved at trykke på STOP knappen på Hand Held Terminalen, hvis kontrolenheden er indstillet i FRONT funktionen.

## VEDLIGEHOLDELSE

Styreenhederne i Turbo-V 70-serien behøver ikke nogen vedligeholdelse. Ethvert indgreb på pumpen skal foretages af autoriseret personale. 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 listes i følgende tabel. Fejlmeddelelserne vises kun såfremt tilbehøret "Hand Held Terminal" er installeret.

| MEDDELELSE                               | BESKRIVELSE                                                                                                                                                                                     | KONTROL                                                                                                                                                                         |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Tilslutning mellem pumpe og styreenhed er defekt.                                                                                                                                               | Controllér 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>FAULT: OVERTIME SX</b>                | Ved opstart af pumpen med "blød start" har pumpen ikke nået den korrekte hastighed for hvert trin indenfor 15 minutter (X kan gælde 0 til 9 og angiver hvilket trin, der ikke blev gennemført). | Kontrollér om systemet er utæt. Tryk to gange på START, for at starte pumpen igen.                                                                                              |
| <b>FAULT: PUMP OVERTEMP.</b>             | Temperaturen på det øverste leje eller pumpen overskrider 60 °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 overskrider 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 (efter startfasen) forbruger pumpen en større effekt end den programmerede værdi (1,5 A).                                                                                    | Kontrollér om 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 2,2 A).                                                                                        | Kontrollér forbindelserne mellem pumpe og styreenhed. Tryk to gange på START for at starte pumpen igen.                                                                         |
| <b>FAULT: R2 DELAY OVER</b>              | Pumpens rotationshastighed er faldet til under den programmerede tærskelværdi. Styreenheden er OFF og R2 er afmagnetiseret.                                                                     | Kontrollér om systemet lækker, samt forholdene omkring påfyldning af gas. Giv signal om genindstilling til stift <b>b8</b> på <b>P17-</b> kontakten, for at starte pumpen igen. |
| <b>OVERVOLTAGE</b>                       | Der er opstået fejl i styreenhedens fødespænding eller styreenheden har fået et falsk signal.                                                                                                   | Tryk to gange på START-knappen for at starte pumpen igen. Hvis meddelelsen kommer igen tag kontakt med Varian for nødvendig vedligeholdelse.                                    |
| <b>CONTROLLER FAILURE</b>                | Afbrydelse af sikring i sekundært effektkredsløb.                                                                                                                                               | Ret henvendelse til Varian vedrørende vedligeholdelse.                                                                                                                          |

## 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 70-serien är mikroprocessorstyrda frekvensomvandlare som består av komponenter med fast tillstånd. Styrenheterna är försedda med självdiagnos- och självskyddsfunktion. Styrenheterna kontrollerar pumparna i Turbo-V 70 serien (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 70-serien. En hjälpkontakt erbjuder kontroll för fjärrstart och fjärrstopp av pumpen, signaler för pumpens tillstånd, kontroll för start och stopp av förvakuum-pumpen, blockeringsignaler (för tryckvakter, kontrollbrytare för vattenflöde osv). 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.*

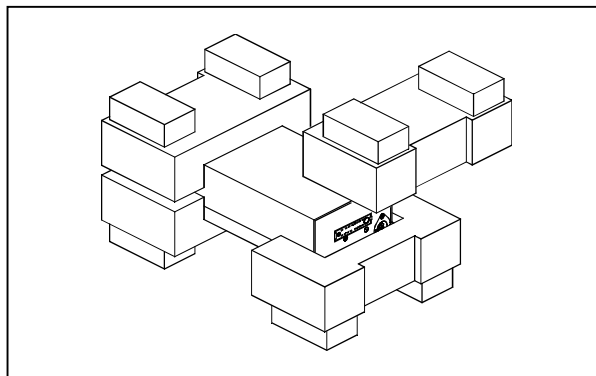
## FÖRVARING

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



*Styrenhetens förpackning*

Styrenheten 969-9506 levereras från Varian med förinställning för en matningsspänning på 120 V växelström.

Om matningsspänningen behöver ändras går du tillväga på följande sätt:

- Frånkoppla strömkabeln från kontakt P17 på styrenheten.
- Välj önskad matningsspänning på den vänstra panelen.
- Kontrollera att den valda matningsspänningen är korrekt. Återanslut strömkabeln till kontakt P17.

## INSTALLATION



### VARNING!

Anslutning till elnätet ska utföras enligt gällande säkerhetsbestämmelser. Anslut alltid jordledaren. 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)

### OBSERVERA

Styrenheten modell 969-9506 levereras utan kabel för anslutning av pumpen. Kabeln kan beställas från Varian som tillbehör. För ytterligare information hänvisas till avsnittet "Accessories and Spare Parts" i bilaga "Technical Information". Denna kabel ska anslutas mellan kontakt J16 på styrenheten och den aktuella kontakten på pumpen. Kontakterna på kabeländarna är sådana, att kabeln inte kan anslutas på fel sätt.

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". Vissa anvisningar som listas nedan kan endast utföras på styrenheten modell 969-9506 när den är utrustad med tillbehöret "Hand held terminal". Innan styrenheten används bör samtliga elektriska och pneumatiska anslutningar utföras. Läs bruksanvisningen för den anslutna pumpen.

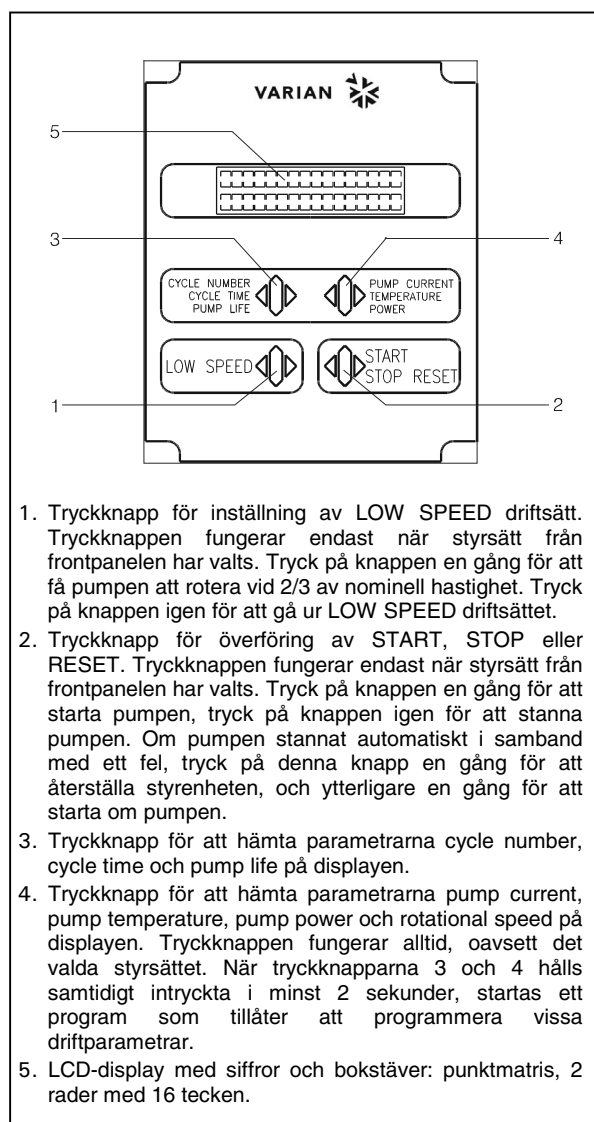


### VARNING!

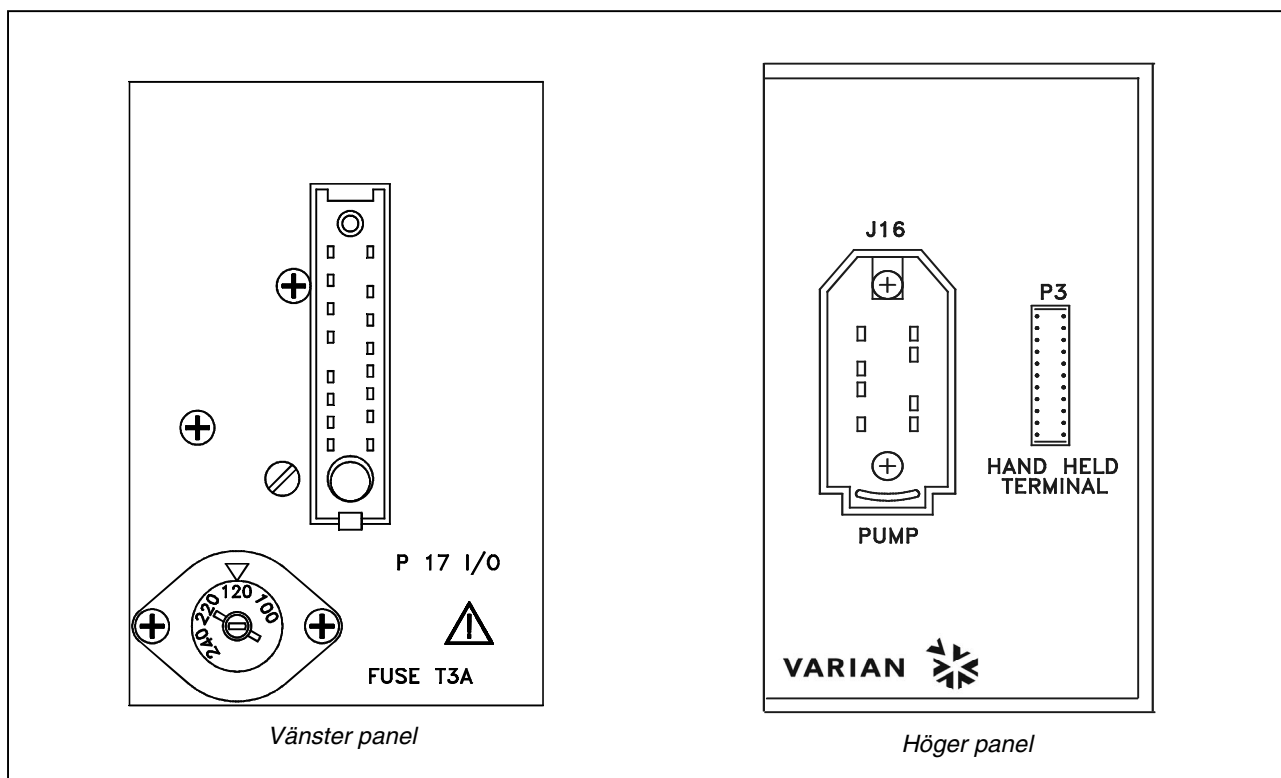
Försäkra dig att pumpen står stadigt, om den är installerad på ett bord, detta för att förebygga skador på apparaten och personer. Sätt aldrig igång pumpen, om intagsflänsen varken är kopplad till systemet eller är blockerad på plats med låsflänsen.

### Kontroller, indikatorer och kontakter på Styrenheten

Nedan beskrivs manöverpanelen för hand-held terminalen samt anslutningspanelerna. För ytterligare information hänvisas till bilaga "Technical Information".



Frontpanelen på "Hand Held Terminalen"



Vänster och höger panel på Styrenheten 969-9506

## INSTRUKTIONER FÖR BRUK

### Start av styrenheten och pumpen

Styrenheten och pumpen startas enkelt genom att ge spänning till kontakt P17.

### Stopp av pumpen

För att stanna pumpen är det nödvändigt att bygla b7-a5 på kopplingsdonet P17, eller trycka på knappen STOP på Hand Held Terminal om styrenheten är konfigurerad i arbetssätt FRONT.

## UNDERHÅLL

Styrenheterna i Turbo-V 70-serien är underhållsfria. Allt servicearbete måste utföras av auktoriserad personal. Om styrenheten havererar, kontakta Varian reparationsverkstad eller Varian utbytesservice, som kan ersätta styrenheten med en renoverad styrenhet.



**WARNING!**

Innan något arbete utförs på styrenheten måste dess strömförsörjning brytas.

Skrotning av pumpen skall ske enligt gällande lagstiftning.

## FELMEDDELANDEN

När vissa fel uppstår visar styrenhetens självdiagnoskrets aktuellt felmeddelande på displayen. De möjliga meddelandena listas i följande tabell. Felmeddelandena visas endast om tillbehöret "Hand Held Terminal" är installerat.

| 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>FAULT: OVERTIME SX</b>                | Vid uppstart av pumpen med "mjukstart" har pumpen inte nått korrekt hastighet för varje steg inom 15 minuter (X kan gälla 0 till 9 och anger vilket steg, som inte genomförts). | Kontrollera om systemet läcker.<br>Tryck två gånger på knappen START för att starta om pumpen.                                                                                    |
| <b>FAULT: PUMP OVERTEMP.</b>             | Temperaturen på det övre lagret eller pumpen överskrider 60 °C.                                                                                                                 | Vänta tills temperaturen sjunker under tröskelvärdet.<br>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.<br>Tryck två gånger på knappen START för att starta om pumpen.                                                              |
| <b>FAULT: TOO HIGH LOAD</b>              | Under normal drift (efter startmomentet) förbrukar pumpen en större effekt än det programmerade värdet (1,5 A).                                                                 | Kontrollera att pumpens rotor kan rotera fritt.<br>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 2,2 A).                                                                                | Kontrollera anslutningarna mellan pump och styrenhet.<br>Tryck två gånger på knappen START för att starta om pumpen.                                                              |
| <b>FAULT: R2 DELAY OVER</b>              | Pumpens rotationshastighet har sjunkit under det programmerade tröskelvärdet. Styrenheten är OFF och R2 är avmagnetiserat.                                                      | Kontrollera om systemet läcker samt förhållandena för påfyllning av gas.<br>Ge återställningssignalen till stift <b>b8</b> på kontakt <b>P17</b> för att starta om pumpen.        |
| <b>OVERVOLTAGE</b>                       | Ett fel i styrenhetens matningsdel har uppstått eller styrenheten har fått en falsk signal.                                                                                     | Tryck två gånger på knappen START för att starta om pumpen.<br>Om meddelandet visas igen, ta kontakt med Varian för nödvändigt underhåll.                                         |
| <b>CONTROLLER FAILURE</b>                | Avbrott i säkring i den sekundära effektkretsen.                                                                                                                                | Kontakta Varian för underhåll.                                                                                                                                                    |

## 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 70 serien er mikro-prosessorstyrte frekvensomvendere, som består av komponenter med fast tilstand. Styreenhetene har funksjoner for selvdiagnose og selvbeskyttelse. Styreenhetene kontrollerer pumpene i Turbo-V 70 serien (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 70 serien. En hjelpekontakt gir muligheter for fjernstyrt start og stopp av pumpen, signaler for pumpens tilstand, kontroller for start og stopp av forvakuum-pumpen, blokkerings signaler (for trykksensorer, kontrollbrytere for vannstrøm osv).

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 tilleggset "Technical Information".

**Denne veiledningen bruker følgende standard-protokoll:**



### **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:

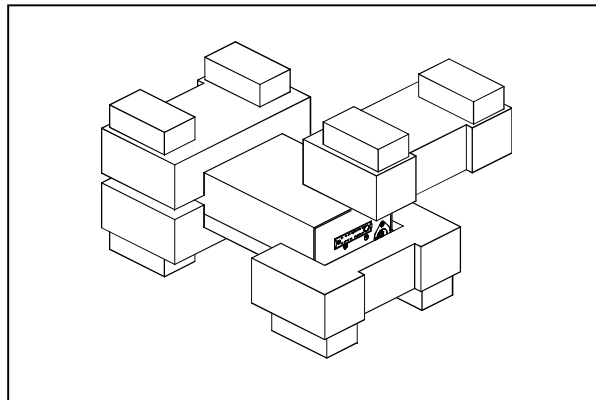
- temperatur: fra 20 °C til +70 °C
- relativ fuktighet: 0 - 95% (uten kondens)

## 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 EUdirektiv 85/399 om miljøbeskyttelse.



*Styreenhetens emballasje*

Styreenheten 969-9506 leveres fra Varian med forhåndsinnstilling for en nettspenning på 120 V vekselstrøm. Gå frem slik dersom innstilt nettspenning må endres:

- Kople fra strømkabelen fra kontakt P17 på styreenheten.
- Velg ønsket matespenning på det venstre panelet.
- Kontroller at den valgte matespenningen er korrekt. Kople strømkabelen tilbake på kontakt P17.

