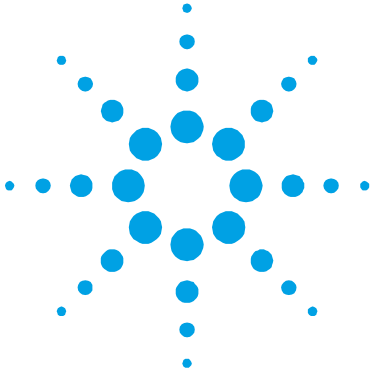


Turbo-V 1001 Rack Controller

Models
X3501-64003

Manual de Instrucciones
User Manual

87-901-033-01
06/2013

Agilent Technologies

Notices

Manual Part Number

Publication Number: 87-901-033-01

Edition

Edition 06/2013

Printed in ITALY

Agilent Technologies Italia S.p.A.

Vacuum Products Division

Via F.lli Varian, 54

10040 Leini (TO)

ITALY

Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as "Commercial computer software" as defined in DFAR 252.227-7014 (June 1995), or as a "commercial item" as defined in FAR 2.101(a) or as "Restricted computer software" as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Trademarks

Windows and MS Windows are U.S. registered trademarks of Microsoft Corporation.

Safety Notices

CAUTION

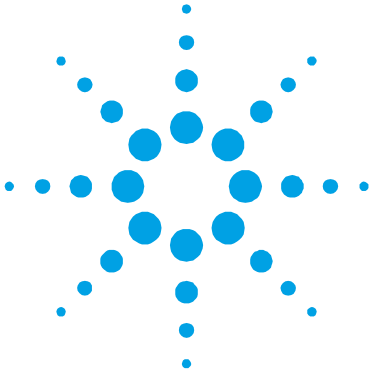
A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully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

WARNING

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

Turbo-V 1001 Rack Controller

Contents



4
Manual de istrucciones

Traducción de las instrucciones originales

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 Agilent antes de utilizar el equipo. Agilent 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 1001 Rack son convertidores de frecuencia, controlados por un microprocesador, realizados con componentes en estado sólido y con capacidad de autodiagnosis y autoprotección.

- Características del controler:
- Ajuste automático de la tensión de entrada
- Operatividad del frontal / remoto / serial
- Pilotaje del ventilador de enfriamiento bomba de 24 Vcc
- Pilotaje de las válvulas de seguridad y de purga
- Lectura de la velocidad de la bomba tras mando de parada (lectura velocidad de parada).

Se han incluido a continuación todas las informaciones necesarias para garantizar la seguridad del operador durante el uso de este equipo . Para información más detallada consultar el punto "Technical Information".

Este manual utiliza los símbolos convencionales siguientes:

¡ADVERTENCIA!

Los mensajes de advertencia 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 completamente reciclable y cumple con los requisitos definidos en la Directiva 94/62/CE y sus modificaciones posteriores, para la tutela del Medio Ambiente.

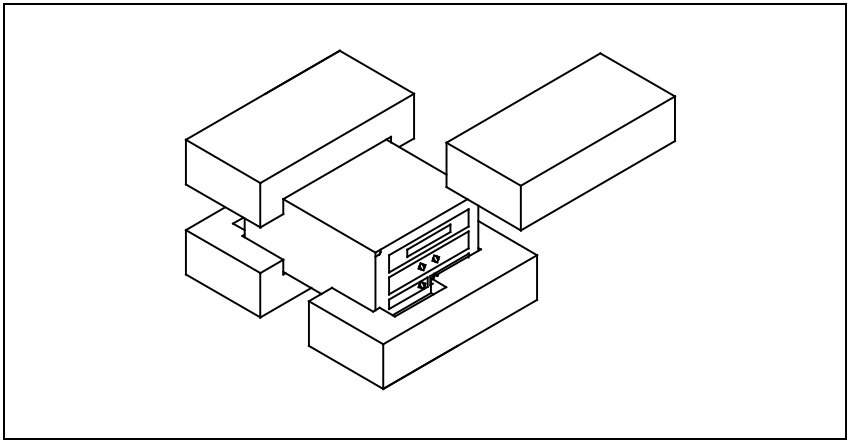


Figura 1 Embalaje de los Controlers

Instalación

¡ADVERTENCIA!

El controlador Turbo-V está diseñado sólo para su uso en interiores y para mantener la seguridad del usuario debe ser alimentado mediante un cable de 3 conductores (v. tabla de las piezas de recambio solicitables) con un tipo de clavija aprobado a nivel internacional. Para evitar el riesgo de descargas eléctricas y cumplir con los requisitos CE, utilizar siempre este cable de alimentación, conectando la clavija a una toma eléctrica dotada con una adecuada conexión a tierra. Dentro del controlador se desarrollan altas tensiones que pueden causar graves daños o la muerte. Antes de efectuar cualquier operación de instalación o mantenimiento del controlador, 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 + 45 °C
- humedad relativa: 0 – 95 % (no condensadora).

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

Uso

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

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

¡ADVERTENCIA!

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.

Mantenimiento

Il Turbo-V 1001 Rack Controller no necesita mantenimiento. Cualquier tipo de intervención en el sistema deberá ser realizado por personal autorizado.

Mandos, Indicadores y Conectores del Controler

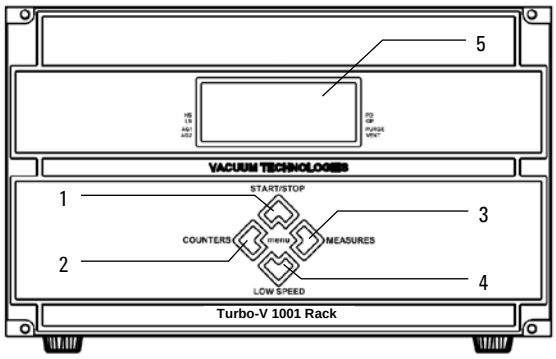


Figura 2 Panel Frontal del Controler X3501-64003

Las funciones de los pulsadores dependen del contexto (ventana principal, menú de configuración, etc.).

1	Pulsador para la selección de los modos START, STOP, RESET. Se activa sólo si ha sido seleccionado el control mediante el panel frontal. Apretando una vez este pulsador, se activa la fase de puesta en marcha; apretándolo otra vez la bomba se para . Si la bomba se para de forma automática por un error, este pulsador deberá ser apretado dos veces: la primera para reajustar el controler y la segunda para volver a poner en marcha la bomba.
2	Pulsador para visualizar en pantalla: número y tiempo de duración del ciclo, , vida operativa de la bomba y número de serie .
3	Pulsador para visualizar en pantalla: corriente temperatura, potencia y velocidad de rotación de la bomba . Está siempre activo independientemente del modo operativo seleccionado .
4	Pulsador para la selección del modo HIGH/LOW SPEED. Está activado sólo si se ha seleccionado el control mediante el panel frontal . Apretándolo varias veces se conmuta el modo entre HIGH SPEED y LOW SPEED.
5	Pantalla alfanumérica LCD retroiluminada: matriz de puntos, 4 líneas x 16 caracteres.

Apretando contemporáneamente, durante 2 segundos como mínimo, los pulsadores 2 y 3, se tiene acceso al menú de configuración del controler. En el ambiente de configuración los 4 pulsadores permiten navegar por el menú y cambiar el valor de los parámetros.

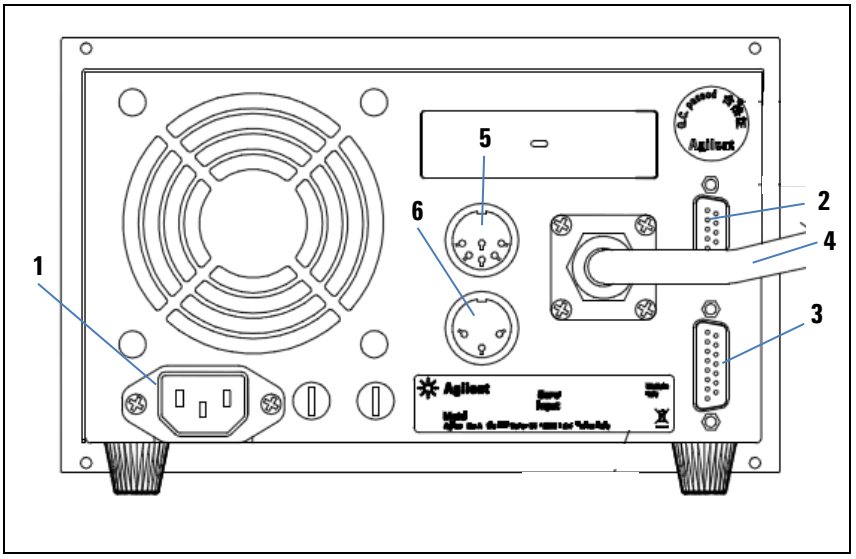


Figura 3 Panel Trasero del Controler X3501-64003

1	Módulo de alimentación del controler, con fusibles, toma de alimentación y filtro EMC.
2	Puerto de comunicación RS-232 / RS-485.
3	Conector para las señales lógicas de input/output con salida analógica programable (el conector de acoplamiento viene suministrado con el correspondiente puente de cierre del Interlock).
4	Cable para la bomba.
5	Conector de salida para el control de las válvulas de seguridad y de purga .
6	Conector de salida para ventilador externo.

Procedimientos de uso

Encendido del controler

Para encender el controler, conectar la clavija del cable de alimentación a una toma eléctrica adecuada.

Puesta en marcha de la Bomba

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

NOTA Para poner en marcha la bomba es necesario habilitar la conexión de interlock de seguridad. Con este fin, acoplar al conector J1 el conector correspondiente suministrado en dotación.

Parada de la Bomba

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

Mantenimiento

Los controlers de la serie Turbo-V 1001 Rack no necesitan ningún mantenimiento. Cualquier operación ha de ser efectuada por personal autorizado.

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

¡ADVERTENCIA! **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.

Eliminación

Significado del logotipo "WEEE" presente en las etiquetas. El símbolo que se indica a continuación, es aplicado en observancia de la directiva CE denominada "WEEE". Este símbolo **(válido sólo para los países miembros de la Comunidad Europea)** indica que el producto sobre el cual ha sido aplicado, NO debe ser eliminado junto con los residuos comunes sean éstos domésticos o industriales, y que, por el contrario, deberá ser sometido a un procedimiento de recogida diferenciada. Por lo tanto, se invita al usuario final, a ponerse en contacto con el proveedor del dispositivo, tanto si éste es la casa fabricante o un distribuidor, para poder proveer a la recogida y eliminación del producto, después de haber efectuado una verificación de los términos y condiciones contractuales de venta.

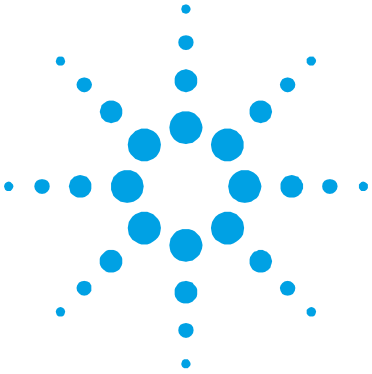
Mensajes de error

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

Tab. 1

MENSAJE	DESCRIPCIÓN	ACCIÓN CORRECTIVA
CHECK CONNECTION TO PUMP	Mal funcionamiento en la conexión entre la bomba y el Controler.	Controlar las conexiones entre la bomba y el controler. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
PUMP WAITING INTERLOCK	Está activa la señal de interlock presente en el conector J1 a causa de la interrupción del cortocircuito entre el pin 3 y el pin 9 y entre el pin 4 y pin 15 del conector P1, o a causa de la apertura de la señal de interlock externo.	Eliminar el cortocircuito entre el pin 3 y el pin 9 y entre el pin 4 y pin 15 del conector J1, o cerrar la señal de interlock exterior.
FAULT: PUMP OVERTEMP.	La temperatura del rodamiento superior de la bomba ha superado los 60 °C.	Esperar a que la temperatura vuelva por debajo del umbral. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
FAULT: CONTROLLER OVERTEMPERATURE	La temperatura del transformador del controler ha superado los 65 °C.	Esperar a que la temperatura vuelva por debajo del umbral. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.

MENSAJE	DESCRIPCIÓN	ACCIÓN CORRECTIVA
FAULT: TOO HIGH LOAD	Durante el funcionamiento normal (tras la fase de puesta en marcha) la corriente absorbida por la bomba es superior a la programada.	Comprobar que el rotor de la bomba tiene la posibilidad de girar libremente. Controlar que la longitud del cable bomba haya sido configurado de forma correcta. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
FAULT: SHORT CIRCUIT	Durante el funcionamiento normal (después de la fase de puesta en marcha) se ha detectado una condición de cortocircuito en el circuito de potencia.	Comprobar las conexiones entre la bomba y el controler. Apretar dos veces el pulsador START para volver a poner en marcha la bomba.
OVERVOLTAGE	Ha occurrido una avería en la sección de alimentación del controler, o el controler ha recibido una interferencia desde la alimentación de red.	Apretar dos veces el pulsador START para volver a poner en marcha la bomba. En caso el mensaje vuelva a aparecer, llamar a Agilent para la manutención.



16 Instructions for Use

Original Instructions

General Information

This equipment is intended for use by professionals. The user should read this instruction manual and any other additional information supplied by Agilent before operating the equipment. Agilent will not be held responsible for any events occurring due to non-compliance, even partial, with these instructions, improper use by untrained people, non-authorized interference with the equipment or any action contrary to that provided for by specific national standards. The Turbo-V 1001 Rack Controller are microprocessor-controlled, solid-state, frequency converters with self-diagnostic and self-protection features.

Controller features:

- Input voltage auto setting
- Front / Remote / Serial Operation
- 24 Vdc pump fan cooling drive
- Vent & Purge valves drive
- Pump speed reading after stop command (stop speed reading)

The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment. Detailed information is supplied in the appendix "Technical Information".

This manual uses the following conventions:

WARNING!

The warning messages 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 Directive 94/62/CE and subsequent amendments.

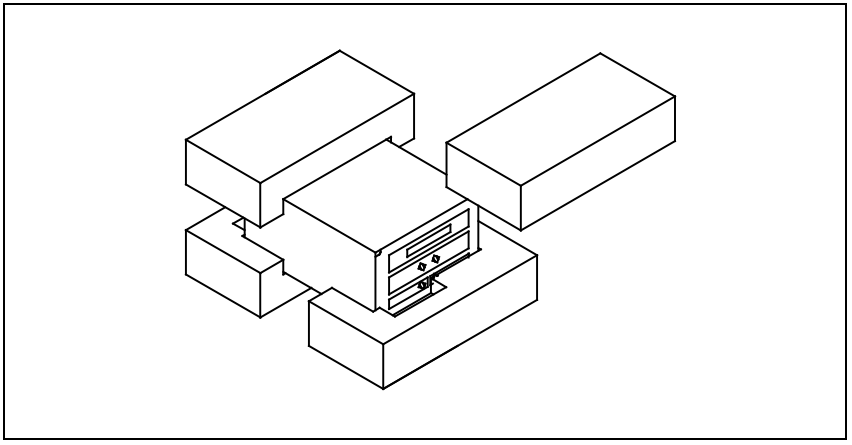


Figure 1 Controllers Packing

Installation

WARNING!