## INSTALLASJON



### ADVARSEL!

Tilkopling til strømmettet skal utføres i henhold til gjeldende sikkerhetsbestemmelser. Jordledningen må alltid tilkoples. 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)

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

### MERK

Styreenheten modell 969-9506 leveres uten kabel for tilkopling av pumpen. Kabelen kan bestilles fra Varian som ekstrautstyr. For ytterligere informasjon vises det til avsnittet "Accessories and Spare Parts" i vedlegget "Technical Information". Denne kabelen skal koples mellom kontakt J16 på styreenheten og den aktuelle kontakten på pumpen. Kontaktene på kabelendene er laget slik at kabelen ikke kan feilkoples.

## BRUK

Dette avsnittet beskriver de viktigste driftsmomentene. For en detaljert beskrivelse samt moment som omfatter tilkoplinger eller ekstrautstyr vises det til avsnittet "Use" i vedlegget "Technical Information". Visse anvisninger som listes nedenfor kan kun gjennomføres på styreenheten modell 969-9506 når den er utstyrt med ekstrautstyret "Hand held terminal". Før styreenheten tas i bruk bør samtlige elektriske og pneumatiske tilkoplinger gjøres. Les brukerveiledningen for pumpen som er tilkopleet.

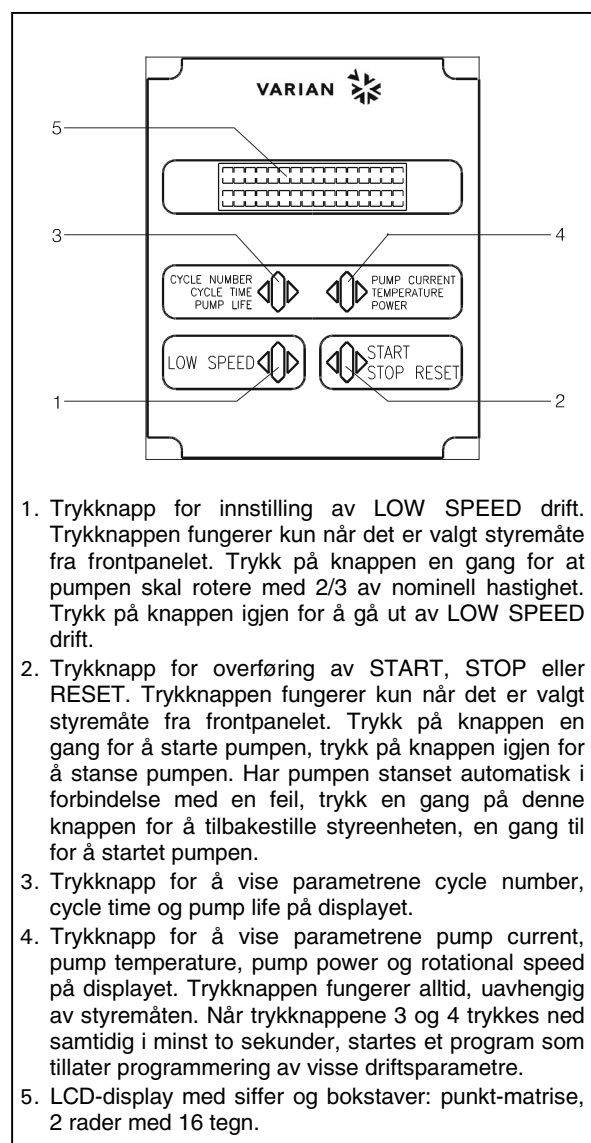


### ADVARSEL!

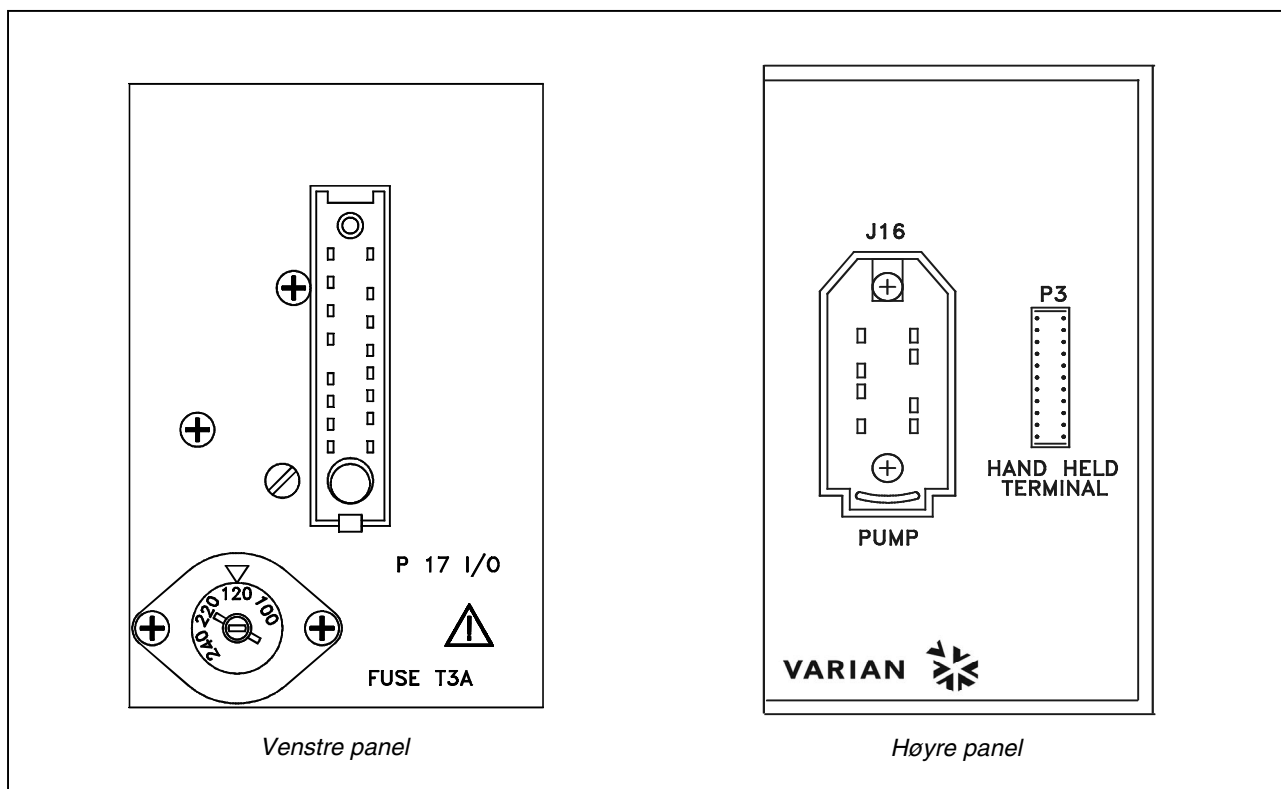
Dersom pumpen er installert på et bord må du kontrollere at pumpen står støtt. Dette er viktig for å forhindre skader på apparatet og på personer. Dersom inngangsflynsen hverken er tilkopleet systemet eller dersom den er blokkert av låseflynsen må pumpen aldri startes opp.

### Kontroller, indikatorer og kontakter på styreenheten

Nedenfor beskrives styrepanelet til "Hand held terminal" samt tilkoplingspanelene. For ytterligere informasjon vises det til vedlegget "Technical Information".



Frontpanelet til "Hand held terminalen"



## INSTRUKSJONER FOR BRUK

### Starte styreenheten og pumpen

Styreenheten og pumpen startes enkelt ved å sette spenning på kontakt P17.

### Stoppe pumpen

Pumpen slås av ved å brokople b7-a5 på kontakten P17 eller ved å trykke på STOP knappen på Hand Held Terminalen hvis styreenheten er konfigurert i FRONT modus.

## VEDLIKEHOLD

Turbo-V 70 seriens 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. Feilmeldingene vises kun dersom ekstrauststyret "Hand Held Terminal" er installert.

| 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>FAULT: OVERTIME SX</b>                | Ved oppstart av pumpen med "mykstart" har pumpen ikke nådd den korrekte hastigheten for hvert trinn i løpet av 15 minutter (X kan gjelde 0 til 9 og angir hvilket trinn som ikke har blitt gjennomført). | Kontroller om systemet lekker. Trykk to ganger på knappen START for å starte pumpen.                                                                                   |
| <b>FAULT: PUMP OVERTEMP.</b>             | Temperaturen på det øvre lageret eller pumpen er over 60 °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 (etter startmomentet) bruker pumpen mer effekt enn den programmerte verdien (1,5 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 2,2 A).                                                                                                                | Kontroller tilkoplingene mellom pumpe og styreenhet. Trykk to ganger på knappen START for å starte pumpen.                                                             |
| <b>FAULT: R2 DELAY OVER</b>              | Pumpens rotasjonshastighet har sunket under den programmerte terskelverdien. Styreenheten er OFF og R2 er avmagnetisert.                                                                                 | Kontroller om systemet lekker samt forholdene for påfylling av gass. Gi tilbakestillingssignalet til stift <b>b8</b> på kontakt <b>P17</b> for å starte pumpen.        |
| <b>OVERVOLTAGE</b>                       | Det har oppstått en feil i styreenhetens matedel, eller så har styreenheten fått et falskt signal.                                                                                                       | Trykk to ganger på knappen START for å starte pumpen igjen. Viser feilmeldingen om igjen, må du ta kontakt med Varian for nødvendig vedlikehold.                       |
| <b>CONTROLLER FAILURE</b>                | Avbrudd i sikringen til det sekundære effekt-krets-løpet.                                                                                                                                                | Kontakt Varian for vedlikehold.                                                                                                                                        |

## 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 70 valvojat ovat mikroprosessorien valvomia kiinteistä materiaaleista tehtyjä taajuudenmuuntimia, jotka kykenevät itsemäärittelyyn ja itsesuojaukseen. Valvojat ajavat Turbo-V 70-sarjan pumppuja (kymmenportaisessa järjestelmässä) käynnistysvaiheessa valvoen jännitettä ja sähkövirtaa suhteessa pumpun saavuttamaan nopeuteen. Ne yhdistävät kaikki sähköpiirit, jotka ovat välttämättömiä Turbo-V 70-sarjan pumpun automaattiselle toiminnalle. Apuliittimiä käyttäen on mahdollista käyttää kauko-ohjattua pumpun käynnistystä ja pysähdystä, signaaleja, jotka ilmaisevat pumpun toimintatilan, esityhjennyspumpun käynnistys- ja pysähdyssäätimiä, veden virtauksen säätelykatkaisijaa jne. Seuraavilla sivuilla on luettavissa tarpeelliset tiedot laitteen käyttäjän turvallisuuden takaamiseksi laitteen käytön aikana. Yksityiskohtaiset tiedot löytyvät liitteestä "Tekniset tiedot".

**Tämä käsikirja 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 tärkeitä tekstistä otettua tietoa.*

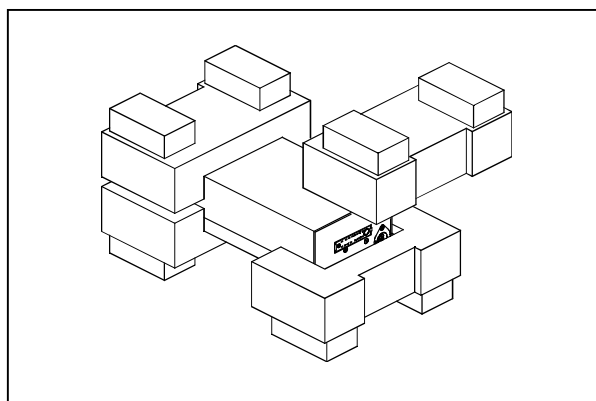
## VARASTOINTI

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 sattuneita vaurioita, ottakaa yhteys paikalliseen myyntitoimistoon. Pakkauksen purkamisen yhteydessä huolehdi, että valvoja eipääse putoamaan ja välttää sen joutumista iskujen kohteeksi. Älkää jättäkö pakkausta ympäristöön. Materiaali voidaan kokonaisuudessaan kierrättää ja se vastaa EY:n 85/399 direktiiviä ympäristön suojelusta.



*Valvojan pakkaus*

Jokainen valvoja 969-9506 on tehtaalla säädetty tietylle sähköjännitteelle 120 vaihtovirta.

Mikäli sähköjännite joudutaan vaihtamaan, seurata seuraavia toimintaohjeita:

- Irroittakaa virtakaapeli valvojan takaosassa olevasta panelista.
- Valitkaa haluttu sähköjännite, jonka jälkeen asettakaa moduuli uudelleen huolellisesti sille tarkoitettuun tilaan.
- Tarkistakaa, että valittu jännite on oikea ja kytkekää P17 virtakaapeli uudelleen.

## ASENNUS

**VAARA!**

Sähköliitännät tulee suorittaa noudattaen voimassa olevia lakeja. Kytkeää aina maadoitusjohto ja asettakaa pistoke sellaisen pistorasiaan, jossa on riittävä maadoituskytkentä. Täten vältetään sähköiskuilta. Valvojan sisällä syntyy korkeajännitettä, joka voi aiheuttaa vakavia vammoja tai jopa kuoleman. Ennen minkätahansa valvojan huolto- tai asennustoimenpiteen suorittamista, irroittakaa 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 alttiiksi ympäristötekijöille (sade, jää, lumi), pölylle, syövyttävälle kaasulle, räjähdysalltiissa ympäristössä tai tiloissa, joissa paloriski on suuri.

Toiminnan aikana tulee noudattaa seuraavia ympäristönoloja koskevia sääntöjä:

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

Valvojaa kytkettäessä sille tarkoitettuun pumppuun käyttäkää valvojalle tarkoitettua erityiskaapelia.

**HUOM**

Valvojamalli 969-9506 toimitetaan ilman pumpun liittoskaapelia ja se voidaan pyytää lisävarusteena Varianilta. Lähempiä lisätietoja löydätte "Lisävarusteet ja varaosat"-kappaleesta, joka on sijoitettu "Tekniset Tiedot"-kappaleen yhteyteen. Liittoskaapeli kiinnitetään toisesta päästään valvojan kytkimeen J16 ja toisesta päästään pumpun sitä vastaavaan kytkimeen. Liittoskaapelin päät ovat muodoltaan sellaisia, että kaapelia ei ole mahdollista kytkeä virheellisesti.