The Turbo-V controller is designed for indoor use only and must be powered with 3-wire power cord (see orderable parts table) and plug (internationally approved) for user's safety. Use this power cord and plug in conjunction with a properly grounded power socket to avoid electrical shock and to satisfy CE requirements. 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 +45 °C;
- relative humidity: 0 – 95 % (without condensation).

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

Use

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

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

WARNING!

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

Maintenance

The Turbo-V 1001 Rack Controller does not require any maintenance. Any work performed on the system must be carried out by authorized personnel.

Controls, Indicators and Connectors

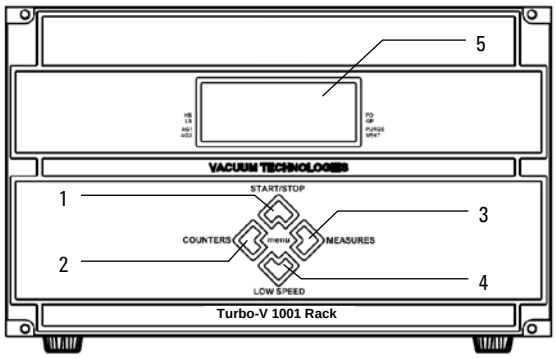


Figure 2 Controller X3501-64003 Front Panel

The keys function depends on the context (main window, configuration menu, etc.).

1	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.
2	Keyboard push-button to recall on the display the cycle number, cycle time and pump life and serial number.
3	Keyboard push-button to recall on the display the pump current, pump temperature, pump power, rotational speed. It is always active, regardless of the selected operating mode.
4	Keyboard push-button for HIGH/LOW SPEED mode selection. It is active only when the front panel operation has been selected. Pressed repeatedly, toggles between HIGH SPEED and LOW SPEED.
5	LCD back-lighted alphanumeric display: dot matrix 4 lines x 16 characters.

Push-buttons 2 and 3, if pressed together for at least 2 seconds allow to access the controller configuration menu. In configuration environment all of four buttons allow to navigate the menu and to change the parameters' values.

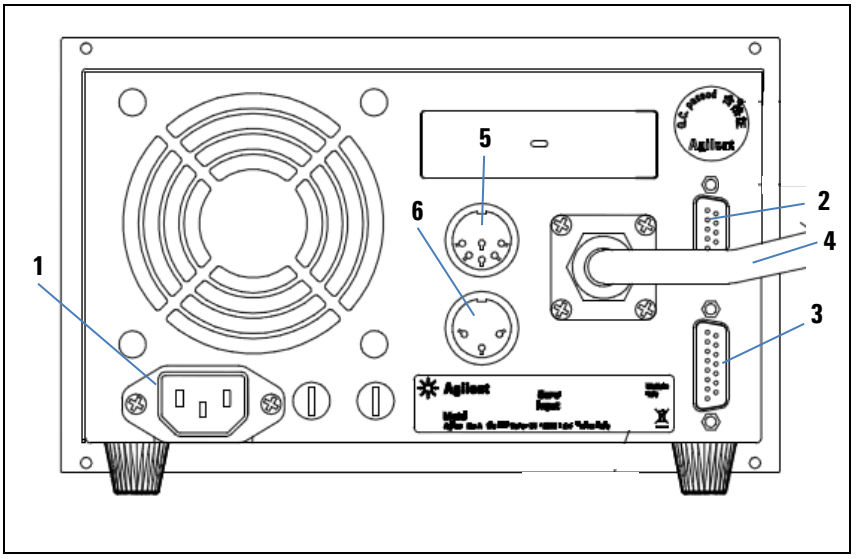


Figure 3 Controller X3501-64003 Rear Panel

1	Controller power entry module consisting of mains fuses, mains socket and EMC filter.
2	RS-232 / RS-485 communication port connector.
3	Logic input/output signals connector plus programmable analog output (mating connector supplied with Interlock link).
4	Pump cable.
5	Vent Valve and Purge Valve control output connector.
6	External Fan output connector.

Use Procedure

Controller Startup

To startup the controller plug the power cable into a suitable power source.

Starting the Pump

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

NOTE In order to start the pump the Interlock safety connection must be secured. This can be achieved by connecting to J1 connector the supplied mating connector.

Pump Shutdown

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

Maintenance

The Turbo-V 1001 Rack 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 Agilent repair service. Replacement controllers are available on an advance exchange basis through Agilent.

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

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

Disposal

Meaning of the "WEEE" logo found in labels

The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive. This symbol **(valid only in countries of the European Community)** indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system. The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.

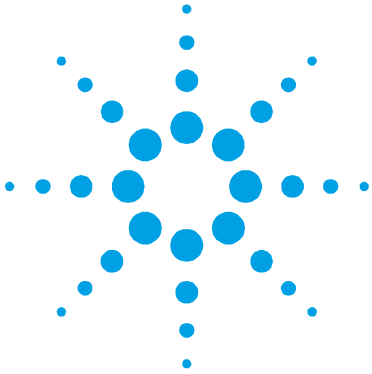
Error Messages

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

Tab. 1

MESSAGE	DESCRIPTION	REPAIR ACTION
CHECK CONNECTION TO PUMP	Wrong connection between the pump and the controller.	Check connections between controller and pump. Press the START push-button twice to start the pump.
PUMP WAITING INTERLOCK	The interlock signal of J1 connector is activated by an interruption of the link between pin 3 and 9 or between pin 4 and 15 of P1 connector, or because the external interlock signal is open.	Reset the short circuit between pin 3 - 9 and between pin 4 - 15 of J1 connector, or close the external interlock signal.
FAULT: PUMP OVERTEMP.	The pump upper bearing temperature exceeded 60 °C.	Wait until the temperature decrease below threshold value. Press the START push-button twice to start the pump.
FAULT: CONTROLLER OVERTEMPERATURE	The controller internal temperature exceeded 65 °C.	Wait until the temperature decrease below threshold value. Check that the pump cable length has been set correctly. Press the START push-button twice to start the pump.

MESSAGE	DESCRIPTION	REPAIR ACTION
FAULT: TOO HIGH LOAD	In normal operation, the current drawn by the pump is higher than programmed.	Check that the pump rotor is free to rotate. Press the START push-button twice to start the pump.
FAULT: SHORT CIRCUIT	During normal functioning (after the start-up phase), a short-circuit condition has been detected in the power circuit.	Check connections and shortages between pump and controller. Press the START push-button twice to start the pump.
OVERVOLTAGE	A failure has occurred in the controller power supply section, or the controller has received a disturbance from the mains.	Press the START button twice to start the pump again. If the message is redisplayed, contact Agilent for maintenance.



17 Technical Information

Original Instructions

Turbo-V 1001 Rack Controller Description

The model is provided with a front panel with an LCD alphanumeric display to indicate the operating conditions/parameters of the Turbo-V pump and a keyboard, and a rear panel with input/output connectors. The following figure is a picture of the Turbo-V 1001 controllers.

The controller is a solid-state frequency converter which is driven by a single chip DSP and is composed of one PCB which include 3-phase output, analog and input/output section, Digital Signal Processor and digital section.

The controller converts mains voltage supply into a 3-phase, low voltage, medium frequency output which is required to power the pump. The controller can be operated by a remote host computer via the serial connection. A Windows-based software is available (T-Plus optional). The DSP generates the variable output frequency and controls the 3-phase output voltage according to the software and the gas load condition of the pump. Moreover, it manages signals from sensors, input/output connection information to be displayed, and gives outputs for a fully automatic operation.

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

The controller can be operated via:

- Front panel switches
- Remote signals via rear panel connectors
- RS 232 and RS 485 serial link.

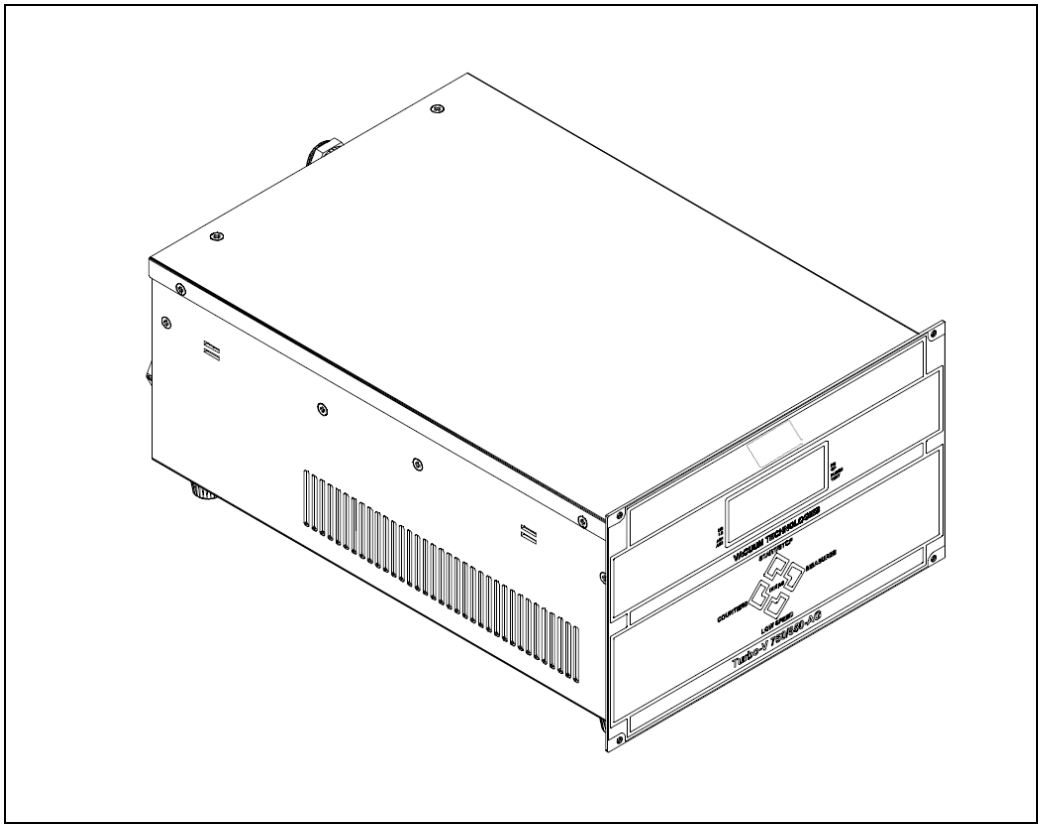


Figure 4 Turbo-V 1001 Rack Controller

Controller Specifications

Tab. 2

Input:	
Voltage	100 ÷ 240 Vac (±10 %), 1-phase
Frequency	50 to 60 Hz
Power	800 VA maximum
Output for pump:	
Power during pump ramp-up	450 W maximum
Power normal (pump water cooled)	450 W maximum
Power normal (pump air cooled)	300 W maximum
Operating temperature	5 °C to +45 °C
Storage temperature	-20 °C to +70 °C
Fuse:	
Mains	2 x T10 AH (slow blow) 250 V 5x20 fuses
Serial communication (T-Plus kit)	RS232 cable with a 9-pin D type male connector and a 9-pin D type female connector, and T-Plus software (optional)
Power cable	With European or NEMA plug 3 meters long (optional)
Pump cable	5 meters long fixed cable
In compliance with norms	EN 61010-1 (2001) EN 61326-1 (2006) Emission level : Class B for Residential Application Immunity level : for Industrial Application
Max altitude	2000 m
Protection category	IP 20
Internal use only	
Weight (both models)	6.3 kg (13.9 lbs)
Installation category	II
Pollution degree	2

NOTE All connecting cables for remote I/O and serial connections, if longer than 3 m, must be of the shielded type.

Controller Outline

The outline dimensions for the Turbo-V 1001 Rack Controller are shown in the following figures:

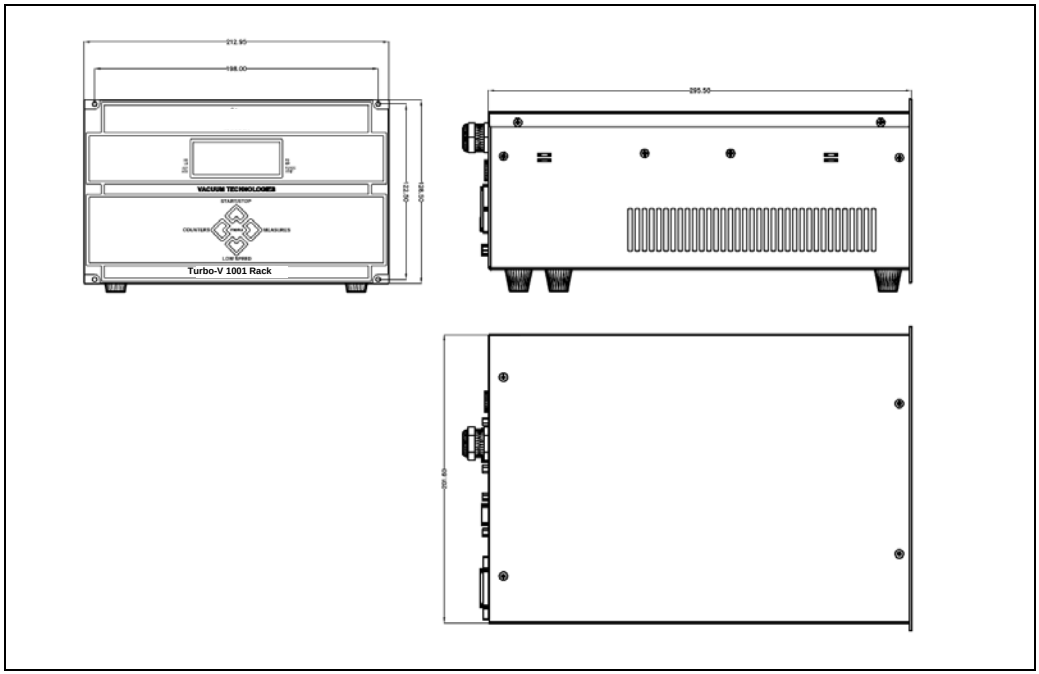


Figure 5 Controller models X3501-64003 outline

Fuse Holder Assembly

The following figure shows the location of this assembly.