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

## KÄYTTÖ

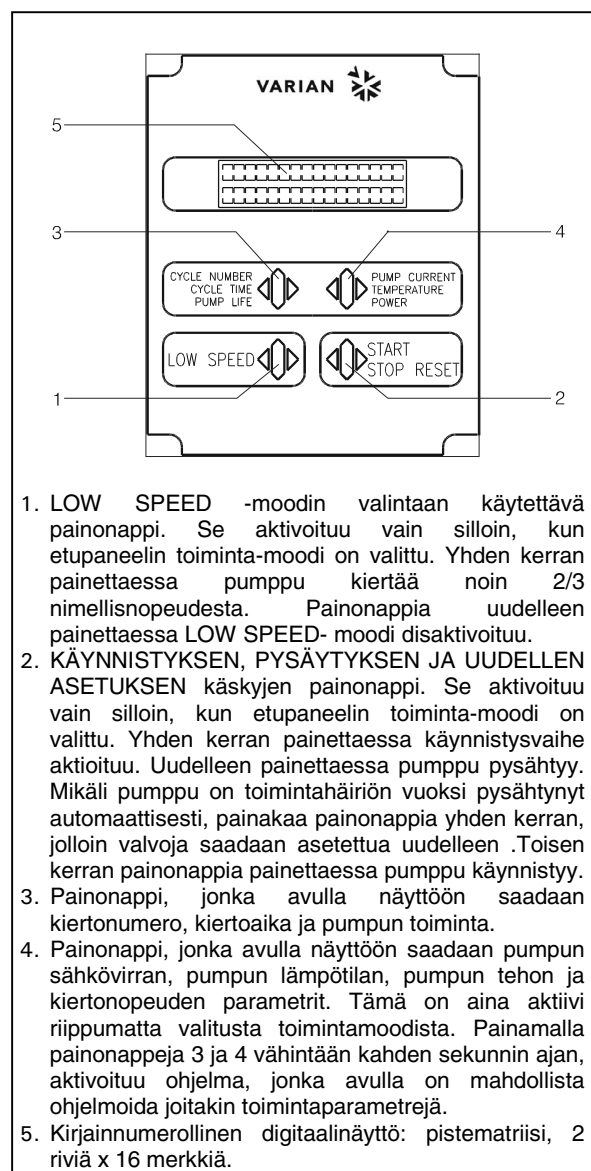
Tähän kappaleeseen on kirjattu tärkeimmät käyttötoimenpiteet. Tarkempia lisätietoja sekä kytkentöjä, että valinnaisia lisälaitteita koskevien toimenpiteiden suorittamista käsittäviä tietoja löydätte kappaleesta "Käyttö", joka on "Tekniset tiedot"-kappaleen liitteenä. Jotkin seuraavista ohjeista ovat mahdollisia valvojamallille 969-9506 vain mikäli se on kytkettynä "Käsin Pidettävä Pääte"-lisälaitteeseen. Ennen valvojan käyttöä suorittaakaa kaikki sähkökytkennät seuraten kytkettävän pumpun käyttöohjeita.

**VAARA!**

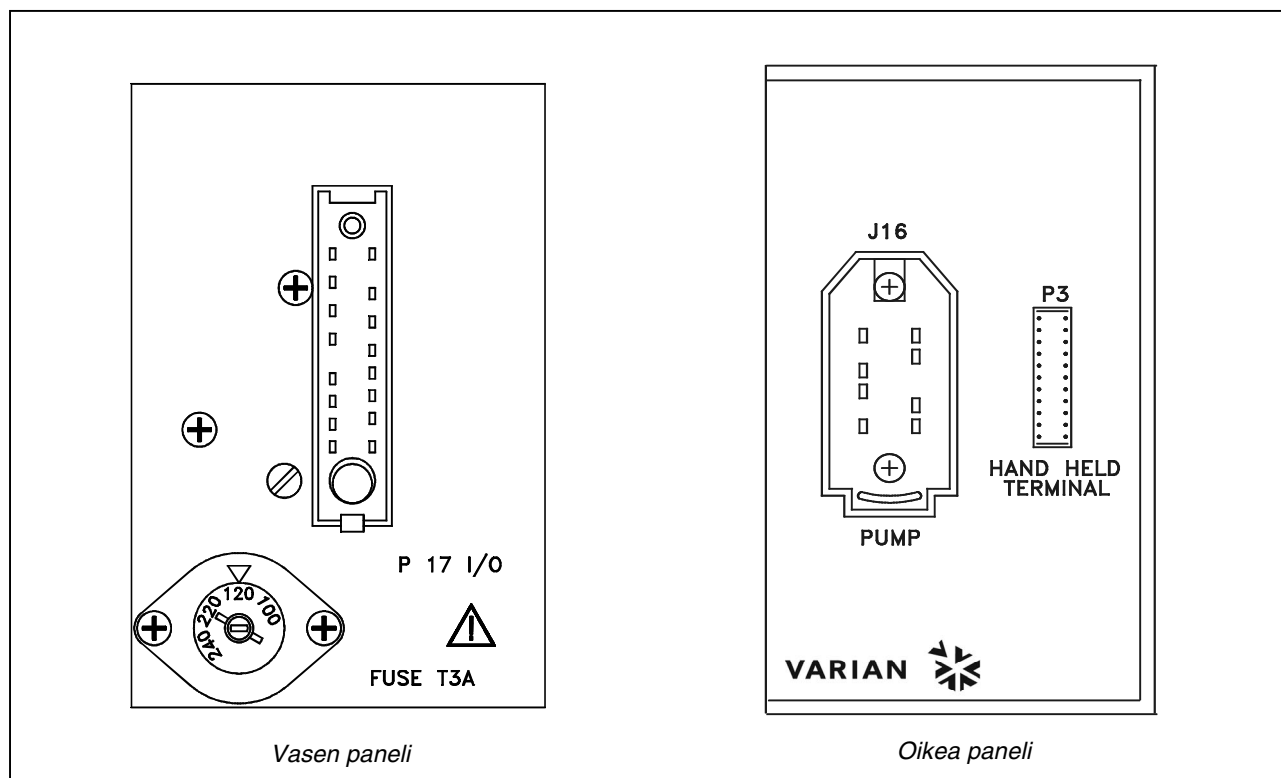
Mikäli pumppu on asetettu pöydälle, varmistakaa että se on vakaa. Näin vältetään vammoilta ihmisille sekä itse koneelle. Älkää myöskään käytäkö pumppua, mikäli sisään tulon laippaa ei ole kytketty järjestelmään tai mikäli sitä ei ole suljettu laippasulkijalla.

**Valvojan säätimet, osoittimet ja liittimet**

Seuraavassa on esitelty käsin pidettävän pääteen valvontapaneli ja yhdyspanelit. Tarkempia tietoja saatte kappaleesta "Tekniset tiedot".



Käsin Pidettävän Pääteen etupaneli



Valvojan 969-9506 vasen ja oikea paneli

## KÄYTTÖTOIMENPITEET

### Valvojan päälle pano ja pumpun käynnistys

Valvojan päälle panemiseksi ja pumpun käynnistämiseksi riittää sähköjännitteen kytkeminen kytkimeen P17.

### Pumpun pysäyttäminen

Pumpun pysäyttämiseksi b7 on kytkettävä hyppyjohtimella a5 kanssa, joka on sijoitettu kytkentäliittimelle P17 tai painettava Hand Held Terminalin STOP-painiketta, mikäli valvoja on konfiguroitu FRONT-tavalla.

## HUOLTO

Turbo-V 70-sarjan valvojat eivät kaipa minkäänlaista huoltoa. Mahdolliset valvojaan tehtävät toimenpiteet tulee jättää aina valtuutetun henkilön tehtäviksi. Toimintahäiriön sattuessa on mahdollista käyttää Varianin korjauspalvelua tai "Varian advance exchange service"-palvelua, jolloin on mahdollista vaihtaa rikkiöntunut valvoja ladattuun valvojaan.



**VAARA!**

Ennen minkätahansa valvojaan tehtävän toimenpiteen suorittamista irroittakaa sähkökaapeli pistorasiasta.

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

## VIANETSINTÄ

Joidenkin toimintahäiriöiden yhteydessä valvojan itsemäärittelypiiri analysoi virheen, joka näkyy viesteinä, jotka on kuvailtu seuraavassa taulukossa. Virheviestit näkyvät vain silloin, kun valinnainen "käsin pidettävä pääte" on asennettu.

| VIESTI                                   | VIKA                                                                                                                                                                                                                          | KORJAUSTOIMENPITEET                                                                                                                                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Toimintahäiriö pumpun ja valvojan liitännässä.                                                                                                                                                                                | Tarkistakaa että pumpun ja valvojan välinen yhteyskaapeli on hyvin kiinnitetty päistään eikä sen varrella ole esteitä. Painakaa kaksi kertaa painonappia START jolloin pumppu käynnistyy.                         |
| <b>FAULT: OVERTIME SX</b>                | "Soft Start" moodissa tapahtuvan pumpun käynnistyksen aikana pumppu ei ole saavuttanut sille joka askeleella tarkoitettua nopeutta 15 minuutin sisällä. (X on askelnumero 09 ja ilmaisee sen askeleen, jota ei ole ylitetty). | Tarkistakaa, että järjestelmässä ei ole vuotoja. Painakaa painonappia START kaksi kertaa, jolloin pumppu käynnistyy.                                                                                              |
| <b>FAULT: PUMP OVERTEMP.</b>             | Ylemmän laakerin tai pumpun lämpötila on ylittänyt 60 °C.                                                                                                                                                                     | Odottakaa että lämpötila putoaa kynnysarvon alapuolelle. Painakaa painonappia START kaksi kertaa jolloin pumppu käynnistyy.                                                                                       |
| <b>FAULT: CONTROLLER OVERTEMPERATURE</b> | Valvojan muuntajan lämpötila on ylittänyt 90 °C.                                                                                                                                                                              | Odottakaa, että lämpötila putoaa kynnysarvon alapuolelle. Painakaa painonappia START kaksi kertaa jolloin pumppu käynnistyy.                                                                                      |
| <b>FAULT: TOO HIGH LOAD</b>              | Normaalityöskentelyn aikana (käynnistyksen jälkeen) pumpun absorboima sähkövirta on korkeampi kuin sille on ohjelmoitu (1,5 A).                                                                                               | Tarkistakaa, että pumpun roottori pyörii vapaasti. Painakaa painonappia START kaksi kertaa jolloin pumppu käynnistyy.                                                                                             |
| <b>FAULT: SHORT CIRCUIT</b>              | Normaalityöskentelyn aikana (käynnistyksen jälkeen) poistoliitin on oikosulussa (poistuva virta suurempi kuin 2,2 A).                                                                                                         | Tarkistakaa pumpun ja valvojan välinen liitos. Painakaa painonappia START kaksi kertaa jolloin pumppu käynnistyy.                                                                                                 |
| <b>FAULT: R2 DELAY OVER</b>              | Pumpun pyörimisnopeus on laskenut alle ohjelmoitujen kynnysarvojen. Valvoja on OFF (sammunut) ja R2 ei ole toiminnassa.                                                                                                       | Tarkistakaa, että järjestelmässä ei ole mahdollisesti vuotoja tai tarkastakaa kaasun kuormituksen tila.<br>Kytkekää kytkimen <b>P17</b> neula <b>b8</b> uudelleen asetuksen signaaliin jolloin pumppu käynnistyy. |
| <b>OVERVOLTAGE</b>                       | Valvojan sähkövirran syötössä on ilmennyt ongelma tai valvojan saama signaali on väärä.                                                                                                                                       | Painakaa painonappia START kaksi kertaa, jolloin pumppu käynnistyy. Mikäli viesti näkyy uudelleen kääntykää Varian huoltopalvelun puoleen.                                                                        |
| <b>CONTROLLER FAILURE</b>                | Sulake palanut toisiovirtapiirissä.                                                                                                                                                                                           | Ota yhteys Variiniin huoltoa varten.                                                                                                                                                                              |

## 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, αυθαίρετες επεμβάσεις ή χρήση που δεν συμφωνεί με τις ειδικές εθνικές διατάξεις.

Οι ρυθμιστές της σειράς **Turbo-V 70** είναι ένας μετατροπέας συχνότητας, ελεγχόμενος από έναν μικροεπεξεργαστή. Είναι κατασκευασμένοι με εξαρτήματα σε στερεά κατάσταση και έχουν αυτοδιαγνωστική και αυτοπροστατευτική ικανότητα.

Ο ρυθμιστής ενσωματώνει όλα τα αναγκαία κυκλώματα για την αυτόματη λειτουργία των αντλιών της σειράς **Turbo-V 70**.

Ο ρυθμιστής οδηγεί τις αντλίες της σειράς **Turbo-V 70** 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.

Με τη βοήθεια βοηθητικών βυσμάτων είναι διαθέσιμοι όλοι οι χειρισμοί για την εκκίνηση και το σταμάτημα της αντλίας εξ αποστάσεως, τα σήματα που δείχνουν την κατάσταση λειτουργίας της αντλίας, οι χειρισμοί εκκίνησης και σταματήματος της αντλίας προκειμένου, τα σήματα μπλοκαρίσματος (για διακόπτες πίεσης, διακόπτες ελέγχου της ροής του νερού, κλπ.).

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.

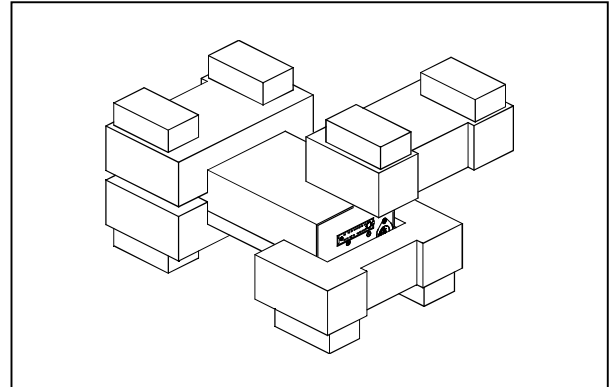
**ΑΠΟΘΗΚΕΥΣΗ**

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

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

**ΠΡΟΕΤΟΙΜΑΣΙΑ ΓΙΑ ΤΗΝ ΕΓΚΑΤΑΣΤΑΣΗ**

Ο ρυθμιστής είναι εξοπλισμένο με μια ευρὺχωρη προστατευτική συσκευασία. Αν υπάρχουν ενδείξεις βλάβης που θα μπορούσαν να χουν προκληθεί κατ' τη διάρκεια τῆ μεταφορῶ, συμβουλευτετε το τοπικὸ τμήμα πωλῶσεων. Κατ' τη διάρκεια του ανογκματὸ τῆ συσκευασῶ, δῶτε ιδιαιτερε προσοχῶ, τῶς ὅστε να μην πσει και να μην χτυπηθε ο ρυθμιστῶ. Μην εγκαταλεπετε τη συσκευασα στο περιβλλον. Το υλικὸ ανακυκλνεται πλῶρ και ανταποκρνεται στην Οδηγὰ τῆ **CEE 85/399** για την διαφῶλαξη του περιβλλοντῶ.



Συσκευασία του ρυθμιστή

Ο ρυθμιστῶ, μοντλο **969-9506** βγαινει ἀφ' την ἄριαν με τση τροφοδοσῶ 120 Vac .

Σε περπτωση που χρειζεται αλλαγῶ, τῆ τση τροφοδοσῶ ακολουθηστε την παρακτω διαδικασια:

- Αποσυνδστε το καλδιο ἀφ' τον συνδετ,ρα **P17** του Ρυθμιστῶ.
- Επιλξτε την επιθυμητῶ, τση τροφοδοσῶ στον αριστερὸ πνακα.
- Ελγξτε αν χει επιλεγε η σωστῶ, τση και επανασυνδστε το καλδιο στον συνδετ,ρα **P17**.

## ΕΓΚΑΤΑΣΤΑΣΗ



## ΚΙΝΔΥΝΟΣ

Η σύνδεση στο ηλεκτρικό δίκτυο θα πρέπει να γίνεται σύμφωνα με το ισχυοντέ-μολ επ του θματό. Συνδστε πντα τη γέωση και χρησιμοποιστε πρζα εφοδιασμένη με γέωση τσι όστε να αποφευγονται ηλεκτρικά εκκείσει. Στο εσωτερικ του ρυθμιστ, αναπτυσσονται υψηλ τσει που μπορούν να προκαλουν σοβαρού τραυματισμού , και το θνατο. Πριν εκτελσετε οποιαδποτε εργασα εγκατστασή , συντρησή του ρυθμιστ, αποσυνδστε τον αφ την πριζα τροφοδοσά.

## ΣΗΜΕΙΩΣΗ

Ο ρυθμιστ, μπουε να τοποθετηθε επνω σε να τραπζι , στο εσωτερικ μιά κατλληλή θική. Σε οποιαδποτε περπτωση εινα αναγκαο ο αρά να κυκλοφορε еле ύθερα στο εσωτερικ τή συσκευ. Μην τοποθετετε και, χρησιμοποιετε τον ρυθμιστ, σε περιβλλοντα που εινα εκτεθειμενα στί καιρικ συνθικέ (βροχ, πγό, χνι, σκινέ, αρια, σε περιβλλοντα —που υπρχει κινδυνό κρηξή , πυρκαγι).

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

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

Για τη σύνδεση του ρυθμιστ, με την αντλα χρησιμοποιστε το αντιστοιχο καλδιο του ρυθμιστ,

## ΣΗΜΕΙΩΣΗ

Ο ρυθμιστ, μοντλο 969-9506 προμηθεεται χωρ καλδιο σιδεσή με την αντλα. Το καλδιο μπουε να ζήτηθε αφ τη άριαν ώ αξεσουρ. Για περισσότερέ λεπτομερέ συμβουλευτετε την παργραφο Αξεσουρ και ανταλλακτικ του Παραρτματο Τεχνικ Πληροφορέ Συνδστε αφ τη μα πλευρα στο συνδετ,ρα J16 του ρυθμιστ, και αφ την λλη στον ειδικ ρυθμιστ, τή αντλά. Οι συνδετ,ρέ που υπρχουν στί δμο, κρέ του καλωδου χουν ττωο σχμα που δεν επιτρηει τη λαθασμένη τοποθτη, τοι.

Για τί,λλε συνδσει και για την εγκατσταση των επιπλων εξαρτημτων, βλπε "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 "Χρήση" του "Technical Information". Μερικές από τις αναφερόμενες στη συνέχεια πληροφορίες μπορούν να εφαρμοστούν και στον ρυθμιστή μόνον αν αυτός είναι συνδεδεμένος με το εξάρτημα "Hand Held Terminal". Πριν χρησιμοποιήσετε τον ρυθμιστή κάντε όλες τις ηλεκτρικές και πνευματικές συνδέσεις βάσει του εγχειριδίου της αντλίας σίδεσης.



## ΚΙΝΔΥΝΟΣ

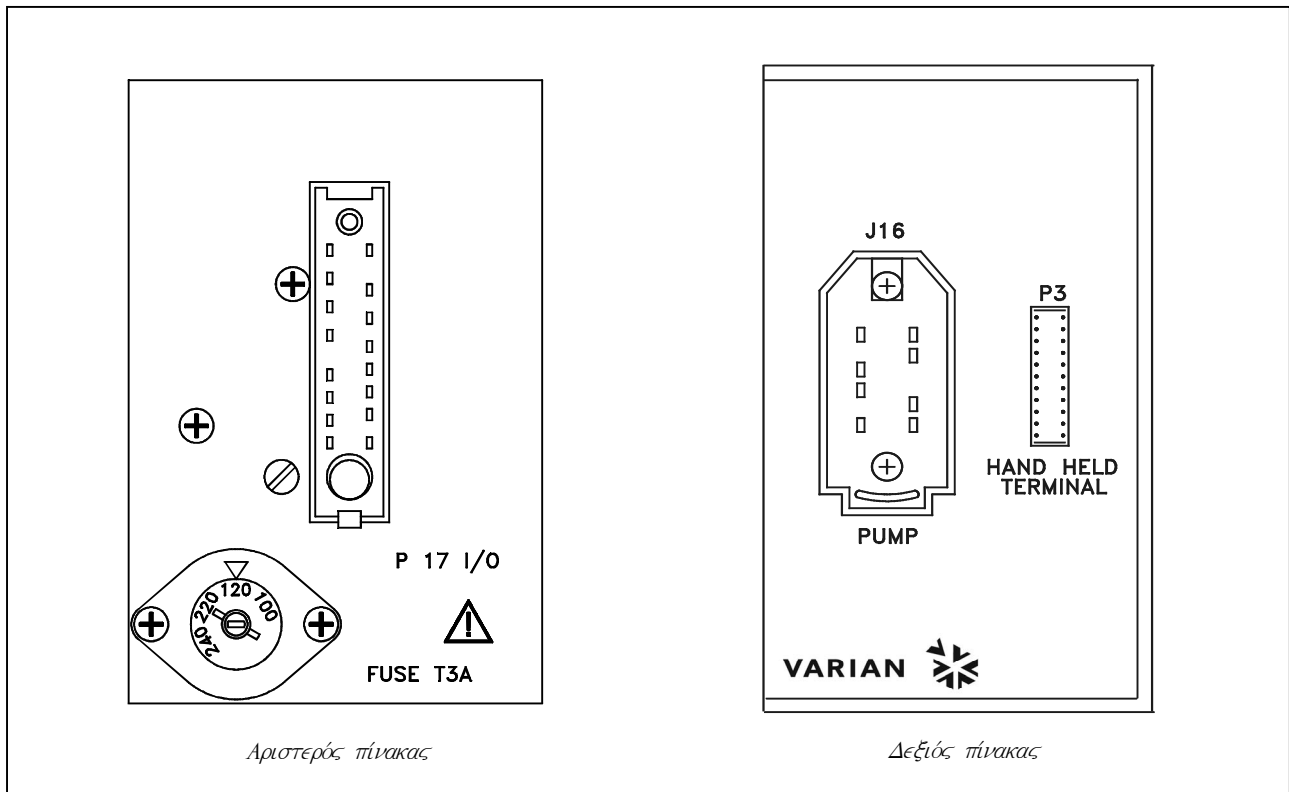
Για να αποφευγετε βλβέ σε τομα , στη συσκευ,—ταν η αντλα εινα τοποθετημένη σε να τραπζι σιγουρευτετε—τι εινα καλ σταθεροποιημένη. Μην θετετε σε λειτουργια την αντλα αν η φλντζα εισδου δεν εινα συνδεδεμένη στο σστημα , αν δεν εινα κλειστ, με την φλντζα κλεισματό.

## Χειριστ,ρια, ενδεξει και συνδετ,ρέ του Ρυθμιστ,

Στη συνέχεια παρουσιζεται ο πνακά ελγχου του hand held τερμιναλ και οι πνακέ διασυνδσει. Περισθετερέ λεπτομερέ παρχονται στον τομα "Technical Information".



Εμπρόσθιος πίνακας του Hand Held Terminal



Δεξιός και αριστερός πίνακας του Ρυθμιστή 969-9506

**ΔΙΑΔΙΚΑΣΙΕΣ ΣΧΕΤΙΚΑ ΜΕ ΤΗ ΧΡΗΣΗ****Αναμμα του Ρυθμιστή, και εκκίνηση τής αντλίας**

Για να ανψει ο ρυθμιστής, και να τεθε σε κίνηση η αντλία είναι αρκετό να εφαρμόσετε την τση τροφοδοσία στον συνδετήρα .

**Σταμάτημα της αντλίας**

Για να σταματήσετε την αντλία χρειάζεται να γεφυρώσετε **B7-B5** στο βύσμα ή άλλως να πιάσετε το κουμπί **STOP** του **Hand Held Terminal** εάν ο χοντρολερ έχει συντονιστεί σε **FRONT Mode**.

**ΣΥΝΤΗΡΗΣΗ**

Οι ρυθμιστές της σειράς **Turbo-V 70** δεν απαιτούν καμία συντήρηση. Οποιαδήποτε επέμβαση θα πρέπει να πραγματοποιηθεί από εγκεκριμένο προσωπικό.

Σε περίπτωση βλάβης μπορείτε να χρησιμοποιήσετε την υπηρεσία επισκευών της **Varian**, το "**Varian** αδανχέ εχχανγε σέριχες", που σά δίνει τη δυνατότητα να χετε να καθαρίσετε ρυθμιστή, σε αντικατάσταση του χαλασμένου.

**ΚΙΝΔΥΝΟΣ**

Πριν από οποιαδήποτε επέμβαση στον ρυθμιστή αποσυνδέστε το καλώδιο τροφοδοσίας.

Αν πρέπει να καταστραφεί ο ρυθμιστής ακολουθήστε τη διαδικασία που προβλέπεται από τους ειδικούς εθνικούς κανονισμούς.

## ΜΥΝΗΜΑΤΑ ΛΑΘΟΥΣ

Πριν κινείτε οποιαδήποτε επμβαση στον Ρυθμιστ, αποσυνδστε το καλδίο τροφοδοσά.  
Για την καταστροφ, του ρυθμιστ, ακολουθστε —τι αναφρετε στού εθνικου κανονισμού.

| ΜΗΝΥΜΑ                                   | ΠΕΡΙΓΡΑΦΗ                                                                                                                                                                                                                    | ΔΙΟΡΘΩΣΗ                                                                                                                                                                                                                |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Κακή λειτουργία στη σύνδεση αντλίας και ρυθμιστή.                                                                                                                                                                            | Ελέγχετε αν το καλώδιο σύνδεσης μεταξύ αντλίας και ρυθμιστή είναι καλά σταθεροποιημένο και στα δύο άκρα και ότι δεν υπάρχει διακοπή. Πατήστε δύο φορές το μπουτόν <b>START</b> για να θέσετε ξανά σε κίνηση την Αντλία. |
| <b>FAULT: OVERTIME SX</b>                | Κατά τη διάρκεια εκκίνησης της αντλίας με το "soft start", η αντλία δεν έφτασε στην προβλεπόμενη ταχύτητα για κάθε στάδιο μέσα σε 15 λεπτά. (Το X μπορεί να είναι από 0 ως 9 και δείχνει το στάδιο που δεν έχει ξεπεραστεί). | Ελέγχετε έτσι ώστε το σύστημα να μην παρουσιάζει διαρροές.<br>Πατήστε δύο φορές το μπουτόν <b>START</b> για να θέσετε ξανά σε κίνηση την Αντλία.                                                                        |
| <b>FAULT: PUMP OVERTEMP.</b>             | Η θερμοκρασία του άνω κουζινέτου της αντλίας χεπέρασε τους 60 °C.                                                                                                                                                            | Περιμένετε ώσπου η θερμοκρασία να κατεβεί κάτω από το ανώτατο επιτρεπτό σημείο.<br>Πατήστε δύο φορές το μπουτόν <b>START</b> για να θέσετε ξανά σε κίνηση την Αντλία.                                                   |
| <b>FAULT: CONTROLLER OVERTEMPERATURE</b> | Η θερμοκρασία του μετασχηματιστή χεπέρασε τους 90 °C.                                                                                                                                                                        | Περιμένετε ώσπου η θερμοκρασία να κατεβεί κάτω από το ανώτατο επιτρεπτό σημείο.<br>Πατήστε δύο φορές το μπουτόν <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. (1,5 A).                                                                               | Ελέγχετε αν ο ρότορας της αντλίας μπορεί να περιστραφεί ελεύθερα.<br>Πατήστε δύο φορές το μπουτόν <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 2,2 A).                                                                                               | Ελέγχετε τις συνδέσεις μεταξύ αντλίας και ρυθμιστή.<br>Πατήστε δύο φορές το μπουτόν <b>START</b> για να θέσετε ξανά σε κίνηση την Αντλία.                                                                               |
| <b>FAULT: R2 DELAY OVER</b>              | Η ταχυτητα περιστροφ, τή αντλά πεσε κτω απ το προκαθορισμένο—ριο, ο ρυθμιστ, είναι στη θέση ΟΦΦ και ο Ρ2 δεν είναι απενεργοποιημένο.                                                                                         | Ελγξτε 'στε να μην υπρхουν διαρρδ στο συστημα , ελγξτε την κατσταση φρτωσή αερου.<br>Εφαρμστε στο πιν <b>b8</b> του συνδετ,ρα <b>P17</b> το σμα επαναρυθμισή για να θσете ξαγ σε κνηση την αντλία.                      |
| <b>OVERVOLTAGE</b>                       | Παρουσιάστηκε βλάβη στον τομέα τροφοδοσίας του ρυθμιστή ή ο ρυθμιστής δέχθηκε ένα λανθασμένο σήμα.                                                                                                                           | Πατήστε δύο φορές το μπουτόν <b>START</b> για να θέσετε ξανά σε κίνηση την αντλία.<br>Αν ξαναπαρουσιαστεί το μήνυμα απευθυνθείτε στην <b>Varian</b> για συντήρηση.                                                      |
| <b>CONTROLLER FAILURE</b>                | Διακοπή ασφάλειας στο δευτερεύον ισχύος.                                                                                                                                                                                     | Απευθυνθείτε στη <b>Varian</b> για τη συντήρηση.                                                                                                                                                                        |

## GENERAL INFORMATION

This equipment is destined for use by professionals. The user should read this instruction manual and any other additional information supplied by Varian before operating the equipment. Varian will not be held responsible for any events occurring due to non-compliance, even partial, with these instructions, improper use by untrained persons, non-authorized interference with the equipment or any action contrary to that provided for by specific national standards. The Turbo-V 70 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 70 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 70 pump series. Remote start/stop, pump status signals, forepump start/stop, interlock control (for pressure switch, water flow switch, etc.) capability, 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 standard protocol:**



### **WARNING!**

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



### **CAUTION!**

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

### **NOTE**

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

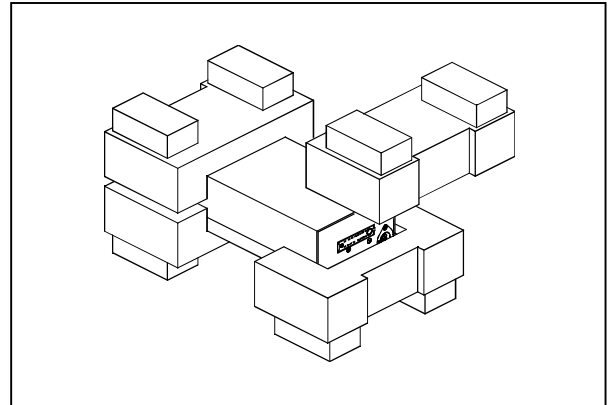
## STORAGE

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

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

## PREPARATION FOR INSTALLATION

The controller is supplied in a special protective packing. If this shows signs of damage which may have occurred during transport, contact your local sales office. When unpacking 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.



*Controller Packing*

The controller model 969-9506 is factory set for a power supply: of 120 Vac.

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

- Disconnect the power cord from the controller P17 connector.
- Select the operating voltage on the left panel.
- Check voltage selector for correct set and connect power cord to P17 connector.

## INSTALLATION



### WARNING!

Connection to the mains must be made in accordance with the local law. Always connect the ground wire and use 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% (without condensation).

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

### NOTE

The controller model 969-9506 is not equipped with the pump cable. It can be requested as an accessory; detailed information is supplied in the paragraph "Accessories and Spare Parts" of the appendix "Technical Information". It must be connected between the controller connector J16 and the pump connector. The two connectors at the two cable extremity cannot be connected in a wrong way.

## USE

This paragraph describes the fundamental operating procedures. Detailed information and operating procedures that involve optional connections or options are supplied in the paragraph "USE" of the appendix "Technical Information". Some procedures can be executed with controller model 969-9506 only when the accessory "Hand held terminal" is available. Make all vacuum manifold and electrical connections and refer to Turbo-V pump instruction manual prior to operating the Turbo-V controller.