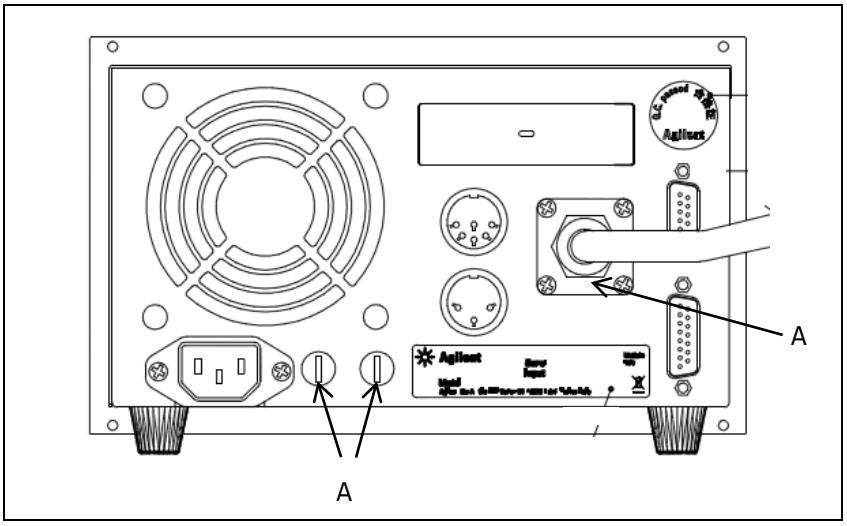


Figure 6 Rear panel

Proceed as follows to replace one or both fuses:

1. Remove the fuse holders (position A) with a small screwdriver.
2. Replace the fuse.
3. Use only T-type fuses of the following characteristics:
   - 250 Vac 10 A (5x20 mm) High breaking capacity

Connection J1 Remote I/O Interconnections

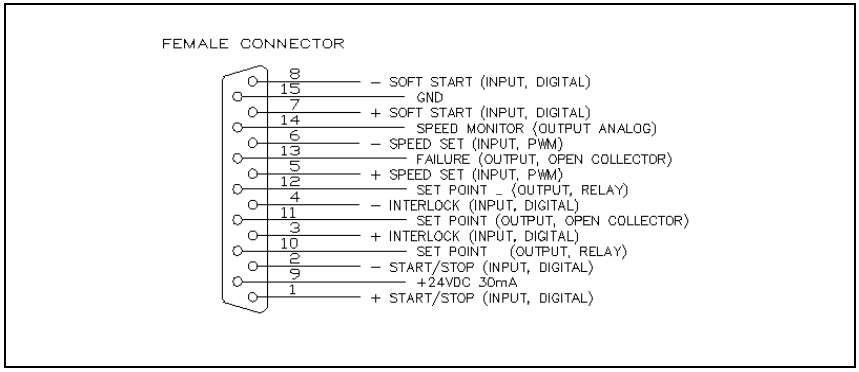


Figure 7 Remote I / O connector

All the input/output remote signals to/from the controller must be connected at P1 mating connector. With the provided J1 mating connector (shipped with pin 3 shorted with pin 9 and pin 4 shorted with pin 15) make the connection with AWG 24 (0.25 mm^2) or smaller wire to the pins indicated in the figure to obtain the desired capability. It is a 15-pins D type connector; the available signals are detailed in the table, the following paragraphs describe the signal characteristics and use.

Tab. 3

PIN N.	SIGNAL	INPUT/OUTPUT
1	START/STOP (+)	IN
2	START/STOP (-)	IN
3	INTERLOCK (+)	IN
4	INTERLOCK (-)	IN
5	SPEED SETTING (+)	IN
6	SPEED SETTING (-)	IN
7	SOFT START (+)	IN
8	SOFT START (-)	IN
9	+24Vdc	OUT
10	SET POINT (RELAY)	OUT

PIN N.	SIGNAL	INPUT/OUTPUT
11	PROGRAMMABLE SET POINT (OPEN COLLECTOR)	OUT
12	SET POINT (RELAY)	OUT
13	FAULT OUTPUT	OUT
14	PROGRAMMABLE ANALOG SIGNAL	OUT
15	GROUND (& PROGRAMMABLE ANALOG SIGNAL (-)	--

When no external input-output device is available this connector must be closed with the supplied mating connector that short-circuits the START/STOP (+) & (-) and INTERLOCK (+) & (-) inputs with the +24Vdc & GROUND.

Signals Description

START/STOP: input signal (opt isolated) to start or stop the pump. With the supplied mating connector the START/STOP (+) signal is connected to the +24 Vdc pin and the START/STOP (-) signal to the GROUND pin: in this condition the pump automatically starts as soon as the controller recognizes the input supply ("Plug & Pump").

INTERLOCK: safety input signal (opt isolated) to control the pump rotation activation.With the supplied mating connector the INTERLOCK (+) signal is connected to the +24Vdc pin and the INTERLOCK (-) signal to the GROUND pin.

PROGRAMMABLE SET POINT: This is a programmable set point output (open collector) that can be related to: Frequency, Power, Time, Status. The output is activated when the reference quantity chosen is higher than the threshold set value.

The output logic can be configured as “high level active” = when the output is active the pin voltage is low or as “low level active” = when the output is active the pin voltage is high (+24V).

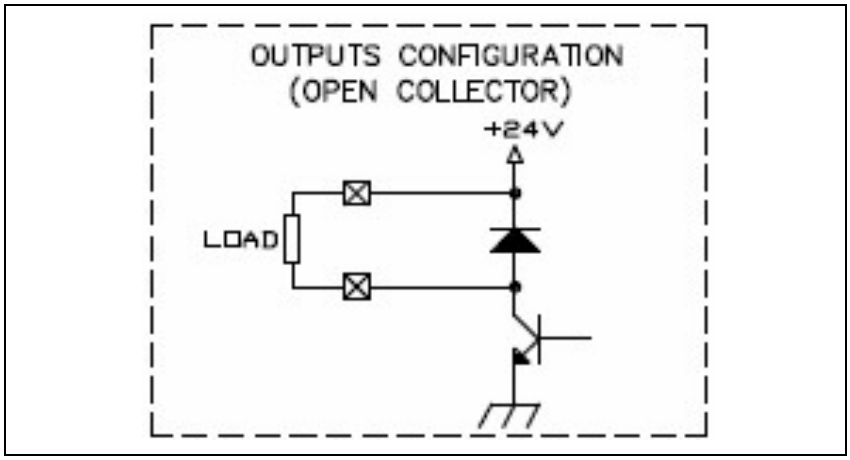


Figure 8

Moreover, if the reference quantity is the frequency, the current drawn or the pressure measured, it is possible to set the hysteresis (in % of the threshold value) to avoid bouncing.

It is possible to delay the set point checking for a programmable delay time.

For example:

- reference quantity: frequency
- threshold: 500 Hz
- threshold hysteresis: 1 %
- activation logic: high level active
- delay time: 0 s

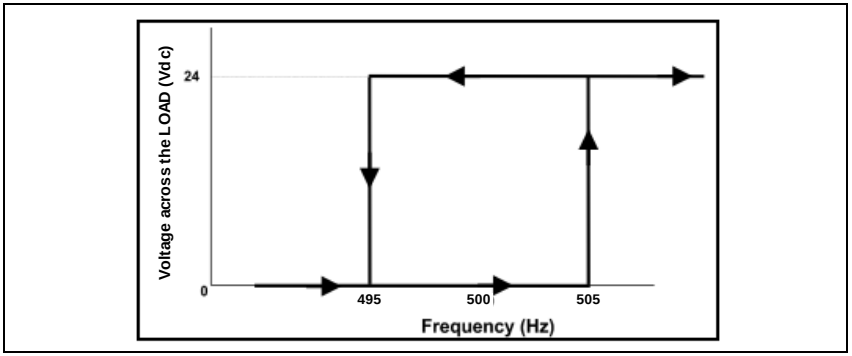


Figure 9

The set PROGRAMMABLE SET POINT Output voltage stays at 24 Vdc until the frequency becomes higher than 505 Hz (that is 500 Hz + 1% of 500 Hz), then the output goes at 0 Vdc and stays at 0 Vdc until the frequency becomes lower than 495 Hz (that is 500 Hz – 1% of 500 Hz).

The PROGRAMMABLE SET POINT signal has the following default settings:

- reference quantity: frequency
- threshold: 582 Hz
- Threshold hysteresis: 2 %
- activation type: high level active
- delay time: 0 s

These settings can be changed by means of serial interfaces (see “Windows Meaning” table, windows form 101 to 105). The same settings are used by the SET POINT CONTACT OUTPUT.

SET POINT CONTACT OUTPUT: This output (relay contact) works in the same way like THE PROGRAMMABLE SET POINT: it uses the same settings used by this programmable set point.

In particular it is activated when the reference quantity chosen (frequency, current, time, status normal) is higher than the threshold setting value.

The contact logic is configured depending on Activation Type parameter status. If Activation Type is “high level active” the contact is configured as “normally open” (it will close the circuit when activated), if Activation Type is “low level active” the contact is configured as or “normally closed” (it will open the circuit when activated).

Then the default factory setting for this contact output is normally open.

SPEED SETTING: PWM input signal (opt isolated) to set the pump speed. The PWM signal characteristics must be the following:

- frequency: 100 Hz +/-20 %
- amplitude: from 5 to 24 V
- duty cycle range: from 25 % to 75 % (t_{off}/T) corresponding to a rotational frequency from 200 Hz to 650 Hz linearly. With duty cycle <25 % rotational frequency = 200 Hz, with duty cycle >75 % rotational frequency = 650 Hz

NOTE The duty cycle percentage is referred to the low level portion of the PWM signal

NOTE High Speed is the nominal rotational frequency of the pump (650 Hz). Low Speed (440 Hz) corresponds to the rotational frequency for a stand by status. Users can set rotational frequency between these two values.

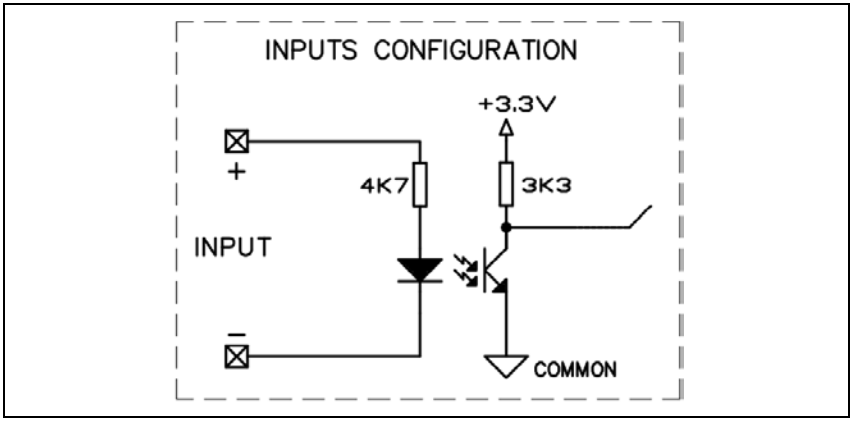


Figure 10

If any signal isn't applied (no connection) the driving frequency is set to "Maximum ROTATIONAL frequency" (the default value is 650 Hz; it is settable via serial line by means of window 121: see the serial command table).

If a continuous signal is applied (for example pin 5 connected to pin 9 and pin 6 connected to pin 15 → $t_{off}/T = 0\%$) the driving frequency is set to "Low Speed" (the default value is 440 Hz; it is settable via serial line by means of window 117: see the serial command table).

The "Low Speed" function can also be activated by serial communication with window 1, and the low speed value can be adjusted via window 117.

Both low speed value (win.117) and high-speed value (win.120) are limited between 440 Hz (value that can't be set by the user) and "Maximum excitation frequency" (win.121, 650 Hz default).

SOFT START: input signal (opt osolated) to activate the Soft Start function. This function must be activated (pin 7 shorted with pin 9 and pin 8 shorted with pin 15) if the pump remains unused for a protracted stop, and de-activated for the next run-up. See the paragraph "SOFT START" for a more detailed description.

PROGRAMMABLE ANALOG SIGNAL: this signal is an output voltage (from 0 to 10 Vdc, max load 1.5 mA) proportional to a reference quantity (frequency, power, pump temperature) chosen by the user (by means of the front panel commands or through serial command – window 111). The default setting is frequency (see the following example diagrams).

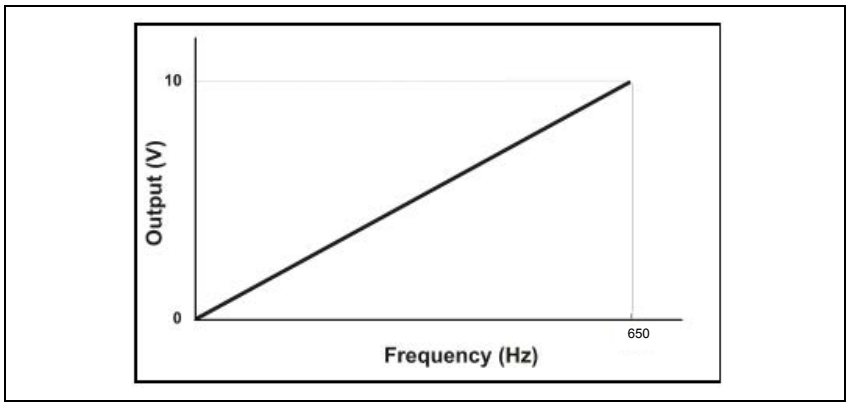


Figure 11

The analog output power related is showed in the following diagram:

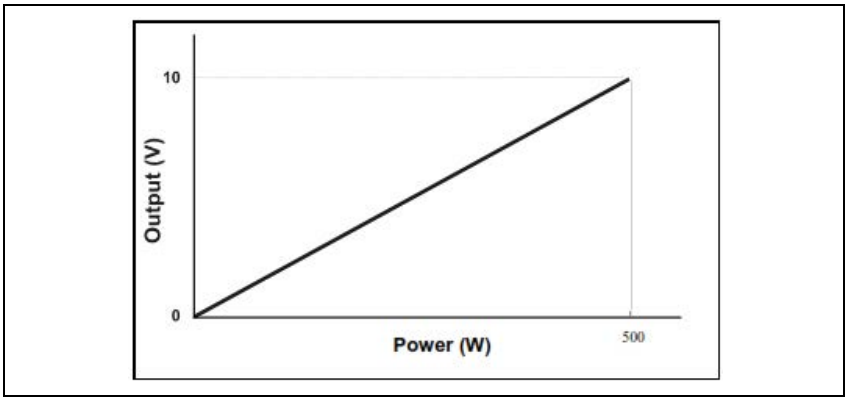


Figure 12

The analog output pump temperature related is showed in the following diagram:

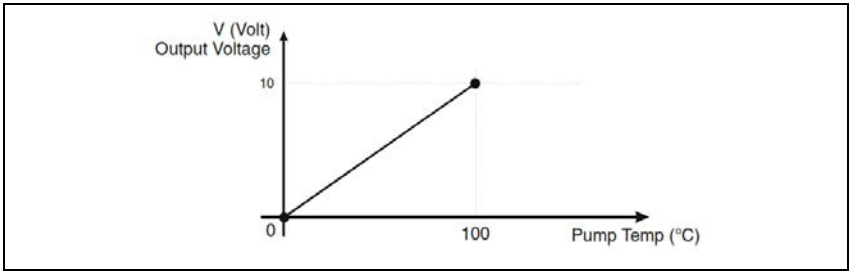


Figure 13

Connection P1 PURGE-VENT

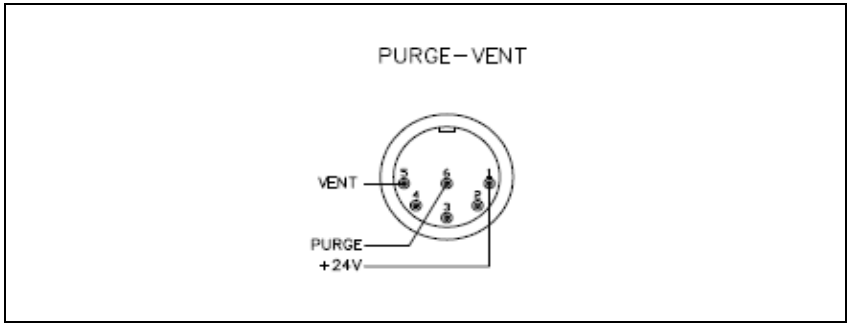


Figure 14

NOTE *ref.7 in figure above*

The Turbo-V 1001 Pumping system can have as an optional accessory the purge/vent device (model X3501-68002). Through P1 connector the controller is able to drive the Vent Valve (Normally Open) placed on the accessory.