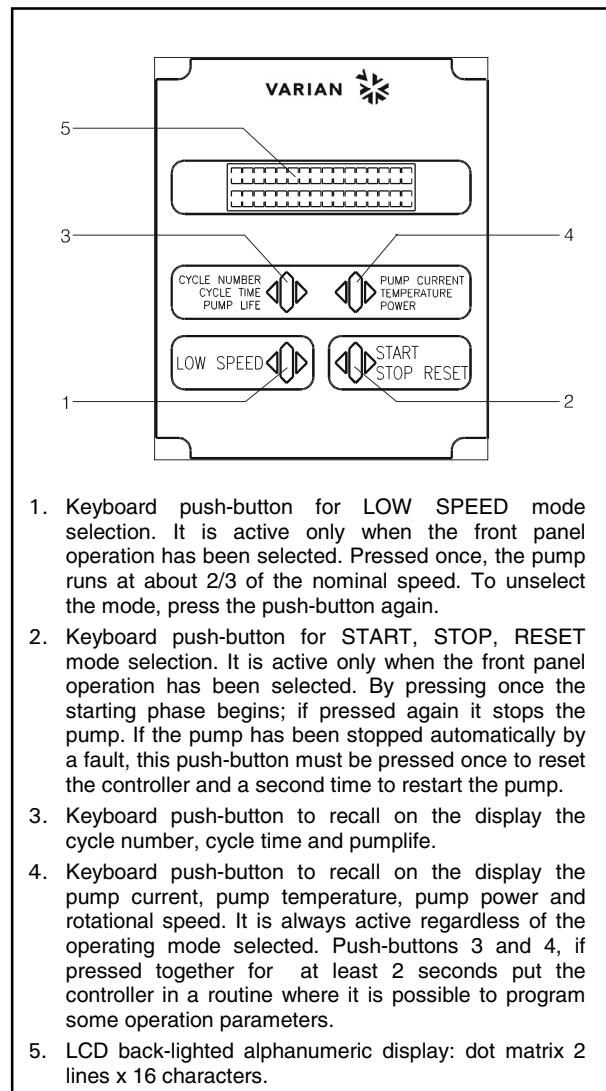


### WARNING!

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 pump if the pump inlet is not connected to the system or blanked off.

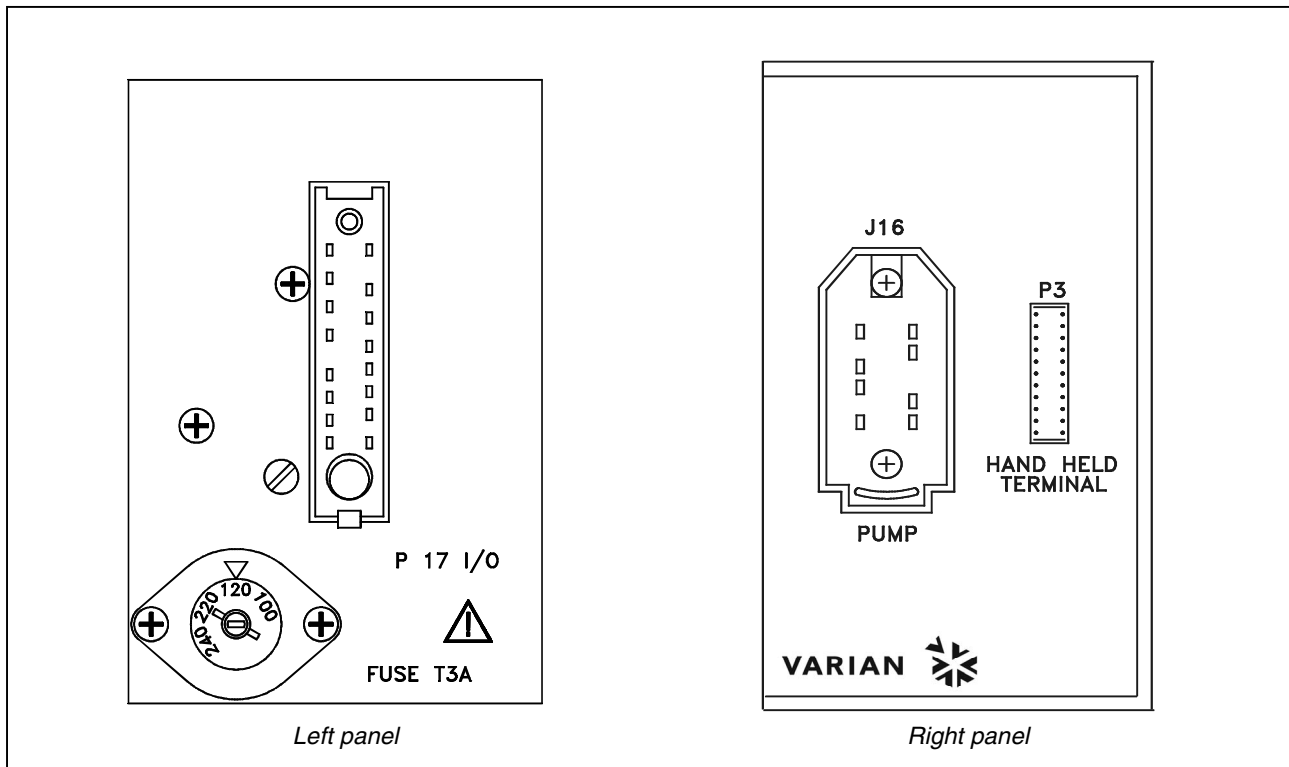
### Controller controls, indicators and connectors

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



1. Keyboard push-button for LOW SPEED mode selection. It is active only when the front panel operation has been selected. Pressed once, the pump runs at about 2/3 of the nominal speed. To unselect the mode, press the push-button again.
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 recall on the display the cycle number, cycle time and pump life.
4. Keyboard push-button to recall on the display the pump current, pump temperature, pump power and rotational speed. 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 program some operation parameters.
5. LCD back-lighted alphanumeric display: dot matrix 2 lines x 16 characters.

Hand Held Terminal Control Panel



Right and left panels of controller 969-9506

## USE PROCEDURE

### Controller and Pump Startup

To startup the controller and the pump apply mains to P17 connector.

### Pump Shutdown

To stop the pump, you need to set jumpers b7-a5 on P17 connector, or press the STOP button on the Hand Held Terminal if the controller is configured in FRONT Mode.

## MAINTENANCE

The Turbo-V 70 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 controller is to be scrapped, it must be disposed of 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.

The error messages are displayed only when the option hand held terminal is available.

| MESSAGE                                  | DESCRIPTION                                                                                                                                                                                                | REPAIR ACTION                                                                                                                          |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK CONNECTION TO PUMP</b>          | Wrong connection between the pump and the controller.                                                                                                                                                      | Check connection between controller and pump.<br>Press the START push-button twice to start the pump.                                  |
| <b>FAULT: OVERTIME SX</b>                | Within each step of the soft start mode the rotational speed of the pump does not reach the planned value within 15 minutes.<br>(X) is the step number from 0 to 9 indicating the step number not passed). | Verify that system has no leaks. Press the START pushbutton twice to start the pump.                                                   |
| <b>FAULT: PUMP OVERTEMP.</b>             | The upper bearing/pump temperature exceeds 60 °C.                                                                                                                                                          | Wait until the temperature decrease below threshold value.<br>Press the START push-button twice to start the pump.                     |
| <b>FAULT: CONTROLLER OVERTEMPERATURE</b> | The controller transformer temperature exceeds 90 °C.                                                                                                                                                      | Wait until the temperature decrease below threshold value.<br>Press the START push-button twice to start the pump.                     |
| <b>FAULT: TOO HIGH LOAD</b>              | In normal operation (after the starting phase) the current drawn by the pump is higher than programmed (1.5 A)                                                                                             | Check that the pump rotor is free to rotate.<br>Press the START push-button twice to start the pump.                                   |
| <b>FAULT: SHORT CIRCUIT</b>              | After the starting phase the output connection is shorted (output current higher than 2.2 A).                                                                                                              | Check connections and shortages between pump and controller.<br>Press the START push-button twice to start the pump.                   |
| <b>FAULT: R2 DELAY OVER</b>              | The pump rotational speed decreased below the programmed speed threshold value, and the controller OFF is selected, when R2 deenergizes.                                                                   | Check for system leaks or gas load conditions.<br>To restart the pump apply the reset signal to <b>b8</b> pin of <b>P17</b> connector. |
| <b>OVERVOLTAGE</b>                       | Controller power supply circuitry is faulty, or the Controller received a spike.                                                                                                                           | Press the START push-button twice to start the pump.<br>Should the message still be present, call the Varian service.                  |
| <b>CONTROLLER FAILURE</b>                | Fuse blown on the power supply secondary of the transformer.                                                                                                                                               | Contact Varian for Maintenance.                                                                                                        |

## **TURBO-V 70 CONTROLLER DESCRIPTION**

The controller, factory set for 120 Vac, 50-60 Hz input voltage, is a solid-state frequency converter which is driven by a single chip microcomputer and is composed of:

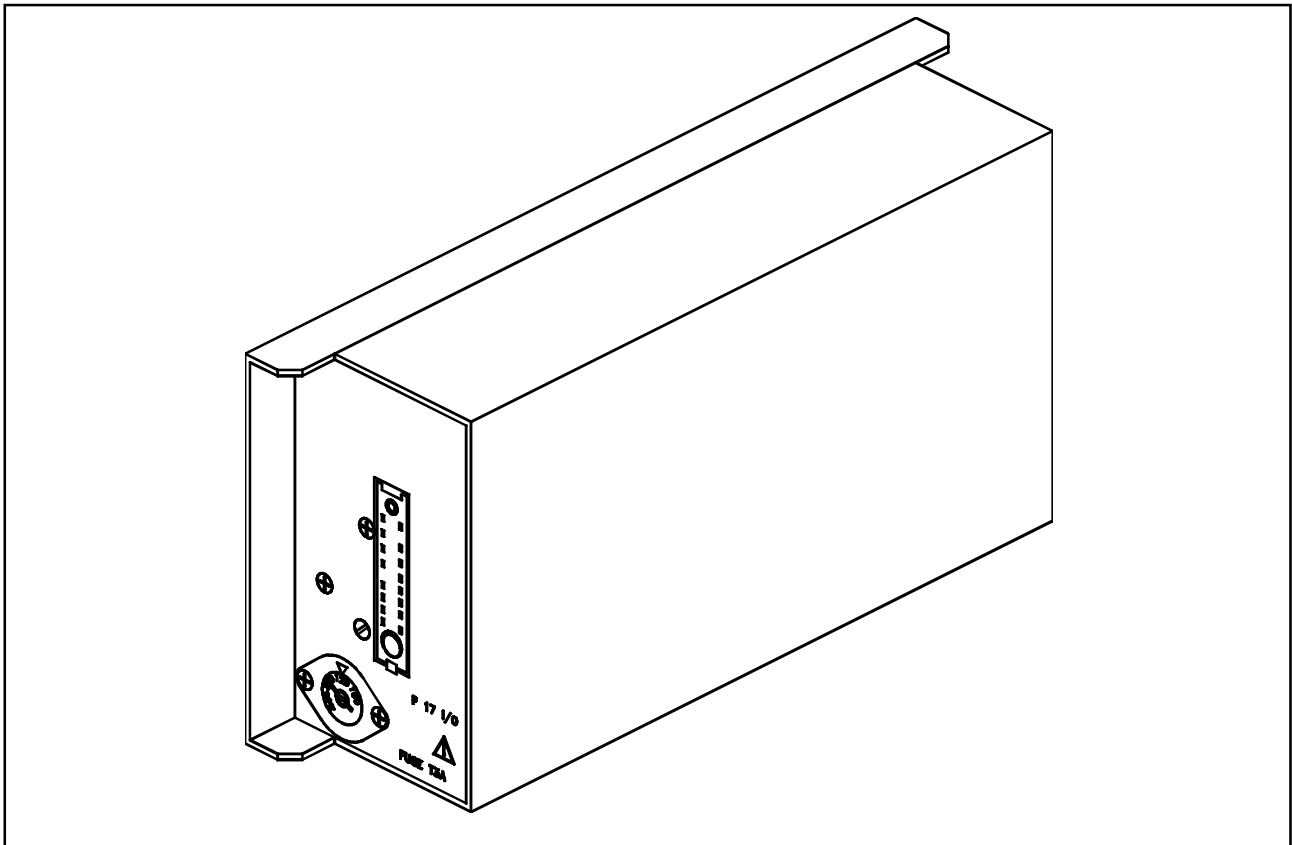
- Power transformer
- Left panel with input/output connector
- Right panel with pump connector and hand-held terminal connector
- PCB including: power supply and 3-phase output, analog and input/output section, microprocessor and digital section, display and keyboard circuits
- PCB external input/output interface
- 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 on the hand-held terminal, and gives outputs for a fully automatic operation.

A dedicated non-volatile RAM is used to store pump operating parameters and the input/output programmed information upon failure for a period of 10 years accumulated off time.

The controller can be operated by remote signals via the left panel connector and may be monitored/reprogrammed using the optional hand-held terminal via the right panel connector.



*Turbo-V 70 Controller*

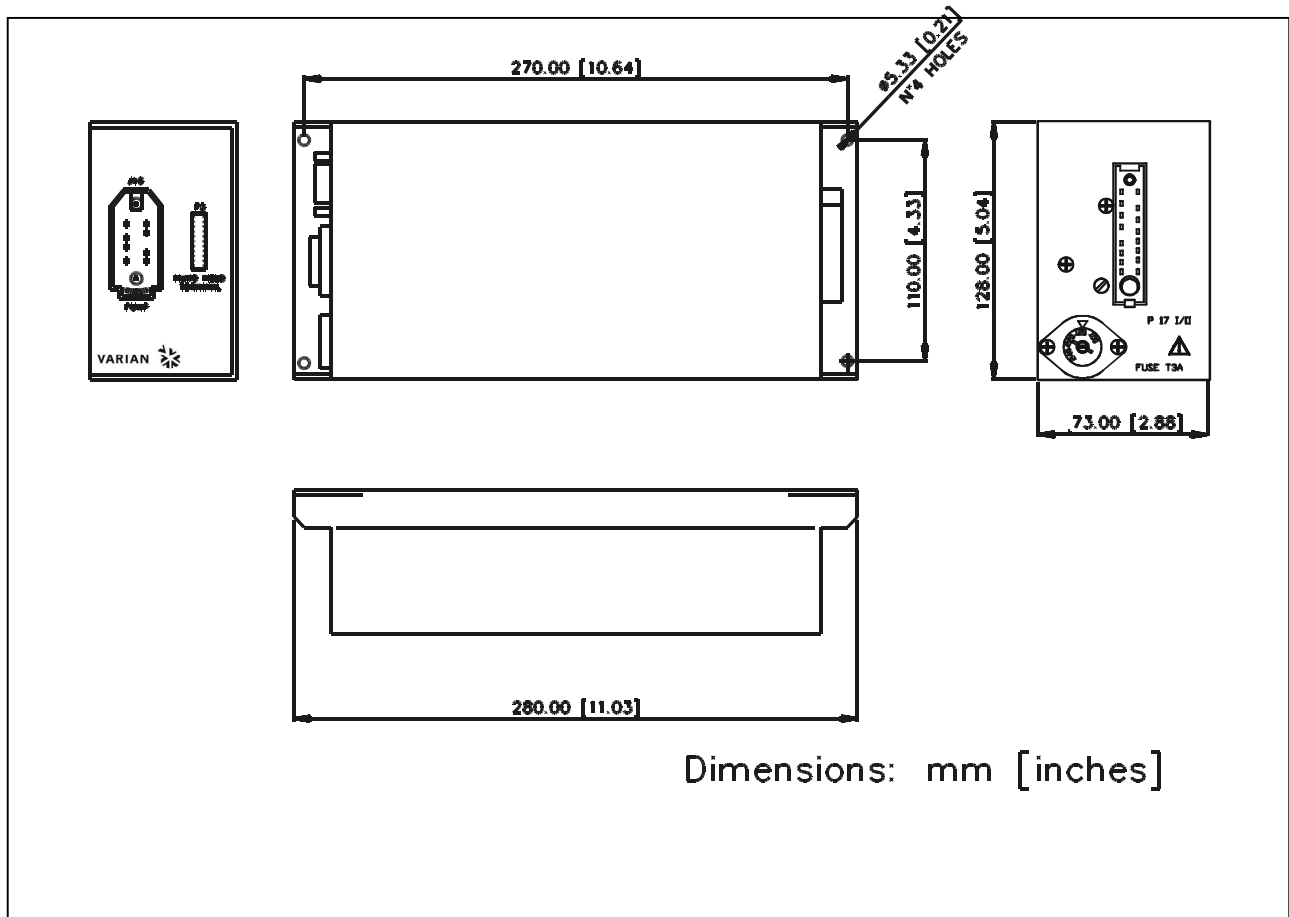
# CONTROLLER SPECIFICATIONS

|                       |                                               |
|-----------------------|-----------------------------------------------|
| Input:                |                                               |
| Voltage               | 100, 120, 220, 240 Vac<br>±10%,               |
| Frequency             | 1-phase                                       |
| Power                 | 47 to 63 Hz<br>350 VA maximum                 |
| Output:               |                                               |
| Voltage               | 54 Vac nominal ±10%,<br>3-phase               |
| Frequency             | 1250 Hz, ±2%                                  |
| Power                 | 150 W maximum                                 |
| Operating temperature | 0 °C to +40 °C                                |
| Storage temperature   | -20 °C to +70 °C                              |
| Fuse (mains)          | T3.15 A (slow blow)<br>disregarding the mains |

|                                |                                                                              |
|--------------------------------|------------------------------------------------------------------------------|
| Radio interference suppression | EN 55011 class A group 1<br>EN 61010-1<br>IEC1000-4-2,<br>1000-4-3, 1000 4-4 |
| Auxiliary connectors:          |                                                                              |
| P17                            | INPUT/OUTPUT mains and signals (pins)                                        |
| J16                            | Pump connector (sockets)                                                     |
| P3                             | Hand-held terminal connector (pins)                                          |
| Weight:                        | 3.8 Kg (8.4 lbs)                                                             |