Connection P2 EXTERNAL FAN

This is a dedicated 24 Vdc connector to supply the optional external fan kit through a suitable optional extention cable (see Orderable Parts table).

See Window Meaning table and HOW TO USE BY FRONT PANEL chapter to know the external fan possible settings.

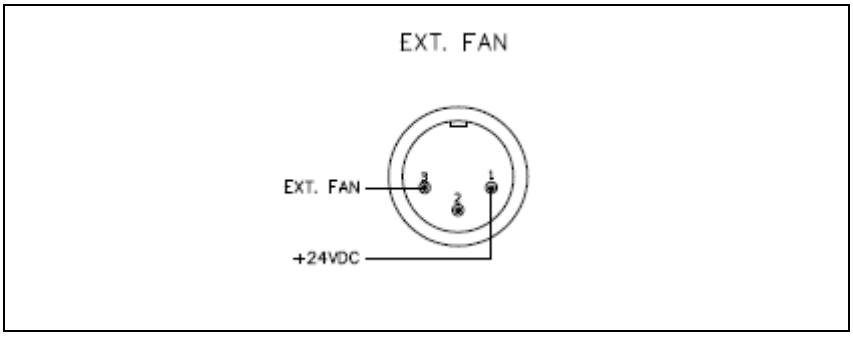


Figure 15

NOTE ref.8 in figure above

Controller-to-Pump Connection

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

A-F = upper bearing sensor

B-C-D = 3-phase output to pump motor

E = ground

A-G =pump body temperature sensor

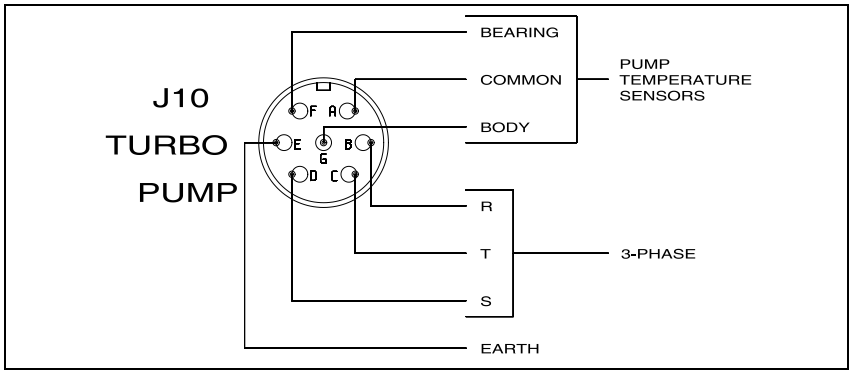


Figure 16 Pump connector

The pump cable can be extended by means of an optional extension cable (see Orderable Parts table).

Input / Output Electrical Specifications

I/O RATINGS				
I/O TYPE	ON	OFF	MAX LOAD	NOTE
INPUT, START/STOP	>12V	< 4V		MAX 24VDC/6mA
INPUT, INTERLOCK	>12V	< 4V		MAX 24VDC/6mA
INPUT, SOFT START	>12V	< 4V		MAX 24VDC/6mA
INPUT, SPEED SET	>12V	< 4V		MAX 24VDC/6mA
OUTPUT, OPEN DRAIN SETPOINT	<0.25V		24VDC/200mA	MAX CURRENT FROM J1.9 200mA
OUTPUT, OPEN DRAIN FAILURE	<0.25V		24VDC/200mA	
OUTPUT, RELAY	<100mohm		24VDC/200mA	
OUTPUT, ANALOG			2mA	RANGE 0/10V 10V=xxxHz T.B.D.
OUTPUT, OPEN DRAIN PURGE	<0.25V		24VDC/200mA	MAX CURRENT (VENT + PURGE) 200mA
OUTPUT, OPEN DRAIN VENT	<0.25V		24VDC/200mA	
OUTPUT, OPEN DRAIN EXT FAN	<0.25V		24VDC/500mA	

Figure 17 Input / Output electrical specifications

PURGE/VENT VALVES: the Turbo-V 1001TwisTorr Pumping System can integrate the Purge and Vent valves. The two valves are Normally Closed (N.C.) so if a power fail occurs, the valves will remain closed.

The valves operating mode can be set by serial communication with WIN 125 or using front panel interface (see following diagram for details). The valve operating mode can be changed only with the pump in STOP status.

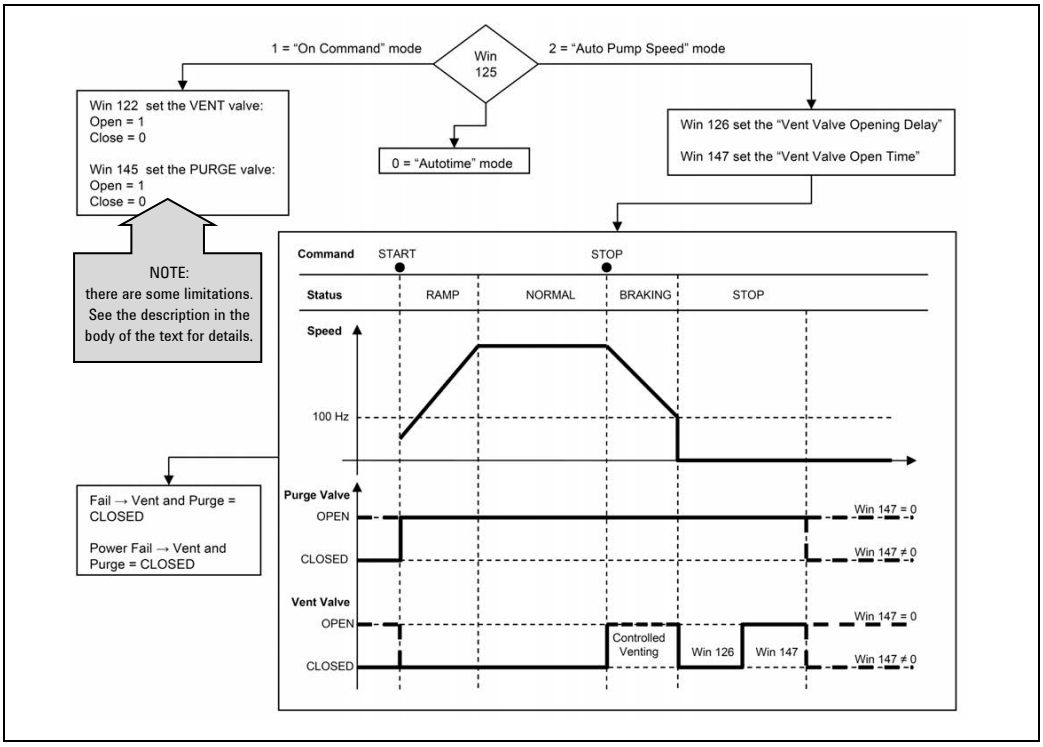


Figure 18

Auto Pump Speed Mode – with Purge/Vent Device Accessory Only

If WIN 125 = 2 the both the valves are managed by an automatic procedure.

When activated, this procedure guarantees that the pump is slowed down properly modulating in automated way the Vent Valve (see the figure above for details).

CAUTION! The vent could damage the pump. Please, use the “Auto Pump Speed” mode or refer to Agilent personnel.

On Command Mode – with Purge/Vent Device Accessory Only

If WIN 125 = 1 the vent valves can be operated manually via serial communication (or by front panel interface) with the followings limitations.

Setting WIN 122 = 1 the Vent Valve opens only if the pump is in STOP status: if the pump is in STARTING, NORMAL or AUTOTUNING status the valve stays close; if the pump is in BRAKING status, the Vent Valve performs a Controlled Venting.

Setting WIN 122 = 0 the Vent Valve is closed independently from the pump status.

Autotime Mode – with Purge/Vent Device Accessory Only

The default setting for vent operating mode is “Autotime” (Win 125 = 0).If WIN 125 = 0 the Vent and Purge Valves are opened as a function of time (see the figure below for details). The timings are configurable through WIN 126 (Vent Valve Opening Delay) and WIN 147 (Vent Valve Opening Time).

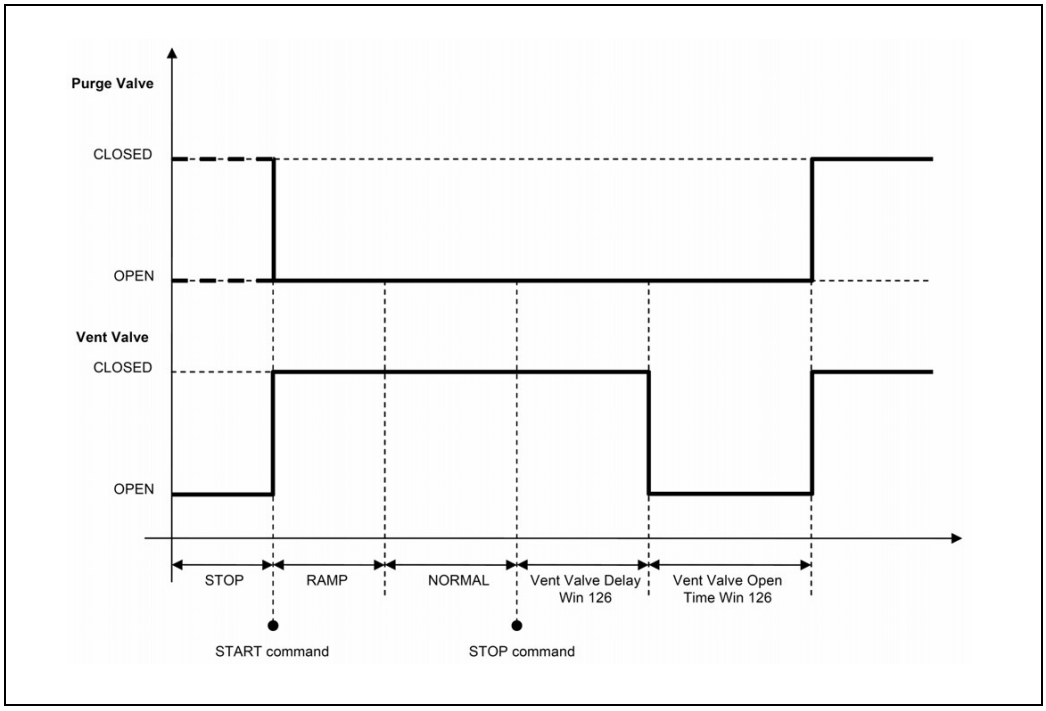


Figure 19 Vent and Purge Valves diagram for " Autotime" mode

Controlled Venting

In the following conditions the Vent Valve performs a Controlled Venting.

If WIN 125 = 1 (On Command mode), WIN 122 = 1 and the pump is in BRAKING status;

If WIN 125 = 2 (Auto Pump Speed mode) and the pump is in BRAKING status.

During a Controlled Venting procedure the Vent Valve opening time is modulated so that the pump deceleration quickness is maintained in the range between 3 and 5 Hz/s. The timing is adjusted every 10 seconds.

Stop Speed Reading

This function allows the user to read the pump rotational frequency (window 232) even after a stop command, during the braking. The function can be activated/deactivated by serial communication (WIN 167). If activated, all the related functions (set point output, programmable analog output – if related to the frequency, ...) will follow the frequency reading.

NOTE The T-Plus Software (optional) allows the operator to set all the programmable feature.

Serial Communication (J2 Connector)

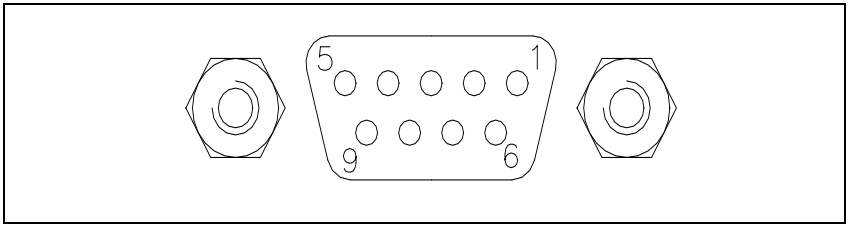


Figure 20

This is a 9 pin Female D-type serial input/output connector to control via an RS 232 or RS 485 connection the Turbo-1001 Pumping System.

Tab. 4

PIN N.	SIGNAL
1	+5Vdc OUT (100mA max)
2	TX (RS232)
3	RX (RS232)
4	Not connected
5	GND
6	A + (RS485)
7	Not connected
8	B – (RS485)
9	Not connected

A serial communication kit with a serial cable and the T-Plus software (p/n 969-9883) is available (optional).

SERIAL CABLE INSTALLATION The supplied serial cable must be installed when the Turbo-V 1001 Pumping System has to be controlled by means of a remote personal computer.

The cable is installed fixing the 9 pin D-type Male connector into the J2 serial connector.

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

The following picture shows the right procedure to connect a cable to the I/O or to the serial port connector.

A shielded cable of 30 m maximum length has to be utilized for both serial and I/O port connections.

NOTE Take care to have a good contact (soldered) between the metallic connector case and the external shield of the cable. Moreover, this connection has to be assured at least on the controller side.

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

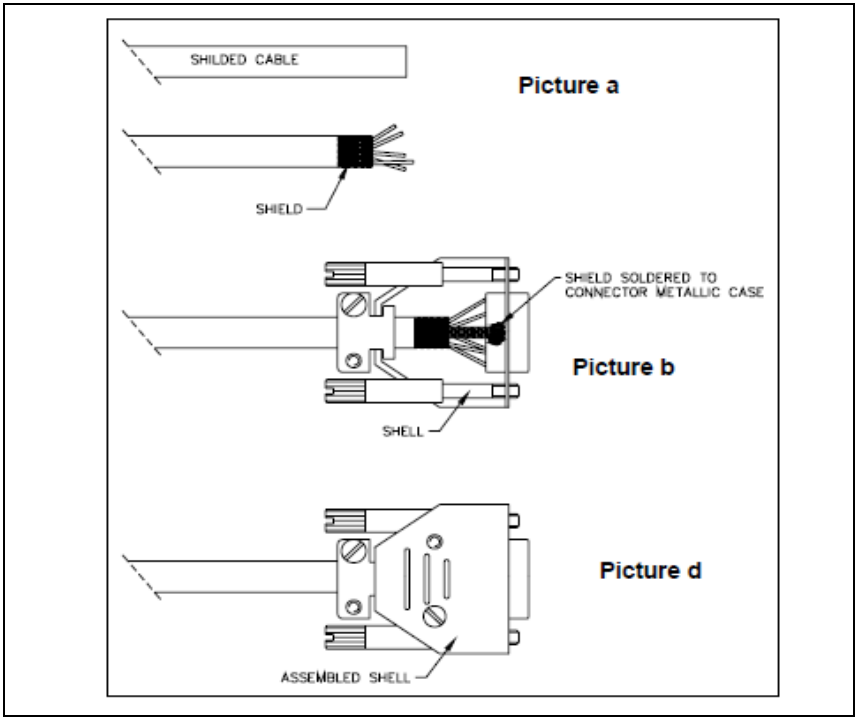


Figure 21

RS 232/RS 485 Communication Description

Both the RS 232 and the RS 485 interfaces are available on the connector J2.The communication protocol is the same (see the structure below), but only the RS 485 manages the address field. Therefore to enable the RS 485 is necessary to select the type of communication as well as the device address by means of the T-Plus software.

Communication Format

- 8 data bit
- no parity
- 1 stop bit
- baud rate: 600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 programmable (default setting: 9600)

Communication Protocol

The communication protocol is a MASTER/SLAVE type where:

- Host = MASTER
- Controller = SLAVE

The communication is performed in the following way:

- the host (MASTER) send a message + CRC to the controller (SLAVE);
- the controller answer with an answer + CRC to the host.

The MESSAGE is a string with the following format:

<STX>+<ADDR>+<WIN>+<COM>+<DATA>+<ETX>+<CRC>

where:

NOTE When a data is indicated between two quotes ('...') it means that the indicated data is the corresponding ASCII character.

- <STX> (Start of transmission) = 0x02
- <ADDR> (Unit address) = 0x80 (for RS 232)
  <ADDR> (Unit address) = 0x80 + device number (0 to 31) (for RS 485)
- <WIN> (Window) = a string of 3 numeric character indicating the window number (from '000' to '999'); for the meaning of each window see the relevant paragraph.

- <COM> (Command) = 0x30 to read the window, 0x31 to write into the window
- <DATA> = an alphanumeric ASCII string with the data to be written into the window. In case of a reading command this field is not present.
  The field length is variable according to the data type as per the following table:

Tab. 5

Data Type	Field Length	Valid Characters
Logic (L)	1	'0' = OFF '1' = ON
Numeric (N)	6	'-', '.', '0' . . . '9' right justified with '0'
Alphanumeric (A)	10	from blank to '_' (ASCII)

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

The addressed SLAVE will respond with an ANSWER whose structure depends from the MESSAGE type.

When the MESSAGE is a reading command, the SLAVE will respond transmitting a string with the same structure of the MESSAGE.

NOTE Using the RS 485 interface, the message structure remains identical to the one used for the RS 232 interface, the only difference being that the value assigned to the ADDRESS <ADDR>.

The controller can answer with the following response types:

Tab. 6

Type	Length	Value	Description
Logic	1 byte	-	After a read instruction of a logic window
Numeric	6 bytes	-	After a read instruction of a numeric window
Alpha-numeric	10 bytes	-	After a read instruction of an alphanumeric window
ACK	1 byte	(0x6)	The command execution has been successfully completed
NACK	1 byte	(0x15)	The command execution has been failed
Unknown Window	1 byte	(0x32)	The specified window in the command is not a valid window
Data Type Error	1 byte	(0x33)	The data type specified in the command (Logic, Numeric or Alphanumeric) is not accorded with the specified Window
Out of Range	1 byte	(0x34)	The value expressed during a write command is out of the range value of the specified window
Win Disabled	1 byte	(0x35)	The specified window is Read Only or temporarily disabled (for example you can't write the Soft Start when the Pump is running)

Examples

Command: START
Source: PC
Destination: Controller

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

Source: Controller
Destination: PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command: STOP
Source: PC
Destination: Controller

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

Source: Controller
Destination: PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

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

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

Source: Controller
Destination: PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

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

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

Source: Controller
Destination: PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Window Meanings

Tab. 7

N.	Read/ Write	Data Type	Description	Admitted Values
000	R/W	L	Start/Stop (in remote mode the window is read only)	Start = 1 Stop = 0
001	R/W	L	Low Speed (in remote mode the window is read only)	0 = OFF 1 = ON (default = 0)
008	R/W	L	Serial, Remote, or Front Panel control mode	Serial = 0 Remote = 1 Front Panel = 2 (default = 1)
100	R/W	L	Soft Start (can be written only in Stop condition)	YES = 1 NO = 0
101	R/W	N	Set Point reference quantity	0 = Frequency 1 = Current 2 = Time 3 = *Normal* (default = 0)
102	R/W	N	Set Point threshold (expressed in Hz, mA, s, _, mbar)	(default = 720)
103	R/W	N	Set Point delay: time between the pump start and the set point check starting (s).	0 to 999999 (default = 0)
104	R/W	L	Set Point Output logic	0 = high level active 1 = low level active (default = 0)
105	R/W	N	Set point hysteresis (in % of threshold)	0 to 100 (default = 2)

N.	Read/ Write	Data Type	Description	Admitted Values
106	R/W	L	Cooling agent	0 = AIR 1 = WATER (default = 0)
107	R/W	L	Active Stop (can be written only in Stop condition)	0 = NO 1 = YES (default = 0)
108	R/W	N	Baud rate	600 = 0 1200 = 1 2400 = 2 4800 = 3 9600 = 4 19200 = 5 38400 = 6 (default = 4)
110	R/W	L	Interlock mode (if configured as Impluse the Interlock signal acts only at the start)	Impulse = 0 Continuous = 1 (default = 1)
111	R/W	L	Analog output link: the output voltage can be related to different quantities.	0 = frequency 1 = power 2 = bearing temp (default = 0)
117	R/W	N	Low speed setting [Hz]	350 to WIN 121 (default = 750)
120	R/W	N	High speed setting [Hz]	350 to WIN 121 (default = 825)
121	R/W	N	Maximum rotational frequency in Hz (can be written only in Stop condition)	350 to 825 (default = 825)
122	R/W	L	Set Vent Valve status	1 = open 0 = close (default = 0)
125	R/W	L	Valves operating mode	0 = On Command 1 = Auto Pump Spedd 2 = Autotime (default = 2)

N.	Read/ Write	Data Type	Description	Admitted Values
126	R/W	N	Vent valve opening delay expressed in 0.2 sec	0 to 65535 Corresponding to 0 to 13107 sec (Default = 15)
143	R/W	N	External Fan Configuration	0 = Always ON 1 = Automatic 2 = Serial (default = 2)
144	R/W	L	External Fan activation	0 = OFF 1 = ON (default = 0)
145	R/W	L	Purge Valve open/close (N.C.)	0 = close 1 = open (Default =1)
147	R/W	N	Vent Valve opening (Time expressed in 0.2 s)	0 to 65535 bit 0 = infinite min 0.2 s, Max 13107 s (default = 0)
155	R	N	Power Limit Applied expressed in W	
157	R/W	L	Gas Load Type	0 = Ar 1 = N_2 (default = 0)

N.	Read/ Write	Data Type	Description	Admitted Values
167	R/W	L	Stop Speed Reading (when active, the pump rotation speed is measured also in Braking status)	0 = No 1 = Yes (default = 1)
200	R	N	Pump current expressed in mA dc	
201	R	N	3 phase voltage expressed in V_{rms}	
202	R	N	Output power expressed in W	
203	R	N	Driving frequency expressed in Hz	
204	R	N	Pump bearing temperature expressed in °C	
205	R	N	System status	Stop = 0 Waiting intlk = 1 Ramp-Up = 2 Auto-tuning = 3 Braking = 4 Normal = 5 Fail = 6
206	R	N	Error code	Bit description: see the following figure
211	R	N	Controller Internal temperature in °C	
222	R	N	Body pump temperature in °C	
232	R	N	Rotational frequency in Hz	
300	R	N	Cycle time in minutes (zeroed by the reset command)	0 to 999999
301	R	N	Cycle number (zeroed by the reset command)	0 to 999999
302	R	N	Pump life in hours (zeroed by the reset command)	0 to 999999

N.	Read/ Write	Data Type	Description	Admitted Values
310 to 399	Reserved to Agilent service			
400	R	A	CRC EPROM (QE)	QE8XXXX (where "XXXX" are variable)
402	R	A	CRC Param. (PA)	PA8XXXX (where "XXXX" are variables)
404	R	A	CRC parameter structure	XXXX
406	R	A	Program Listing code & revision	XXXX
407	R	A	Parameter Listing code & revision	XXXX
500 to 502	Reserved to Agilent service			
503	R/W	N	RS 485 address	0 to 31 (default = 0)
504	R/W	L	Serial type selection	0 = RS 232 1 = RS 485 (default = 0)

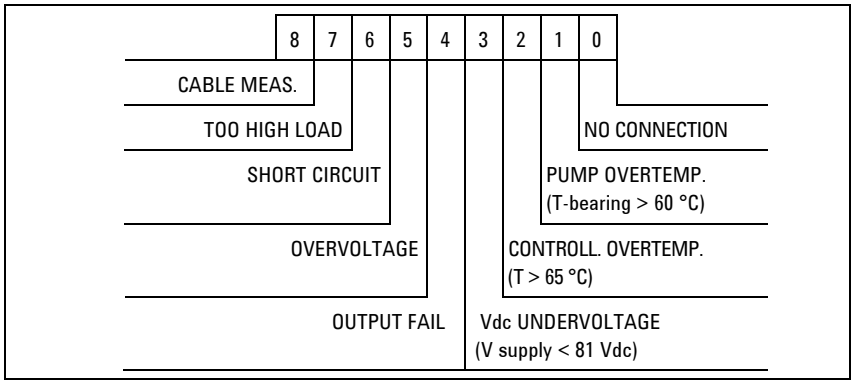


Figure 22 Window N. 206 Bit Description

Soft Start

"Soft Start" mode is provided to start the pump after a protracted stop of the Turbo 1001 Pump. This allows a better grease distribution in the bearings.

The "Soft Start" mode is disabled by default. The "Soft Start" mode can be activated by a suitable software, by Remote I/O or by Front Panel command (see the paragraphs "INTERCONNECTIONS" and "RS 232/485 COMMUNICATION DESCRIPTION"). "Soft Start" frequency steps are the followings: 150 Hz, 250 Hz, 350 Hz, 450 Hz, 550 Hz and 650 Hz. The pump remains at each step for a period of 300 s. A fail condition occurs if the pump is not able to properly spin up the driving frequency (Too High Load Error).

Agilent T-Plus

Agilent T-plus (Turbo Pumps Linked User Software) is the communication, control and monitoring software for Agilent Turbo molecular Pumps and all other Agilent products featuring the Agilent Window Serial Protocol. With T-plus, you can simultaneously drive and control one or more Turbo Pumps, connected to a PC through an RS232 or an RS485 serial communication and by an easy User Interface it is possible to obtain totally control of the Vacuum Pumps. Automatic identification of the connected Pumps, description of each command always on screen, and User Interface adaptable to the Pump Status are only some of the features developed to make the approach to pump settings easy and to reduce the number of steps during pump configuration. Moreover, special care is given to the GUI (Graphical User Interface), to reproduce the environment of well-known User Interfaces (such as Microsoft® Windows® applications), to obtain a real User Friendly tool, and to reduce the user learning time. T-plus software features several options like Data Logging, Chart Representation and Network Configuration, to help you configure your Vacuum devices quickly, and to check your vacuum system status at any time. Exhaustive online Help is also included, providing the user with a complete, easy to learn system, tailored to customer requirements.

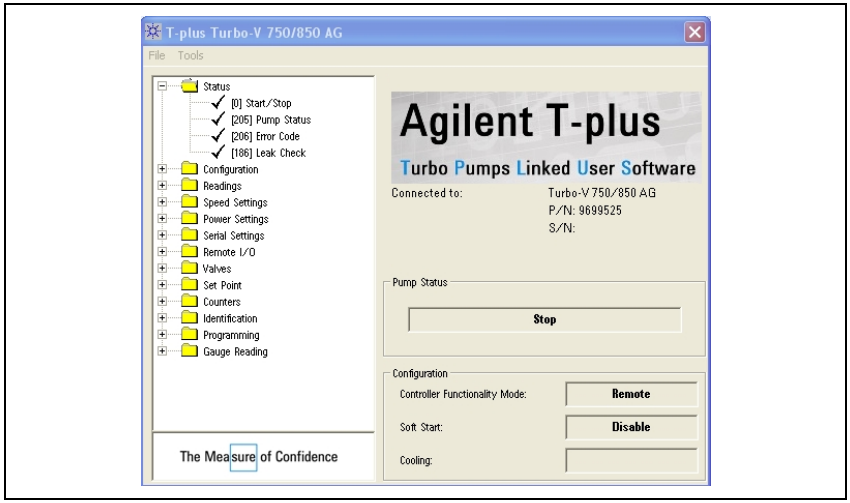


Figure 23

Embedded Data Logger Manager (New Function)

This controller integrates the data logger function, it enables the controller to manage some log files with a big amount of data. The user can download this data using the T-plus software.