## CONTROLLER OUTLINE

The outline dimensions for the Turbo-V 70 controllers are shown in the following figure.



Dimensions: mm [inches]

Controller outline

Inspect the controller for any shipping damage.



**WARNING!**

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 must be positioned so that free air can flow through the holes. Connection to the mains must be made in accordance with the local law. Always connect the ground wire and use a properly grounded power socket to avoid electrical shock.*

**Line Voltage Change Over**

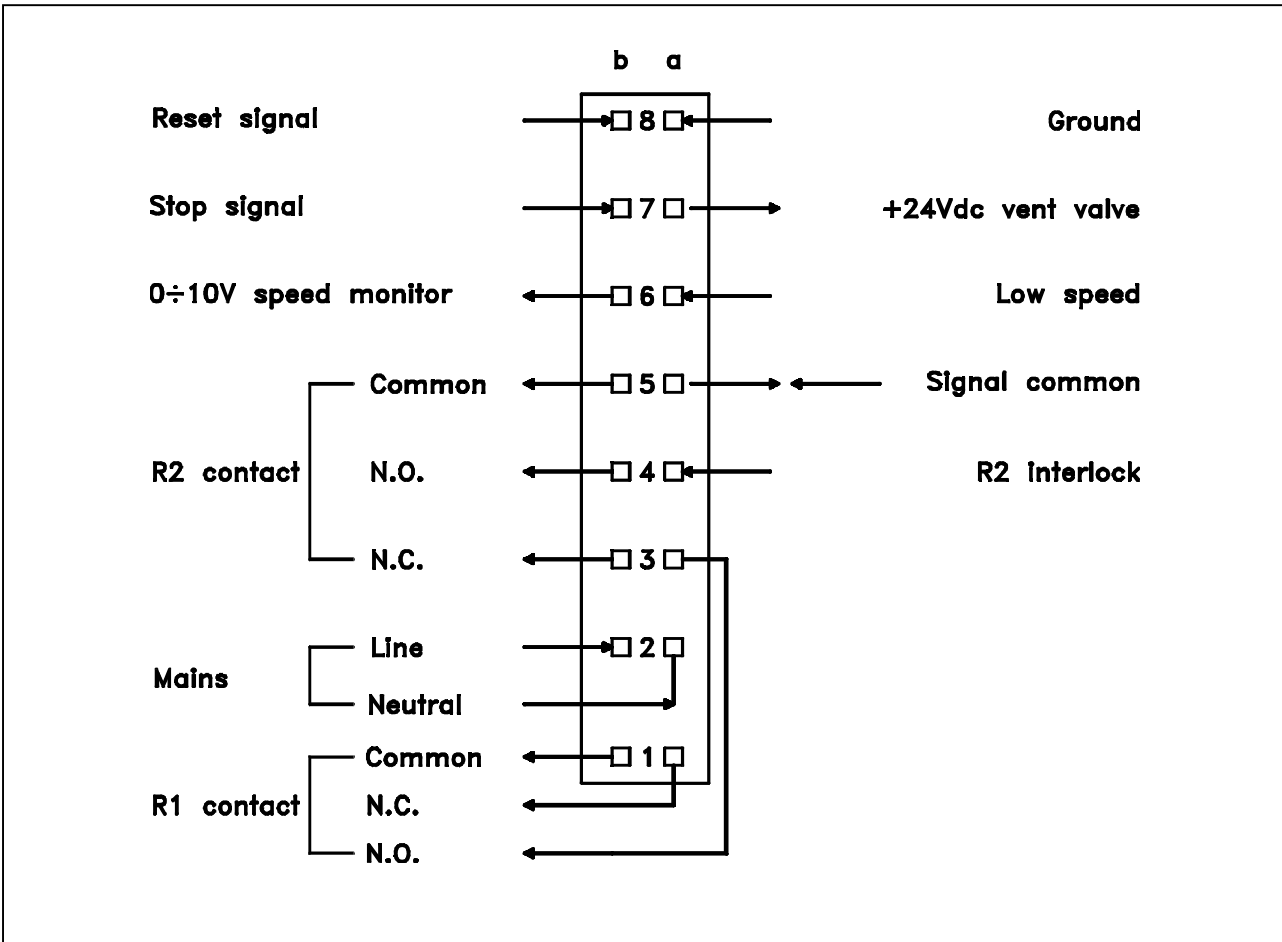
The controller is factory-set for 120 Vac operation.

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

- Disconnect the INPUT/OUTPUT connector J17.
- Select the desired operating voltage on left hand panel.
- Check voltage selector window for correct set and insert connector J17.

**Input/Output Connector**

Input/output signals and mains must be connected to J17 mating connector (not provided). Make the connections with AWG 20 (0.5 mm<sup>2</sup>) to the pins indicated in the following figure, to obtain the desired capability.



P17 I/O Connector

### Mains and Input Signals

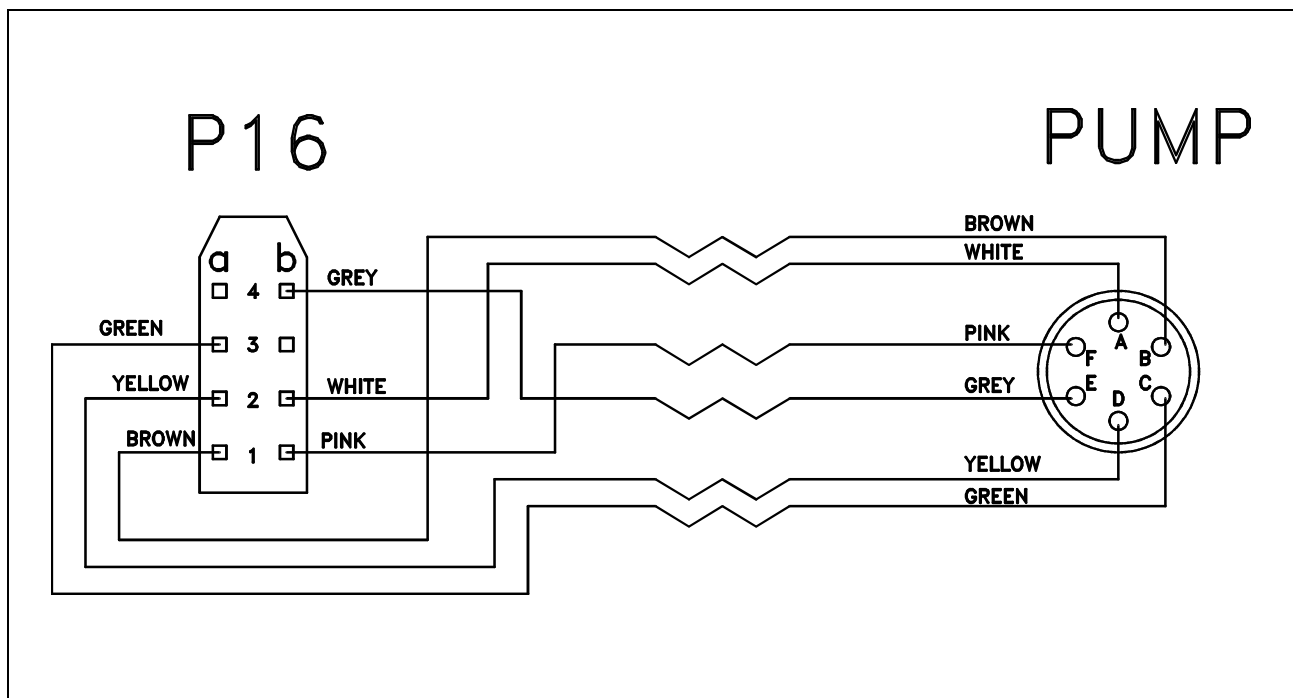
| PIN   | DESCRIPTION                                                                                                                                                                                                                        |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a8    | GROUND power connection                                                                                                                                                                                                            |
| a2    | MAINS neutral connection                                                                                                                                                                                                           |
| b2    | MAINS line connection                                                                                                                                                                                                              |
| a5    | SIGNAL COMMON connection for all input/output signals                                                                                                                                                                              |
| a6-a5 | Remote LOW SPEED, requires a permanently closed contact (relay contact, transistor etc). When the first time contact closes, the turbopump runs at low speed and when the contact opens, the turbopump reverts to high speed mode. |
| a4-a5 | R2 INTERLOCK, requires a permanent closed contact to set at infinite the run-up time. After closure, when the contact is reopened, the run-up time is set to zero minutes.                                                         |
| b7-a5 | Remote STOP signal, requires a closed contact and it is used to stop the pump. When the contact is closed, the turbopump and the interconnected devices are stopped.                                                               |
| b8-a5 | Remote RESET, requires a momentarily closed contact for at least 0.5 seconds to reset the pump after failure.                                                                                                                      |

### Output Signals

| PIN   | DESCRIPTION                                                                                                                                                                                                                                                      |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a5    | SIGNAL COMMON connection for all input/output signals.                                                                                                                                                                                                           |
| b6-a5 | ANALOG OUTPUT SPEED signal 0 to +10 Vdc proportional to pump rotational speed 0 to 75 KRPM.                                                                                                                                                                      |
| a7-a5 | VENT VALVE output voltage. +24 Vdc without load; +6.5 Vdc with vent valve load (430 ohm). The output voltage is present when the turbopump is started, and will remain present for about 5 more seconds after the turbopump is stopped or after a power failure. |

### J16 Pump Connection

The pin configuration of the cable that connects the controller to the pump using a 0.5 mm<sup>2</sup> (AWG 20) wires is shown in the following figure.



Controller-to-pump cable

## USE

### General

Make all vacuum manifold and electrical connections and refer to Turbo-V pump instruction manual before to operating the Turbo-V 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 pump if the pump inlet is not connected to the system or blanked off.

The controller is factory-set to operate via remote signals with a Soft Start mode that allows the pump to ramp-up to Normal speed slowly. The minimum ramp-up time is 75 seconds and the maximum is about 45 minutes. Different default selection has been made as per customer demands.

To modify the default values and to program the controller, connect the hand-held terminal to the Turbo-V controller.

### NOTE

*When the Turbo-V 70 pump is baked by a membrane pump, the Soft Start mode should be deselected.*

### Startup

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

Apply mains to the I/O connector. Voltage and frequency output will be at the maximum level; then the frequency will decrease to a value proportional to the pump rotational (9 KRPM if the pump is completely stopped) and then it will accelerate until the normal condition has been reached.

The controller with the Soft Start mode allows the pump to ramp-up to Normal speed slowly with a minimum ramp-up time of 75 seconds and a maximum of about 45 minutes. If the Soft Start mode is deselected, the ramp-up will be done within 75 seconds.

### Monitor Mode

After the mains is applied to the I/O connector the pump starts and the display shows in the following figure.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|
| S | O | F | T |   | S | T | A | R | T |   | O | N |   |  |  |
|   |   | [ | - | - | - | - | - | - | - | - | - | - | ] |  |  |

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 current drawn by the pump exceed 1.4 A the speed of the pump is decreased to maintain the maximum power allowable (1.4 A).

If within each step of the Soft Start mode the rotational speed of the pump do not reach the planned value within 15 minutes the display shows:

|   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|
| F | A | U | L | T | : |   |   |   |   |   |  |  |  |  |  |
| O | V | E | R | T | I | M | E | : | S | X |  |  |  |  |  |

where **X** = the step number from 0 to 9 indicating the step number not passed.

When this message is displayed the pump is stopped.

- 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 |   |   |   |   |

where:

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

- 1** is displayed when relay R1 is de-energized and the related output is zero voltage.
- 2** is displayed when relay R2 is energized.

**XX KRPM** = indicates the actual theoretical rotational speed of the pump as a function of the controller output frequency (range 9 to 75 KRPM).

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 (9 KRPM if the pump is completely stopped).

The pump will accelerate to its normal rotational speed and when this speed is reached, the display will be as follows, even if any previous display selection was made, and the normal condition has been reached.

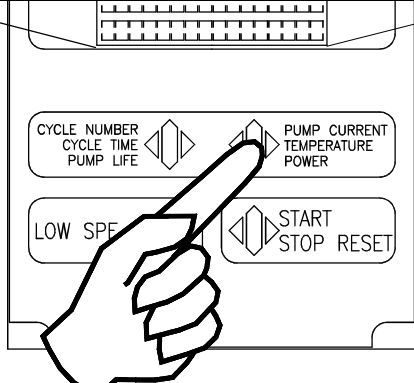
|   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|
| N | O | R | M | A | L |  | O | P | E | R | A | T | I | O | N |
|   |   |   | X | X |   |  | K | R | P | M |   |   |   |   |   |

where: **XX** =indicates the rotational speed (75 KRPM for high speed, or 50 KRPM for low speed).

During acceleration of the pump or during any operating condition, it is always possible to select the other parameters to be displayed (PUMP CURRENT or CYCLE NUMBER push-buttons). If this is the case when the pump reaches the normal speed, the display reverts to the previous figure.