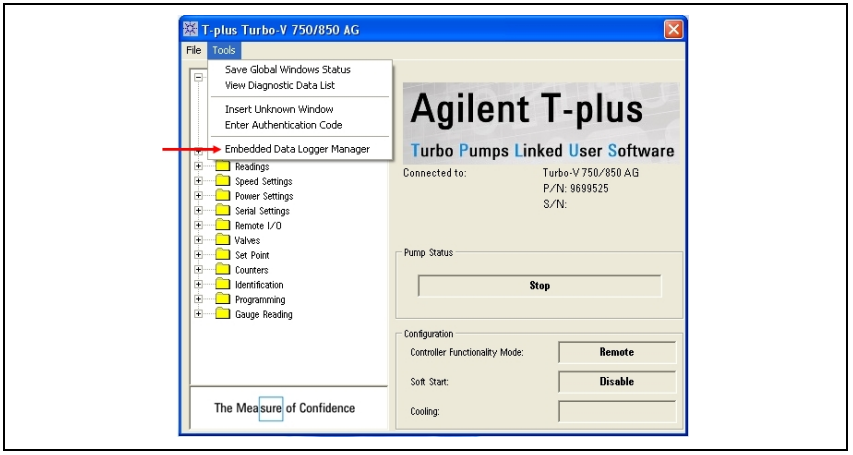


Figure 24

The EDLM Interface will be as shown below:

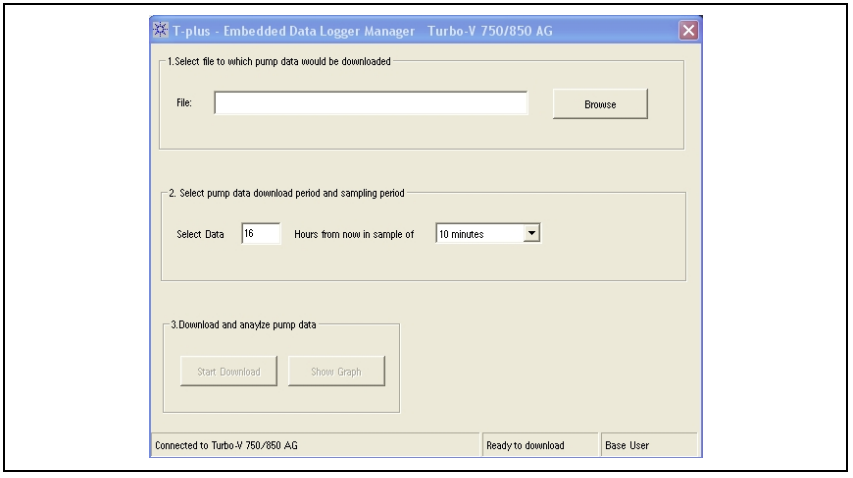


Figure 25

In this screen the user would:

1. Select the pump data download file. This file could be a new or an existing file. When any file is selected Start Download button will be enabled. If an existing file is selected Start Download and Show Graph buttons will be enabled.
2. Select the pump data download period and appropriate sample time. The max data download period is limited to 16 hours– edit field having default value 16 and fixed sample time of 10 minutes only.
3. Initiate download by pressing the Start Download button which would be enabled after selecting a file. When the user clicks on this button the input data would be validated and the download would begin. During the download process the Start Download button would read “Abort Downloading”. This could be used to abort the data download midway.
4. Click the Graph Button – This button would be enabled when the file download is complete and/or the destination file specified is present on the computer. Clicking this button would invoke the Graph control and the trend for the entire data for that period would be plotted in the Graph.

Drive the External Fan

There are three different ways to drive the external Fan selectable via Front Panel and via RS232/RS485:

1. Always ON
   Setting WIN 143 = 0 the fan remains always ON (the value in WIN144 is not considered)
2. Automatic Setting WIN 143 = 1 the external fan is always ON during the Ramp-up status. In the others status the fan behavior depends only on WIN 144 value: WIN 144 = 1 external fan ON; WIN 144 = 0 external fan OFF That means that WIN 144 determines the Fan status when the pump reaches the “normal” status.
3. Serial With WIN 144 = 2 (default value) the external fan is configured in serial mode, in this condition the fan behavior depends only on WIN 144 value) Setting WIN 143 = 2: WIN 144 = 1 external fan ON; WIN 144 = 0 external fan OFF. The WIN 143 default value is 0.

Power Derating Function during High Temperature Condition

During operation the controller limits the power provided to the motor according to:

- Gas type load (selectable with WIN 157: see the "Window Meanings" paragraph)
- Cooling mode (selectable with WIN 106: see the "Window Meanings" paragraph)
- Body temperature (can be read by WIN 222).
- Electronics temperature (can be read by WIN 211).

WARNING!

The user must set the gas type load (WIN 157) and Cooling mode (WIN 106) before starting the pump.

The applied power limit is readable by serial line (WIN 155).

If the pump body temperature exceed 55 °C or the pump bearing temperature exceed 60 °C or the Controller temperature exceed 60 °C, the controller goes in status 6 (Fail).

The controller compensates, according to maximum available power, the power loss estimated due to the length of the pump cable.

In order to avoid wrong power compensations it is fundamental that the user sets the correct pump cable length (by considering the unit cable and possible extension cables) by means of the user interface or with WIN 148.

How to Use by Front Panel

Startup

Plug the controller power cable into a suitable power source.

The display lights up for approx. 2 seconds and shows:

A	G	I	L	E	N	T			V	A	C	U	U	M	
		T	E	C	H	N	O	L	O	G	I	E	S		
			T	U	R	B	O			7	5	0			
		A	U	T	O	T	E	S	T		O	K			

After 4 seconds, the display shows the following screen page:

S	T	A	T	U	S						X	X	X	H	z
						M	O	D	E						

Main Screen:

STATUS indicates the operating regime of the pump: Stop, Interlock, Starting, Autotune, Braking, Normal, Fail.

XXXHz is the current rotational frequency of the pump.

MODE = Front, Remote, Serial.

NOTE: If the pump is not connected and in case of the other fails, the display will be as follows:

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

Pump Start, Stop and Reset Fail

Press once the START/STOP button for the START command and again for the STOP command. In the case of controller's failure, press once to reset the fail condition.

NOTE The front panel START/STOP function is available only if the controller is set to "FRONT mode". If it is set to "REMOTE mode", when the key is pressed an error message is shown indicating "COMMAND LOCKED IN REMOTE", if it is set to "SERIAL" mode, the "COMMAND LOCKED IN SERIAL MODE" error message is displayed.The error message is displayed for approx. 1 second before moving to the previous parameter. The "Reset Fail" function is always available regardless of controller mode.

S	T	A	T	U	S						X	X	X	H	z
	C	O	M	M	A	N	D		L	O	C	K	E	D	
			I	N		R	E	M	O	T	E				
					R	E	M	O	T	E					

S	T	A	T	U	S						X	X	X	H	z
	C	O	M	M	A	N	D		L	O	C	K	E	D	
			I	N		S	E	R	I	A	L				
					S	E	R	I	A	L					

Counters / Controller Data:

Pressing once the COUNTERS pushbutton, the following information is displayed:

- **CYCLE XXXX** Number of start/stop cycles
- **TIME XXXXXm** Time of last cycle (minutes)
- **P.LIFE XXXXXX** total operating time (hours) of the pump

S	T	A	T	U	S						X	X	X	H	z
			C	Y	C	L	E		X	X	X	X			
		T	I	M	E			Y	Y	Y	Y	Y	m		
	P	.	L	I	F	E		X	X	X	X	X	X	h	

Pressing twice the pushbutton, the following information is displayed

- **MN** Model Number of the controller
- **SN** Serial Number

S	T	A	T	U	S						X	X	X	H	z
			C	O	N	T	R	O	L	L	E	R			
	M	N	:		X	X	X	X	X	X	X	X	X	X	
	S	N	:		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

Pressing a third time, the following message is displayed:

- **FW** Firmware version
- **PA** Parameter Listing version

S	T	A	T	U	S						X	X	X	H	z
			C	O	N	T	R	O	L	L	E	R			
	F	W			X	X	X	X	X	X	X	X	X	X	
	P	A			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

On pressing the key again, the display goes back to main screen.

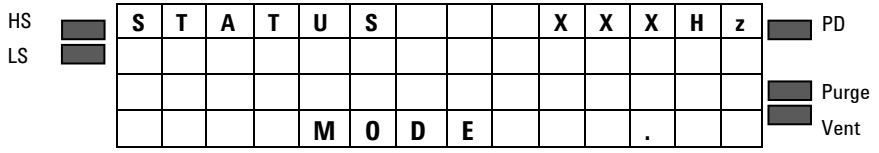
Measures

Pressing once on the MEASURES pushbutton, the information is displayed:

- **P=XXX W** is the power absorbed by to the pump.
- **T=XX °C** is the pump bearing temperature.
- **XXXX Hz** is the rotational frequency of the pump.
- **I=X.XXA** is the current absorbed by the pump.

S	T	A	T	U	S						X	X	X	H	z
				M	E	A	S	U	R	E	S				
	P	=	X	X	X	W			T	=	X	X	°	C	
	I	=	X	.	X	X	A								

On pressing the key again, the display goes back to main screen



If not otherwise specified the following status are showed with a solid symbol (no blinking request). Not showed in programming.

- **PD** Power Derating (blinking warning)
- **Purge** when active shows the status of the PURGE VALVE OPEN
- **Vent** when active (blinking) the VENT VALVE is OPEN or a CONTROLLER VENT BRAKING is active
- **HS** Shows the high speed selection: the controller is at HIGH SPEED.
- **LS** Shows the low speed selection: the controller is at LOW SPEED

Programming

To access the configuration menu, press the COUNTERS + MEASURES buttons at the same time for at least 2 sec.

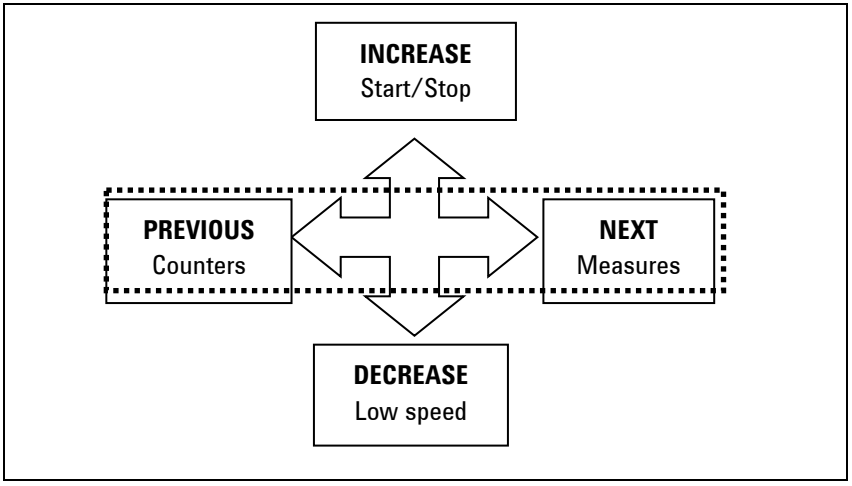


Figure 26

In programming mode, the meaning of the 4 buttons changes as follows:

- **COUNTERS/LOW SPEED**speed become "**INCREASE** and **DECREASE**"; it's possible to select the next or previous value of a parameter (in the case of compulsory parameters) or to increase/decrease the individual digit of a parameter (in the case of numeric parameters).
- The "**MEASURES** and **COUNTERS**" buttons become "**NEXT** and **PREVIOUS**"; it's possible to select the next parameter (or next digit of a numeric parameter) or previous parameter.

Swit from one parameter to the next using the “INCREASE/DECREASE” key. To Select the desired value use NEXT button. To exit from the current sub-menu use the PREVIOUS button. “Change OK” indicates confirmation of any changes made to the specific parameter.

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	O		Y	Y	Y	Y		H	z	
			C	H	A	N	G	E		O	K				

If the changes cannot be accepted by the controller, the “Out of limits” error message is displayed for approx. 1 second; the changes are cancelled and the previous parameter value is displayed.

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	O		Y	Y	Y	Y		H	z	
	O	U	T		O	F		L	I	M	I	T	S		

Switching from a parameter to the previous parameter (using the “PREVIOUS” key) indicates the intention to abort any changes made to the specific parameter. Abort is indicated by the caption “Change aborted” that is displayed for approx. 1 second before moving to the previous parameter.

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	O		Y	Y	Y	Y		H	z	
	C	H	A	N	G	E		A	B	O	R	T	E	D	

The configuration limits are showed in a sliding line reporting a minimum and maximum value like the following example: “XXXX TO YYYY ZZZ”.

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	O		Y	Y	Y	Y		H	z	
					X	X	X	X	H	z					

The configuration menu has a tree-like structure and permits “circular” navigation; on reaching the end of a branch, the user is returned automatically to the start of this. Navigation can proceed in a forwards (NEXT button) or backwards (PREVIOUS button) direction It is possible to enter a sub-branch by pressing the “INCREASE” button.

If no buttons are pressed for more than 1 minute, the controller automatically quits the programming menu canceling any modifications made to the current parameter.

The figure below shows the first level of the configuration menu and the links to the respective second level menus (indicated below).

After entering in any menu, the blinking value displayed is the value currently enabled.

Configuration Menu

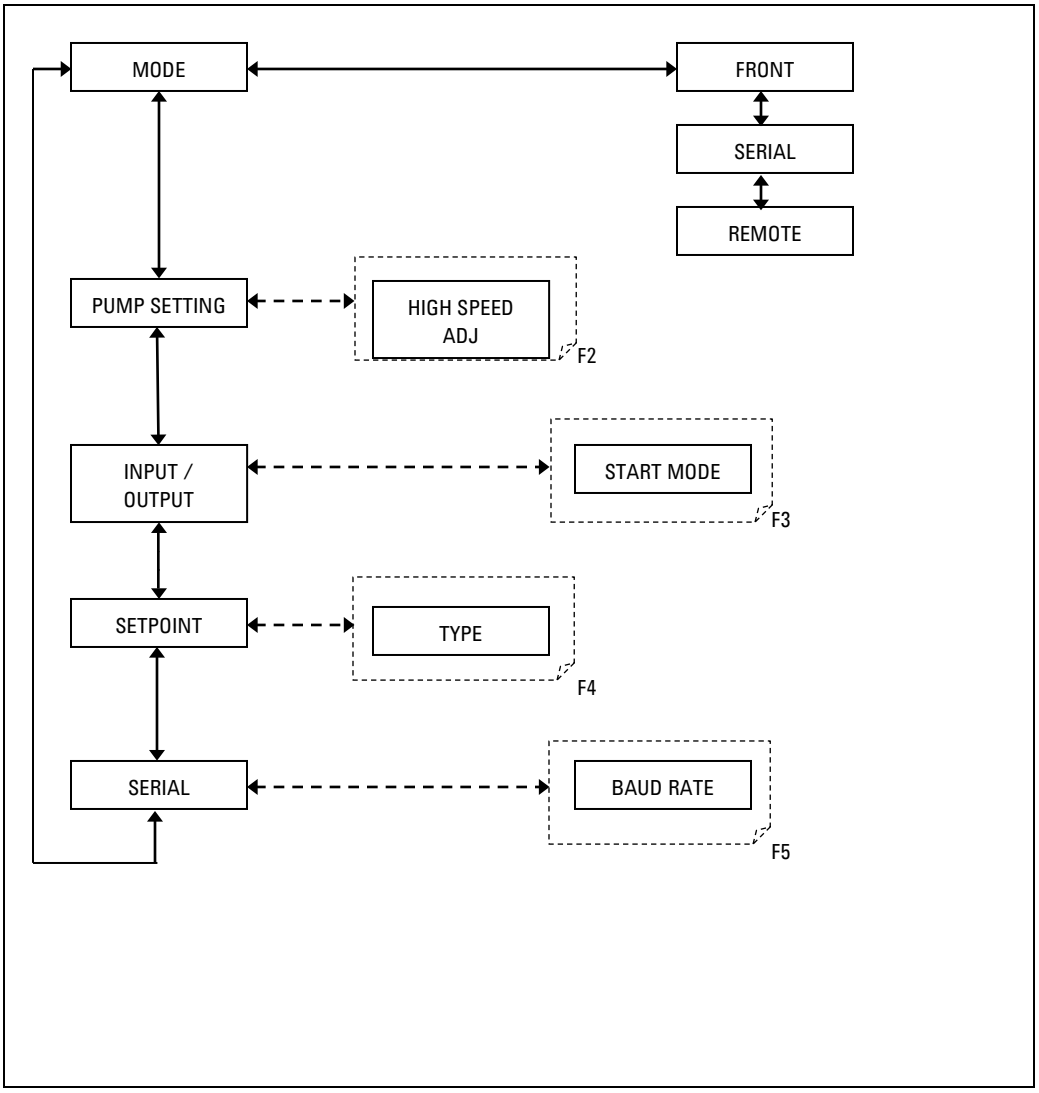


Figure 27

MODE: selections (see Flow 1/6) between following modes of operating:

- FRONT: accepts commands from the front panel
- SERIAL: accepts commands from the serial interface
- REMOTE: accepts commands from the remote input connector

The first selection displayed is the value currently enabled.
The selected choice is highlited with a special character on the right side (→).

The selected item shall be showed blinking as first entry in the circular menu.

S	T	A	T	U	S						X	X	X	H	z
	C	O	N	F	I	G	U	R	A	T	I	O	N		
→	M	O	D	E											
	P	U	M	P		S	E	T	T	I	N	G			

PUMP SETTING Menu

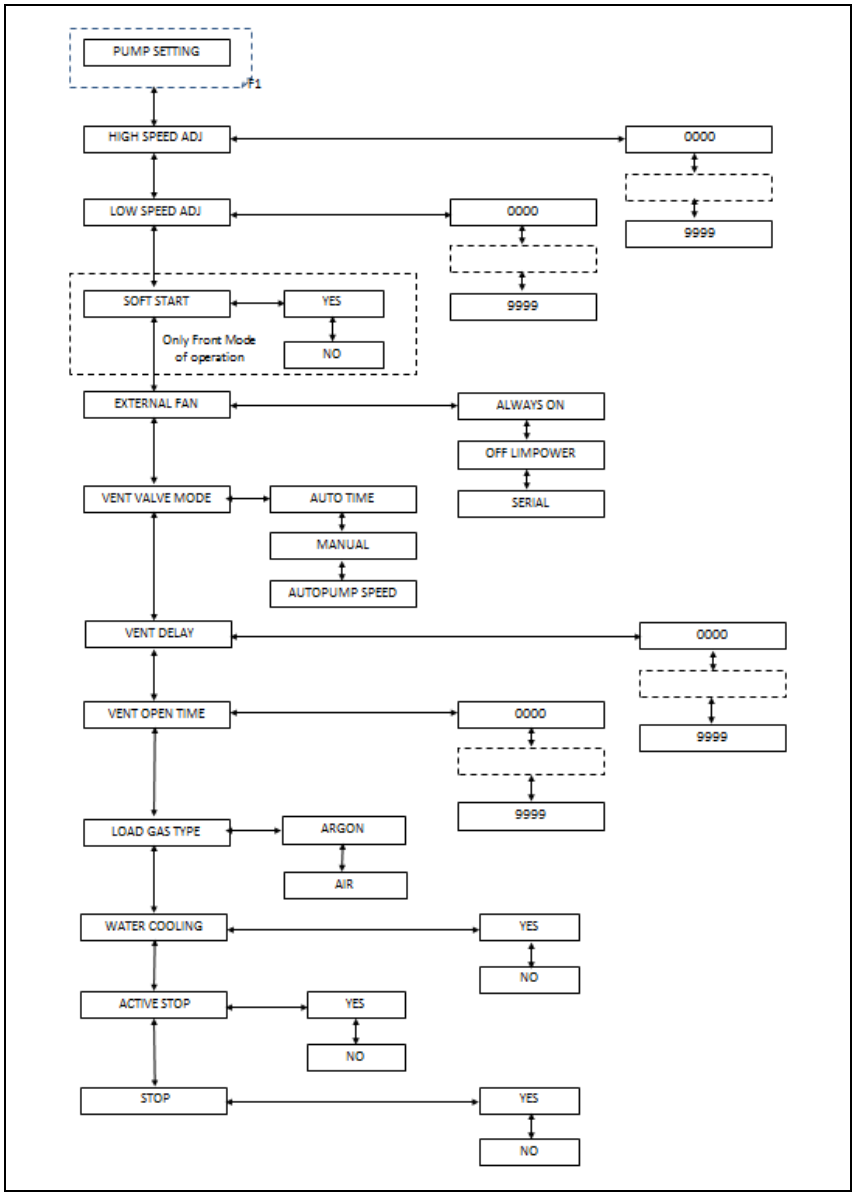


Figure 28

This menu contains all the parameters that have a direct effect on driving of the pump.

HIGH SPEED ADJ: Sets the rotational speed of the pump when the low-speed function is not active, expressed either in Hz or KRPM.

LOW SPEED ADJ: Sets the rotational speed of the pump when the low-speed function is active, expressed either in Hz or in KRPM.

SOFT START: enables (YES) or disables (NO) the soft start function. This parameter is visible only if the controller is configured in FRONT mode.

EXTERNAL FAN: it's possible to operate the external cooling fan selecting between following options:

- ALWAYS ON: the cooling fan is always ON
- OFF_LIMPOWER: 10 seconds after the pump has reached NORMAL status, the fan is switched off and the driving power of the pump is reduced to XXX.
- SERIAL: the cooling fan is controlled directly via the serial port.

VENT VALVE MODE: it's possible to operate the optional vent valve selecting between following mode of operation:

- AUTO TIME: the valve is controlled by the controller
- SERIAL: the valve is controlled by the serial port.
- AUTO PUMP SPEED: the valve is controlled by the controller its king into account the pump's deceleration.

VENT VALVE DELAY: Sets the delay, expressed in seconds, between stopping of the pump and opening of the vent valve.

VENT OPEN TIME: sets the time, expressed in seconds, for the vent vale to stay in open condition. Enter 0 if the valve has to stay open until the next start.

LOAD GAS TYPE: selects the type of gas used in the process. Therefore, the controller limits the power supplied to the pump according to this setting.

WATER COOLING: indicates whether the pump is cooled with water or not. The controller limits the power supplied to the pump according to this setting.

ACTIVE STOP: enables (YES) or disables (NO) active braking.

STOP SPEED READING: enables (YES) or disables (NO) the reading function of the pump rotational frequency during braking, after stop command.

INPUT/OUTPUT Menu

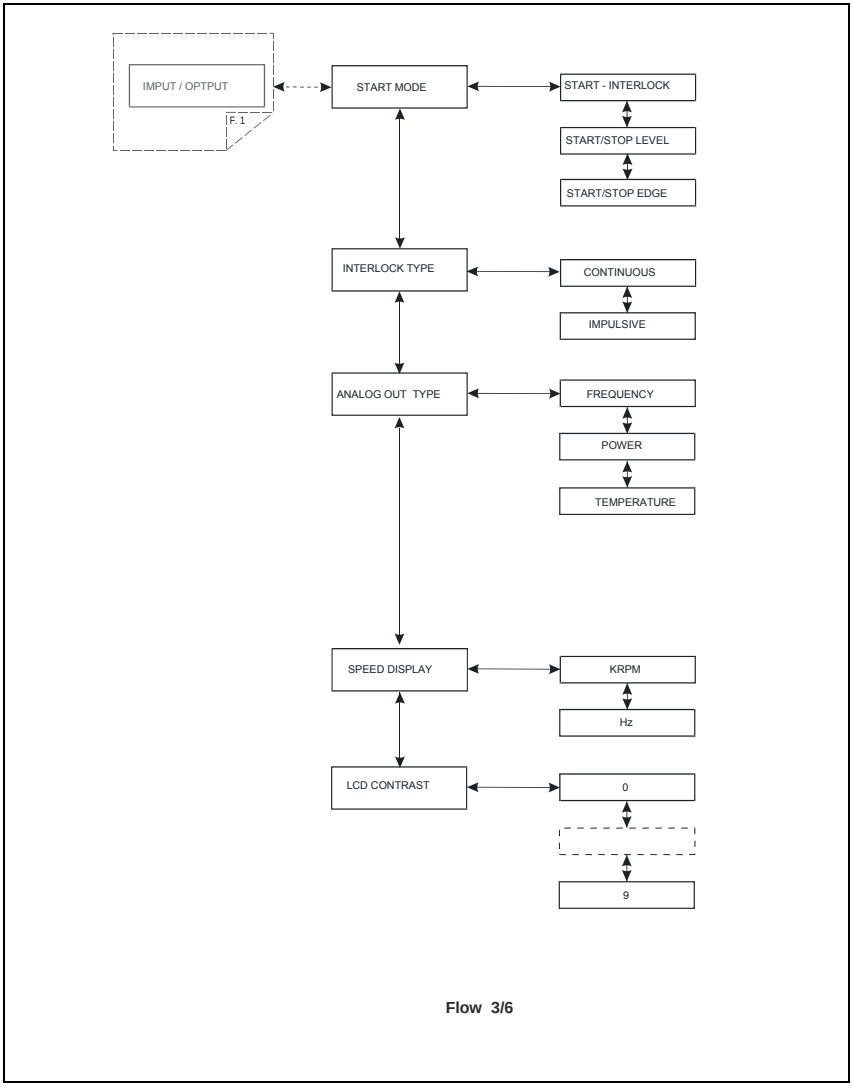


Figure 29

This menu contains parameters that determine the operating mode of the inputs and outputs of the controller.

START MODE: it distinguish three ways to start/stop the pump according to following description:

- START INTERLOCK, the controller checks for interlock mode; see interlock type description for further details.
- START/STOP LEVEL; if selected, close the START/STOP contact on I/O connector (1-9 and 2-15) to start the pump and close the INTERLOCK signal (3-9 and 4-15) to stop the pump.

INTERLOCK TYPE: selects the interlock mode on I/O connector:

- CONTINOUS: if enabled, the unit wants the contact on I/O connector to be closed; should be the contact open, error condition WAITING FOR INTERLOCK is displayed;
- IMPULSIVE: if enabled, the unit wants the interlock to be closed only at start command; should be removed the contact after start command or during normal operation, no error is displayed.

ANALOG OUTPUT TYPE: referred to the ANALOG OUTPUT SIGNAL on I/O connector; it can be related to one of following quantity:

- FREQUENCY, default value
- POWER
- TEMPERATURE

SPEED DISPLAY: the rotational speed can be displayed in

- KRPM
- Hz

LCD CONTRAST, increases/decreases the contrast on LCD display.

SETPOINT Submenu

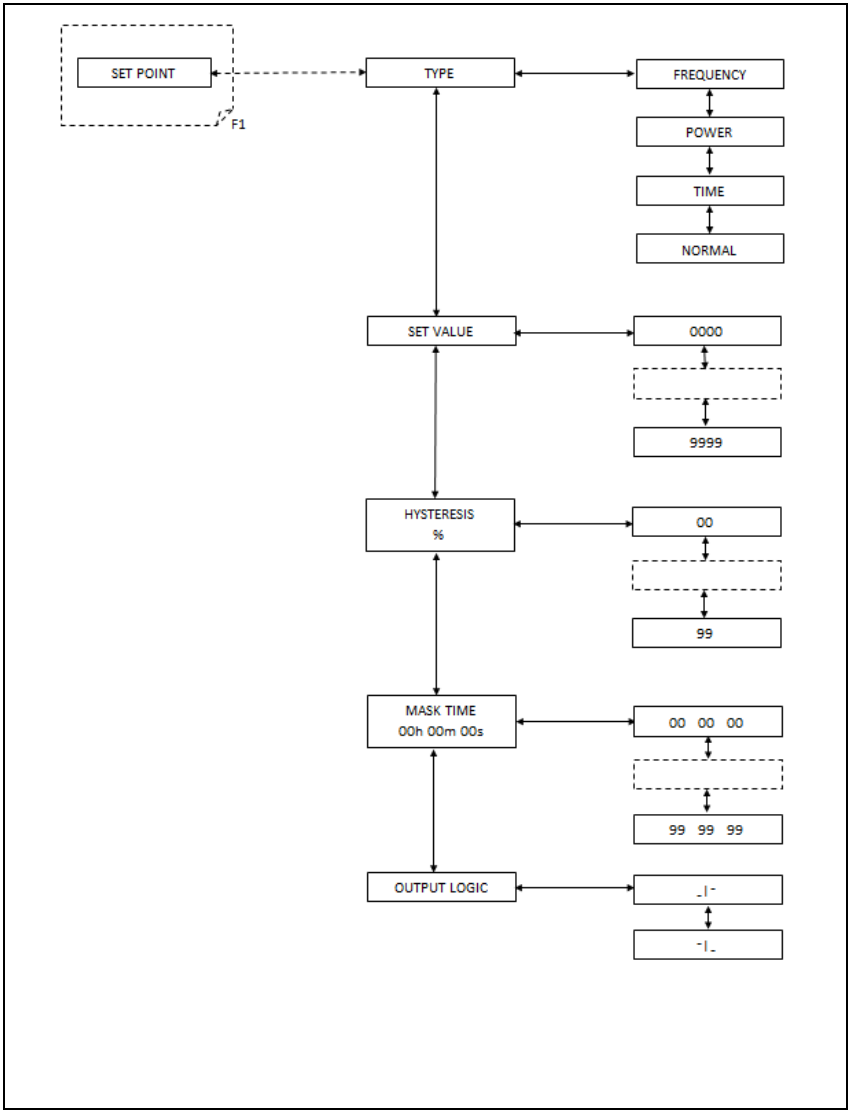


Figure 30

This submenu contains the settings related to the set point contact output with relay.

TYPE: the output signal can be setted referring on one of following values:

- FREQUENCY, default value
- POWER drawn by the pump
- TIME
- NORMAL, when the pump has reaches Normal Operation mode

SET VALUE, after selection of the analog output type, select the desired value from 0000 to 9999

HYSTERESYS, if a Hysteresys value is required, it can be adjusted between 00 and 99

MASK TIME Selectable between 00:00:00 and 99:99:99

OUTPUT LOGIC The contact logic is configured depending on Activation Type parameter status.

- If Activation Type is “high level active” the contact is configured as “normally open” (it will close the circuit when activated);
- if Activation Type is “low level active” the contact is configured as or “normally closed” (it will open the circuit when activated).

SERIAL Menu

This menu contains the settings for management of the RS232/485 serial line.