- At any time by pressing the CURRENT push-button and the display shows:

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | = | 0 | . | 0 | 0 | A |   |   |   | P | = |   |   | 0 | W |
| X |   |   | . | . |   | K | R | P | M |   | X | X | ° | C |   |

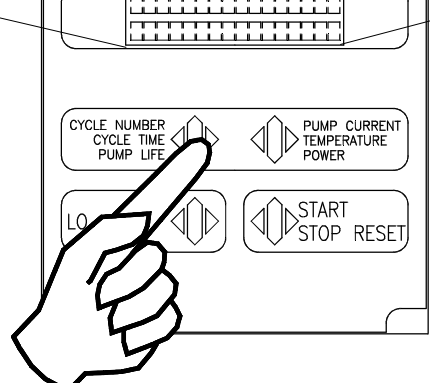


where:

- I** = is the DC current drawn by the pump range (0.00 to 9.99 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 9 to 75 KRPM)
- °C** = is the temperature of the outer ring of the upper bearing (range 00 to 99 °C)
- X** = during operation a selected set point condition (1 or 2 contrast inverted) appears when the programmed threshold speed value is not reached.

- Press the CYCLE NUMBER 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).

## PROGRAM MODE

### FRONT / REMOTE/ 232 Selection

- Press CYCLE NUMBER and PUMP CURRENT push-buttons together for at least 2 seconds and the processor enters in 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 push-buttons at the same time for at least 2 seconds.

The display shows:

|   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|--|---|---|---|---|--|
| 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 |   |  |

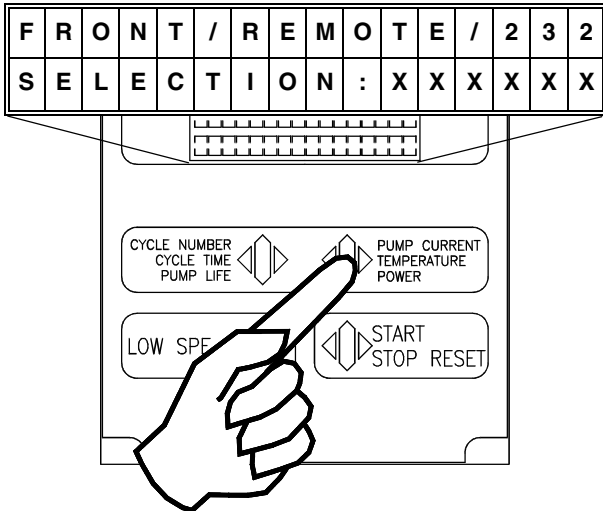
where: **XXX** = YES or NO.

If YES is selected, the Soft Start mode allows the pump to ramp-up the Normal speed within ten steps. When NO is selected, the Soft Start mode is deselected and the ramp-up of the pump will be done within 75 seconds. The controller is factory set to YES.

**NOTE**

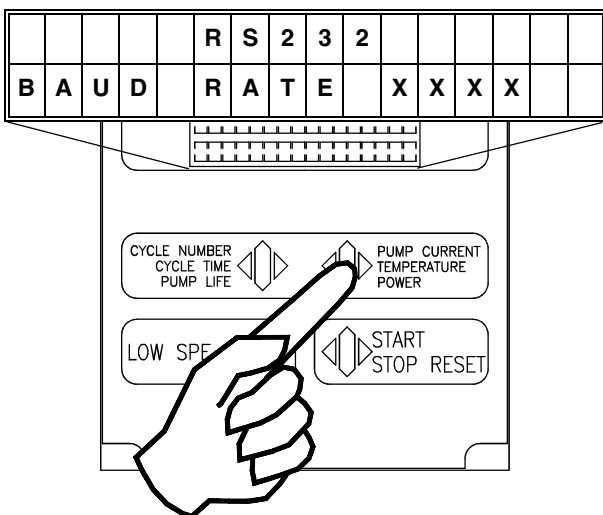
The Soft Start mode may be deselected/selected only when the pump is stopped.

If necessary press CYCLE NUMBER to select YES or NO, then enter the selection by pressing the PUMP CURRENT push-button. The display shows:



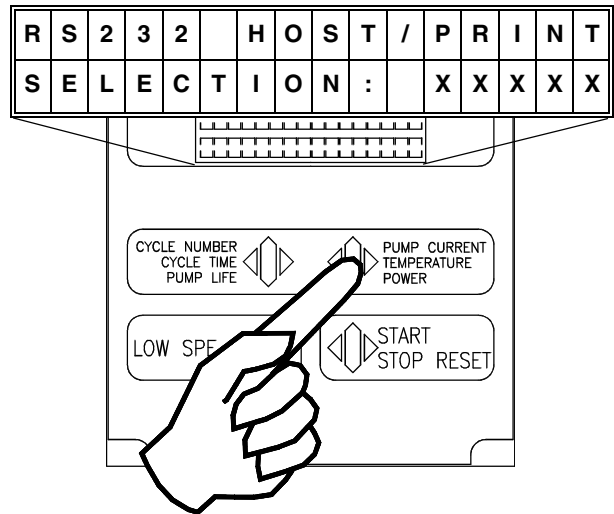
where: **XXXXXX** = means the word FRONT or REMOTE, or RS 232 depending on the last selection.

After choosing the desired selection by pressing the CYCLE push-button, press the PUMP CURRENT push-button to enter the value. The display shows:



where: **XXXX** = means 600, 1200, 2400, 4800, 9600 baud rate for the host computer or printer communication.

If necessary, select the desired value by pressing the CYCLE NUMBER, then enter the value by pressing the PUMP CURRENT push-button. The display shows:



where: **XXXX** == means HOST or PRINT.

Select HOST or PRINT by pressing the CYCLE push-button. With the RS 232 connected, a bidirectional communication is established by selecting HOST. Data are sent to an external computer every time the external computer asks for the values. The data available are:

- Pump/controller operating condition
- Cycle time
- Pump life
- Pump temperature
- Pump current
- Pump voltage
- Controller output frequency
- Cycle number
- R1 condition
- R2 condition
- Life time and cycle # zeroing
- Configuration parameter readings
- Configuration parameter setting

If PRINT is selected and a printer is connected on RS 232 line, a 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
- R1 condition
- R2 condition

The controller is factory-set to HOST.

- Confirm the selection by pressing the PUMP CURRENT push-button. The display will be as shown in the following figure.

### Monitor Relay Programming

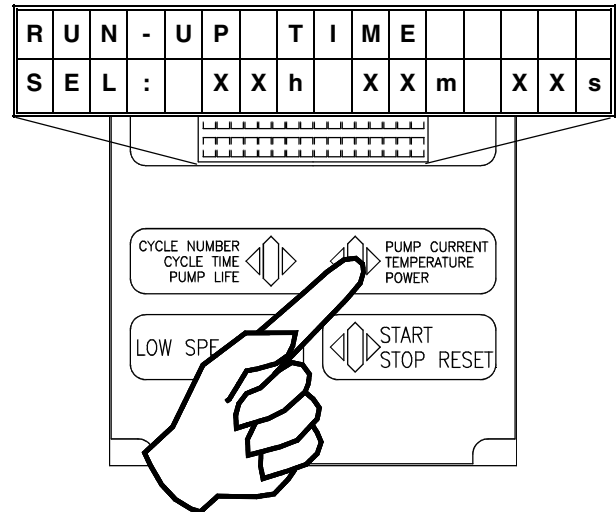
- The display shows:

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | P | E | E | D |   | T | H | R | E | S | H | O | L | D |   |
| S | E | L | E | C | T | I | O | N | : | X | X | K | R | P | M |

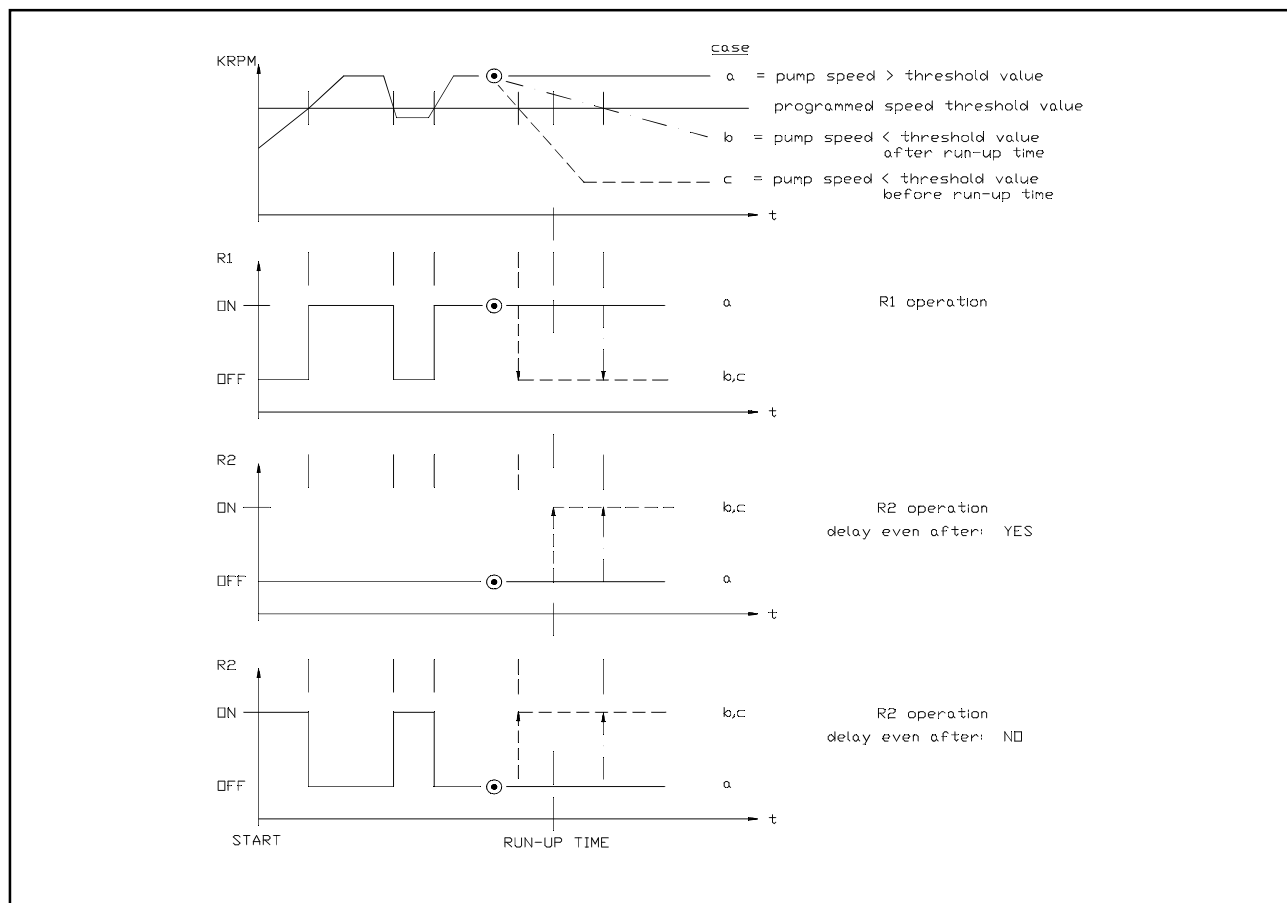
where: **XXKRPM** = is the switch point of relay R1 at the preset turbopump speed, adjustable from 00 to 99 KRPM.

The speed threshold will condition the R1 and R2 operation (see the following cycle diagram) and it is factory-set to 40 KRPM.

Select the first number by pressing the CYCLE NUMBER push-button, then enter the value by pressing the PUMP CURRENT push-button. Do the same for the second number. After pressing the PUMP CURRENT the second time, the display will be as shown in the following figure.



where: **RUN-UP TIME** = is the interval time from start to speed threshold value in hours, minutes, seconds. Select from 00 to 99 hours, and from 00 to 59 minutes or seconds.



Cycle diagram

Select the run-up time according to the chamber volume and/or operating cycle feature by pressing the CYCLE NUMBER push-button to select the desired number, then press the PUMP CURRENT push-button to enter the data.

The run up time is factory-set to:  
00h 08m 00s.

When the last digit is entered, the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | E | L | A | Y | E | V | E | N | A | F | T | E | R |
| T | H | R | E | S | H | O | L | D | : | X | X | X |   |

where:

**XXX** = YES or NO.

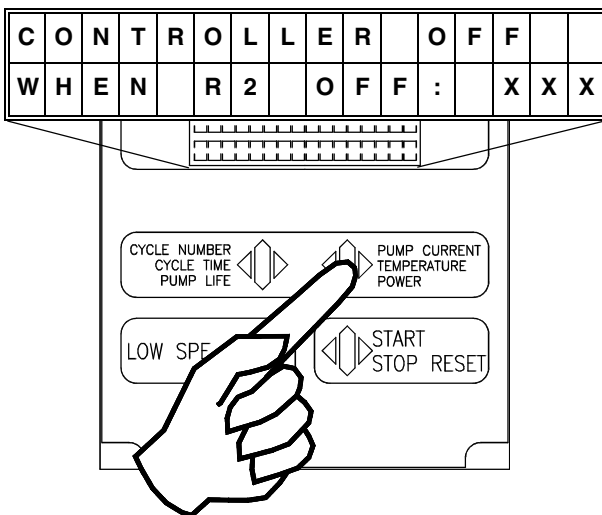
By pressing the CYCLE NUMBER push-button, select YES or NO.

If YES is selected, R2 energizes from the start of the turbopump and deenergizes after the run-up time when the pump rotational speed becomes lower than the programmed speed threshold value.

If NO is selected, R2 energizes from the start of the turbopump and - after the rotational speed of the pump exceeds for the first time - the speed threshold value the R2 deenergizes once the pump speed becomes lower than the programmed speed threshold value.

The function is factory-set to YES.

After selection, press PUMP CURRENT to confirm; the display will be as shown in the following figure.



where:

**XXX** = YES or NO.

If YES is selected when R2 deenergizes the controller, and the interconnecting devices are automatically switched off.

This function is factory set to YES.

After selection, press PUMP CURRENT to confirm; the display will be as shown in the following figure.

### Reset Command

- The display shows:

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | U | M | P | L | I | F | E | X | X | X | X | X | h |
|   |   |   | R | E | S | E | T | ? | X | X | X |   |   |

where:

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

If YES is selected, the pump life shall be reset to 000. After selecting YES, press the PUMP CURRENT push-button to enter the command and the display shows as follows.

### NOTE

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

### 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. Then the Turbo-V pump is slowed down in proportion to the gas load at least until it reaches about 9 KRPM.

This will occur either in NORMAL operation or with the LOW SPEED selected.

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.

## Low Speed Operation

### NOTE

With the FRONT panel operation selected, the remote and RS 232 operations are inoperative; conversely, the CYCLE NUMBER and PUMP CURRENT pushbuttons are always active, even when the operating mode selected is REMOTE or RS 232.

This feature is provided for operating the pump at moderate high pressure with high gas throughput. To operate in this low speed mode, engage the LOW SPEED push-button once if the display shows:

|   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|
| N | O | R | M | A | L |  | O | P | E | R | A | T | I | O | N |
|   |   |   |   | X | X |  | K | R | P | M |   |   |   |   |   |

or twice if the display shows other parameters, either before starting the pump or after it is operating. If LOW SPEED is selected before starting the pump, 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 |   |   |   |   | L | S |

The pump reaches the Normal high speed, then decrease the speed to the low speed value and the display shows:

|   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|---|
| A | P | P | R | O | A | C | H | I | N | G |  | L | S |   |   |
|   |   |   |   | X | X |   | K | R | P | M |  |   |   | L | S |

If the Soft Start has been deselected the display shows:

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

where: **LS** = means low speed mode is selected.

After starting, a **LS** appears on the right bottom corner of the following displays:

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | O | F | T |   | S | T | A | R | T |   | O | N |   |   |   |
|   |   | [ | - | - | - | - | - | - | - | - | - | - | - | L | S |

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | U | M | P |   | I | S |   | S | T | A | R | T | I | N | G |
| 1 | 2 |   |   | X | X |   | K | R | P | M |   |   |   | L | S |

|   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|
| N | O | R | M | A | L |  | O | P | E | R | A | T | I | O | N |
|   |   |   |   | X | X |  | K | R | P | M |   |   |   | L | S |

With normal LOW SPEED operation, the pump will run at about 2/3 of its nominal speed and achieves a base pressure somewhat higher than the standard specifications. If the gas load becomes higher, the controller output frequency and voltage start to decrease automatically, and the Turbo-V pump is slowed down in proportion to the gas load until it reaches about 9 KRPM.

If the LOW SPEED mode is selected after normal operating condition is reached, the display shows:

|   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|---|
| A | P | P | R | O | A | C | H | I | N | G |  | L | S |   |   |
|   |   |   |   | X | X |   | K | R | P | M |  |   |   | L | S |

while approaching the low speed value.

When the low speed mode is deselected, the pump starts to accelerate to its rotational speed.

When this is reached, the display will be as shown in the following figure.

|   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|
| N | O | R | M | A | L |  | O | P | E | R | A | T | I | O | N |
|   |   |   |   | X | X |  | K | R | P | M |   |   |   |   |   |

### Pump Shutdown

With the FRONT panel operation, press the front panel STOP pushbutton; the power from the turbopump is removed and the pump will begin to slow down.

When a stop signal is provided via a remote contact, the display will be as shown in the following figure.

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | E | X | T | E | R | N | A | L |   | S | W | I | T | C | H |
|  |   |   |   | b | 7 |   | C | L | O | S | E | D |   |   |   |

### Power Failure

In the event of a power failure (momentary or long term), the Turbo-V controller will stop the turbopump and all the interconnected pumps/devices. The Turbo-V 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 controller automatically restarts the interconnected devices and the turbopump in the proper sequence.

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 |   |   |   |   |   |

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 "FRONT/REMOTE/232 Selection") and when ready to start, the display shows as in the following figure.

As soon as the remote operation is selected the pump will start automatically if b7 stop signal is not applied.

|   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|
| R | E | A | D | Y |  | F | O | R |   | R | E | M | O | T | E |
| S | O | F | T |   |  | S | T | A | R | T |   |   |   |   |   |

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 |   |   |  |

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

## ERROR MESSAGES

For a certain type of failure, the controller will self-diagnose the error and the following messages will be displayed if the hand-held terminal is connected.

### NOTE

If the pump is not connected, the display will be as shown in the following figure.

|   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|
| C | H | E | C | K |  | C | O | N | N | E | C | T | I | O | N |
|   |   |   | T | O |  | P | U | M | P |   |   |   |   |   |   |

Check connection between controller and pump, then press START RESET pushbutton twice to start the pump.

### NOTE

If within each step of the soft start mode the rotational speed of the pump do not reach the planned value within 15 minutes the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|
| F | A | U | L | T | : |   |   |   |   |   |  |  |  |  |  |
| O | V | E | R | T | I | M | E | : | S | X |  |  |  |  |  |

Verify that systems has no leaks than press STOP RESET pushbutton twice to start the pump.

### NOTE

If the upper bearing/pump temperature exceeds 60 °C, the pump is shut off, and the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|
| F | A | U | L | T | : |   |   | P | U | M | P |  |  |  |  |
|   | O | V | E | R | T | E | M | P | . |   |   |  |  |  |  |

The message will stay on until the temperature decreases below threshold value. Press the STOP RESET pushbutton twice to start the pump.

### NOTE

If the controller transformer temperature exceeds 90°C, the pump is shut off, and the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F | A | U | L | T | : | C | O | N | T | R | O | L | L | E | R |
|   | O | V | E | R | T | E | M | P | E | R | A | T | U | R | E |

The message will stay on until the temperature decreases below threshold value. Press the STOP RESET pushbutton twice to start the pump.

### NOTE

If in normal operation (after the starting phase) the current drawn by the pump is higher than programmed (1.5 A), the pump and the inter-connected devices are switched off and the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |  |   |   |   |   |  |  |  |
|---|---|---|---|---|---|---|---|--|---|---|---|---|--|--|--|
| F | A | U | L | T | : |   |   |  |   |   |   |   |  |  |  |
| T | O | O |   | H | I | G | H |  | L | O | A | D |  |  |  |

Check that pump rotor is free to rotate then press the STOP RESET pushbutton twice to start the pump.

**NOTE**

After the starting phase if the output connection is shorted (output current higher than 2.2 A), the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|--|
| F | A | U | L | T | : |   |   |   |   |   |   |   |  |  |  |  |  |  |  |
| S | H | O | R | T |   | C | I | R | C | U | I | T |  |  |  |  |  |  |  |

Check connections and shortages between pump and controller, then press the STOP RESET pushbutton twice to start the pump.

**NOTE**

If the pump rotational speed decreased below the programmed speed threshold value, and the controller OFF is selected, when R2 deenergizes, the display will be as shown in the following figure.

|   |   |   |   |   |   |   |   |  |   |   |   |   |  |  |  |  |  |
|---|---|---|---|---|---|---|---|--|---|---|---|---|--|--|--|--|--|
| F | A | U | L | T | : |   |   |  |   |   |   |   |  |  |  |  |  |
| R | 2 |   | D | E | L | A | Y |  | O | V | E | R |  |  |  |  |  |

Check for system leaks or gas load conditions, then apply the reset signal b8 to restart the pump.

The following message is displayed if the fuse of the transformer secondary blows:

|  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |  |
|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|--|
|  |  |  | C | O | N | T | R | O | L | L | E | R |  |  |  |
|  |  |  |   | F | A | I | L | U | R | E |   |   |  |  |  |

Since no operation can be carried out, contact  
VARIAN.

## CONTROLLER TEST

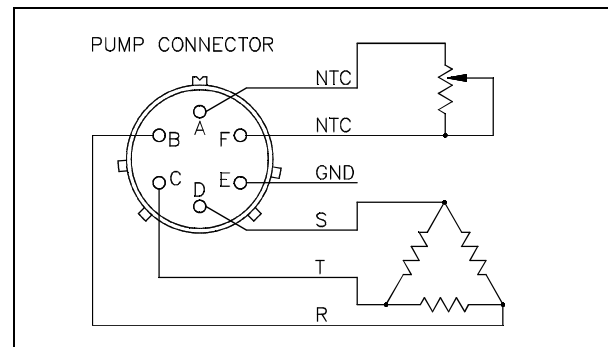
**a) Equipment required**

- Digital voltmeter (DVM) true RMS.
- Dummy load: 3 x 48 $\Omega$ , 50 W each or 3 x 78 $\Omega$ , 50 W each.

Potentiometer 50 K $\Omega$ , 1/4 W minimum.

### b) Test set up

- Remove the pump connector from the turbopump.
- Disconnect the Turbo-V controller connectors (J17 and P16).
- Remove the cover from the Turbo-V controller.
- Set potentiometer to 30 K $\Omega$  and connect it as directed in the following figure.
- Connect the hand-held terminal, check the line voltage selector and connect J17 I/O connector, and select the FRONT panel operation.



### Dummy load connections

### Power Supply Test

**a) DC voltage test**

Check the DC voltages referring to test points indicated in the following figure. The meter should read:

- +5Vdc  $\pm 5\%$
- $\pm 12$  Vdc  $\pm 5\%$
- Ground reference = case of Q3

On the controller front panel, push the START pushbutton and check:

- 54 Vdc  $\pm 10\%$  between TP3(-) and TP5(+)
- 24 Vdc  $\pm 15\%$  on the fan connector.

**b) AC three-phase output voltage test**

Connect P16 and on the pump connector connect the DVM in turn between: pins B and C, B and D, C and D.

The meter should read 44 Vac  $\pm 15\%$ ; a different value of 0.4 Vac is tolerable between phase and phase.

### c) Front panel check

On the controller front panel, press the CURRENT pushbutton and check:

- Current 0.00 A
- Power 0.00 W
- Speed 70 KRPM
- Temperature 25 °C ±2 °C

On controller front panel, press STOP and remove J17 from the controller.

### Test with Dummy Load

- Connect the 48Ω or the 78Ω dummy loads to the pump connector pins B, C, D, as shown in the previous figure.
- Disconnect the potentiometer, set it to 10 KΩ, and then reconnect it.
- Connect the power cable.

On the hand-held terminal push the START and CURRENT pushbuttons and check the front panel display as shown in the following table.

|                   | During start-up without Soft Start mode |                     | After start-up      |                     |
|-------------------|-----------------------------------------|---------------------|---------------------|---------------------|
|                   | With 48Ω dummy load                     | With 78Ω dummy load | With 48Ω dummy load | With 78Ω dummy load |
| Current ±10%      | 1.4 A                                   | 0.6 A               | 1.3 A               | 0.45 A              |
| Power ±10%        | 80 W                                    | 40 W                | 70 W                | 24 W                |
| Speed ±4 KRPM     | 34                                      | 75                  | 9                   | 75                  |
| Temperature ±2 °C | 52 °C                                   | 52 °C               | 52 °C               | 52 °C               |

- Check the 3-phase ac output voltage.  
After start up it should be:  
42 Vac with 78Ω dummy load and  
42 Vac with 48Ω dummy load.

On the hand-held terminal press the STOP pushbutton and remove J17 from the controller.

### Pump over-Temperature Test

- Disconnect the potentiometer, set it to 5KΩ, and then reconnect it.
- Disconnect the dummy loads.
- Connect J17.
- On the hand-held terminal push the START pushbutton, then press the CURRENT pushbutton. The temperature reading should be 71 °C ±2 °C. All the other values should be zero.
- Check the 3-phase ac output voltage. It should be zero.
- On the hand-held terminal press STOP and remove J17 from the controller.

### Functional Test

Perform the functional test with the turbopump, taking care to check the ramp sequence and start up time.

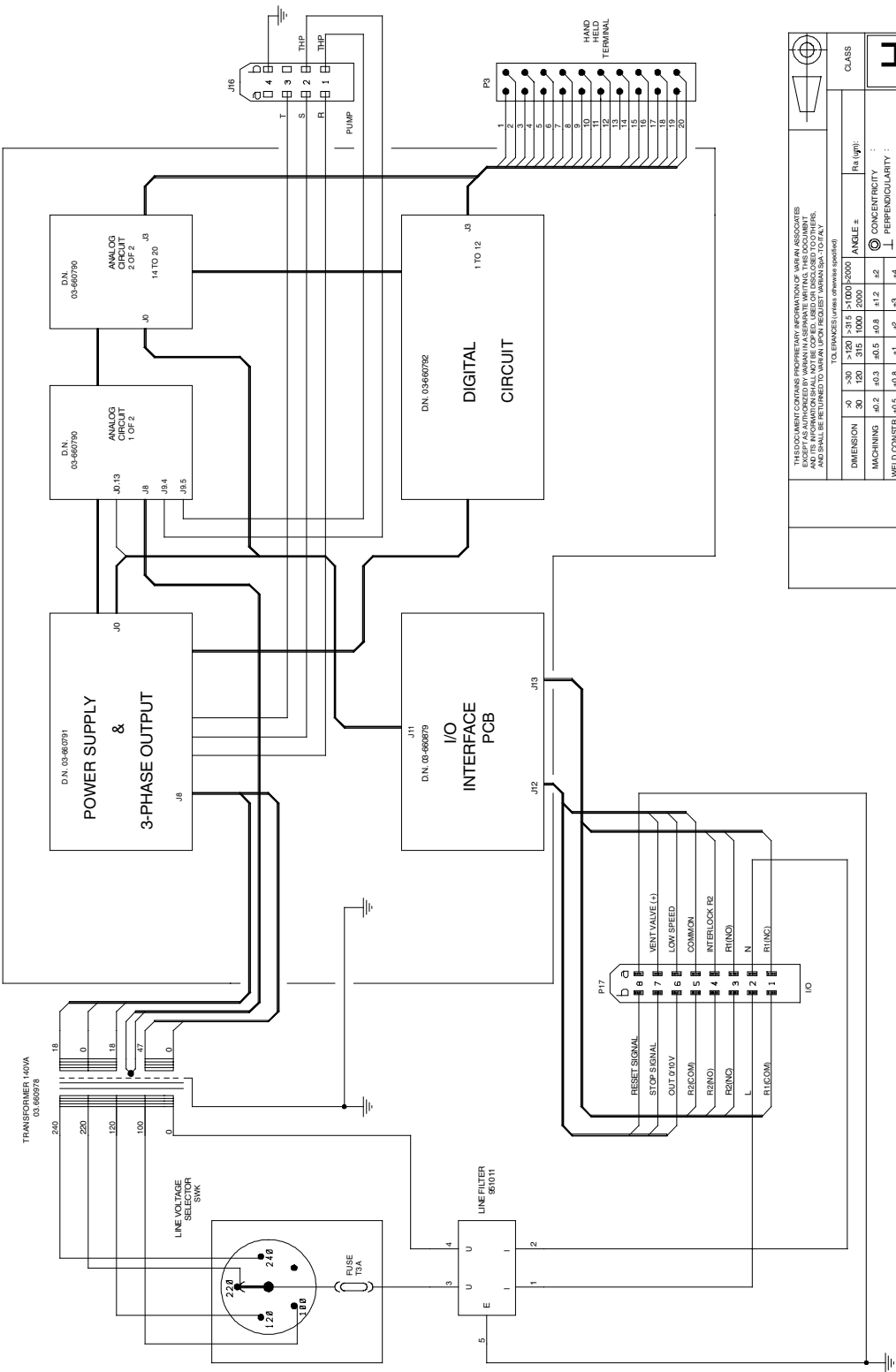
After test, on the hand-held terminal press STOP and select the REMOTE operation. Disconnect J17 and remove the hand-held terminal.

**ACCESSORIES AND SPARE PARTS**

| DESCRIPTION                   | PART NUMBER |
|-------------------------------|-------------|
| Input/output mating connector | 969-9855    |

**OPTIONS**

| DESCRIPTION                              | PART NUMBER   |
|------------------------------------------|---------------|
| Controller to pump cable (3 m extension) | 969-9863L0300 |
| Hand held terminal                       | 969-9860      |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                         |  |                                 |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------|--|---------------------------------|--|
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| DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | ANGLE                                   |  | H (in)                          |  |
| H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | H                                       |  | H                               |  |
| MACHINING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | CONCENTRICITY                           |  | H                               |  |
| WELD CONSTR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | PERPENDICULARITY                        |  | H                               |  |
| OTHER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | PARALLELISM                             |  | H                               |  |
| C24/94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | NUMBER                                  |  | TV70 COMP. MAINS WIRING DIAGRAM |  |
| C.M.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | POSITION                                |  | SCALE                           |  |
| 06/94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | DRAWN                                   |  | /                               |  |
| D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | CHECKED                                 |  | 07/06/94                        |  |
| A3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | DATE                                    |  | 03.660878                       |  |
| D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | REVISION                                |  | D                               |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | SIZE                                    |  | DRAWING No.                     |  |



## Request for Return



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

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Fax: +1 781 8609252

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Phone: +39 011 9979111  
Fax: +39 011 9979330

### Asia and ROW

Varian Vacuum Technologies  
Local Office

### CUSTOMER INFORMATION

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

### PRODUCT IDENTIFICATION

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

### TYPE OF RETURN (check appropriate box)

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

### HEALTH and SAFETY CERTIFICATION

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

The equipment listed above (check one):

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

OR

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

☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive

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

.....

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

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

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

Do not write below this line

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

## FAILURE REPORT

### TURBO PUMPS and TURBOCONTROLLERS

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

### ION PUMPS/CONTROLLERS

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

### VALVES/COMPONENTS

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

### LEAK DETECTORS

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

### INSTRUMENTS

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

### PRIMARY PUMPS

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

### DIFFUSION PUMPS

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

### FAILURE DESCRIPTION

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

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

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

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

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### **Worldwide Web Site:**

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

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Representatives in most countries



# **VARIAN**