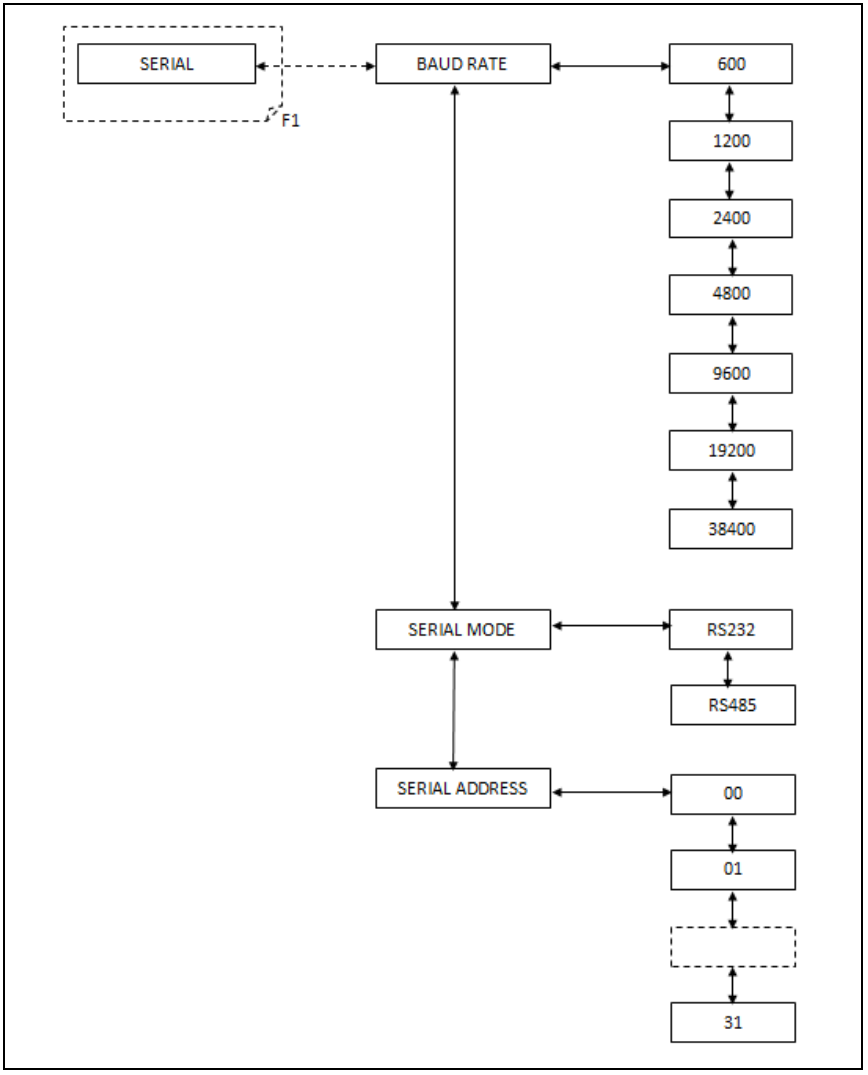


Figure 31

- **BAUD RATE:** permits selection of the communication speed selecting this from 600, 1200, 4800, 9600, 38400 baud
- **SERIAL MODE:** permits setting of the type of interface to RS232 (point to point) or RS485 (multidrop)
- **SERIAL ADDRESS:** sets the address of the node in the case of the RS485 interface. This parameter is not visible if the RS232 is selected.

To exit the menu press COUNTERS and MEASURE pushbuttons for at least 2 sec.

Examples

S	T	A	T	U	S						X	X	X	H	z
	C	O	N	F	I	G	U	R	A	T	I	O	N		
→	M	O	D	E											
	P	U	M	P		S	E	T	T	I	N	G			

NEXT button (to select MODE)

- MODE

- FRONT
- REMOTE
- SERIAL

From FRONT to SERIAL

S	T	A	T	U	S						X	X	X	H	z
						M	O	D	E						
→	F	R	O	N	T										
	R	E	M	O	T	E									

DECREASE button

S	T	A	T	U	S						X	X	X	H	z
						M	O	D	E						
	F	R	O	N	T										
→	R	E	M	O	T	E									

DECREASE button

S	T	A	T	U	S						X	X	X	H	z
						M	O	D	E						
	R	E	M	O	T	E									
→	S	E	R	I	A	L									

NEXT button (to select SERIAL)

S	T	A	T	U	S						X	X	X	H	z
						M	O	D	E						
			C	H	A	N	G	E		O	K				

S	T	A	T	U	S						X	X	X	H	z
						M	O	D	E						
→	S	E	R	I	A	L									
	F	I	E	L	D	B	U	S							

DECREASE button (to go on PUMP SETTING)

S	T	A	T	U	S						X	X	X	H	z
	C	O	N	F	I	G	U	R	A	T	I	O	N		
	M	O	D	E											
→	P	U	M	P		S	E	T	T	I	N	G			

NEXT button (to select PUMP SETTING)

S	T	A	T	U	S						X	X	X	H	z
		P	U	M	P		S	E	T	T	I	N	G		
→	H	I	G	H		S	P	E	E	D		A	D	J	
	L	O	W		S	P	E	E	D		A	D	J		

    - PUMP SETTING
- HIGH SPEED ADJ
    - 0000 TO 9999 Hz

NEXT button (to select HIGH SPEED ADJ)

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	0		Y	Y	Y	Y		H	z	
				X	X	X	X		H	z					

INCREASE button to raise the value

DECREASE button to diminish the value

PREVIOUS button to turn to the previous menu (and abort the change if any changes made)

NEXT button to pass to the next digit

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	0		Y	Y	Y	Y		H	z	
				X	X	X	X		H	z					

INCREASE button to raise the value

DECREASE button to diminish the value

PREVIOUS button to go to the previous digit

NEXT button to pass to the next digit

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	0		Y	Y	Y	Y		H	z	
				X	X	X	X		H	z					

INCREASE button to raise the value

DECREASE button to diminish the value

PREVIOUS button to go to the previous digit

NEXT button to pass to the next digit

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	O		Y	Y	Y	Y		H	z	
				X	X	X	X		H	z					

INCREASE button to raise the value

DECREASE button to diminish the value

PREVIOUS button to go to the previous digit

NEXT button to confirm the value

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
			C	H	A	N	G	E		O	K				

S	T	A	T	U	S						X	X	X	H	z
	H	I	G	H		S	P	E	E	D		A	D	J	
X	X	X	X		T	O		Y	Y	Y	Y		H	z	
				X	X	X	X		H	z					

PREVIOUS button to turn to the previous menu

S	T	A	T	U	S						X	X	X	H	z
		P	U	M	P		S	E	T	T	I	N	G		
→	H	I	G	H		S	P	E	E	D		A	D	J	
	L	O	W		S	P	E	E	D		A	D	J		

DECREASE button (to move down)

S	T	A	T	U	S						X	X	X	H	z
		P	U	M	P		S	E	T	T	I	N	G		
→	H	I	G	H		S	P	E	E	D		A	D	J	
	L	0	W		S	P	E	E	D		A	D	J		

DECREASE button (to move down)

S	T	A	T	U	S						X	X	X	H	z
		P	U	M	P		S	E	T	T	I	N	G		
	L	0	W		S	P	E	E	D		A	D	J		
→	S	0	F	T		S	T	A	R	T					

NEXT button (to select SOFT START)

- SOFT START
- YES
- NO

From YES to NO

S	T	A	T	U	S						X	X	X	H	z
			S	0	F	T		S	T	A	R	T			
→	Y	E	S												
	N	0													

DECREASE button (to move down)

S	T	A	T	U	S						X	X	X	H	z
			S	0	F	T		S	T	A	R	T			
	Y	E	S												
→	N	0													

NEXT button (to select NO)

S	T	A	T	U	S						X	X	X	H	z
			S	O	F	T		S	T	A	R	T			
			C	H	A	N	G	E		O	K				

S	T	A	T	U	S						X	X	X	H	z
			S	O	F	T		S	T	A	R	T			
→	N	O													
	Y	E	S												

PREVIOUS button to go to the previous menu

- VENT DELAY

- 0000 TO 9999

S	T	A	T	U	S						X	X	X	H	z
			V	E	N	T		D	E	L	A	Y			
				X	X	X	X		H	z					

- VENT OPEN TIME

- 0000 TO 9999 0= NO LIMIT

S	T	A	T	U	S						X	X	X	H	z
	V	E	N	T		O	P	E	N		T	I	M	E	
			0	=	N	O		L	I	M	I	T			
				X	X	X	X		H	z					

- SETPOINT R1 ADJ

- TYPE
  - FREQUENCY
  - POWER
  - TIME
  - NORMAL

- SET VALUE
  - 0000 TO 9999 XX

  [XX = unit of measurement relative to the type]

For FREQUENCY:

S	T	A	T	U	S						X	X	X	H	z
					S	E	T		V	A	L	U	E		
				X	X	X	X		H	z					

For POWER:

S	T	A	T	U	S						X	X	X	H	z
					S	E	T		V	A	L	U	E		
				X	X	X	X		W						

For TIME:

S	T	A	T	U	S						X	X	X	H	z
					S	E	T		V	A	L	U	E		
				X	X	X	X		s	e	c				

  - MASK TIME

- 00h 00m 00s

S	T	A	T	U	S						X	X	X	H	z
					S	E	T		V	A	L	U	E		
		X	X	h		X	X	m		X	X	s			

- OUTPUT LOGIC

- _|--
- --|_

S	T	A	T	U	S						X	X	X	H	z
			O	U	T	P	U	T		L	O	G	I	C	
→	_|--														
	- |_														

Fails:

Flag fail:

NO_CONN	1
PUMP_OVERTEMP	2
CONTROLLER_OVERTEMP	4
VDC_UNDERVOLTAGE	8
VDC_OVERVOLTAGE	32
SHORT_CIRCUIT	64
ROTOR_BLOCK	128
TOO_HIGHLOAD	128
PUMP_AIR	128

F	A	I	L		0	0	1								
C	H	E	C	K		C	O	N	N	E	C	T	I	O	N
				T	O		P	U	M	P					
						M	O	D	E						

F	A	I	L		0	0	2								
						P	U	M	P						
				O	V	E	R	T	E	M	P				
						M	O	D	E						

F	A	I	L		0	0	4								
			C	O	N	T	R	O	L	L	E	R			
				O	V	E	R	T	E	M	P				
						M	O	D	E						

F	A	I	L		0	0	8								
						V	D	C							
		U	N	D	E	R	V	O	L	T	A	G	E		
						M	O	D	E						

F	A	I	L		0	3	2								
						V	D	C							
		O	V	E	R	V	O	L	T	A	G	E			
						M	O	D	E						

F	A	I	L		0	6	4								
	S	H	O	R	T		C	I	R	C	U	I	T		
						M	O	D	E						

F	A	I	L		1	2	8								
		R	O	T	O	R		B	L	O	C	K			
						M	O	D	E						

F	A	I	L		1	2	8								
		T	O	O		H	I	G	H	L	O	A	D		
						M	O	D	E						

F	A	I	L		1	2	8								
				P	U	M	P		A	I	R				
						M	O	D	E						

F	A	I	L		2	5	6								
	O	V	E	R	F	R	E	Q	U	E	N	C	Y		
						M	O	D	E						

Two or more fail: each fail are showed for 2 seconds.

XXX: fails code

Y: number of fails

N	.	Y		F	A	I	L	S		X	X	X			
						M	O	D	E						

Auto Test Phase:

In stop status, it is possible to take the three phase test diagnosis pressing the COUNTERS + MEASURES + LOW SPEED buttons at the same time for at least 2 sec.

This test checks the motor windings electrical continuity and symmetry. Furthermore it is able to detect a short circuit between a motor phase winding and the Protection Earth.

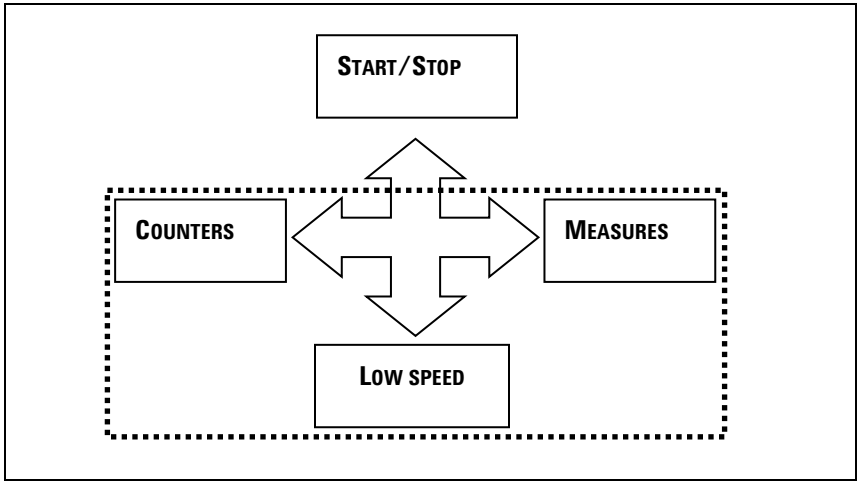


Figure 32

S	T	A	T	U	S						X	X	X	H	z
T	H	R	E	E		P	H	A	S	E		T	E	S	T
			D	I	A	G	N	O	S	I	S				

S	T	A	T	U	S						X	X	X	H	z
T	H	R	E	E		P	H	A	S	E		T	E	S	T
			D	I	A	G	N	O	S	I	S				
						P	A	S	S						

S	T	A	T	U	S						X	X	X	H	z
T	H	R	E	E		P	H	A	S	E		T	E	S	T
			D	I	A	G	N	O	S	I	S				
						F	A	I	L						

The test result can be PASS or FAIL. Press any button to exit and return to the **main screen**.

During the test, no function is associated to the buttons.

Orderable Parts

Tab. 8

Description	Part number
Turbo-V 1001 Rack Controller	X3501-64003
T-Plus communication software and serial cable kit	969-9883
Turbo-V HT Rack Air Cooling kit	X3501-68001
Mains cable NEMA plug 3m long	969-9958
Mains cable European plug 3m long	969-9957
Turbo-V vent	X3501-68002

Agilent Technologies

Vacuum Products Division

Dear Customer,

Thank you for purchasing an Agilent vacuum product. At Agilent Vacuum Products Division we make every effort to ensure that you will be satisfied with the product and/or service you have purchased.

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

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

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

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

Sincerely.

Giampaolo LEVI

Vice President and General Manager
Agilent Vacuum Products Division

Note: Fax or mail the Customer Request for Action (see backside page) to Agilent Vacuum Products Division (Torino) – Quality Assurance or to your nearest Agilent representative for onward transmission to the same address.

CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO: AGILENT VACUUM PRODUCTS DIVISION TORINO – QUALITY ASSURANCE

FAX N°: XXXX-011-9979350

ADDRESS: AGILENT TECHNOLOGIES ITALIA S.p.A. – Vacuum Products Division –

Via F.lli Varian, 54 – 10040 Leinì (TO) – Italy

E-MAIL: vpd-qualityassurance_pdl-ext@agilent.com

NAME	COMPANY	FUNCTION
_____	_____	_____

ADDRESS:

_____

TEL. N° : _____ FAX N° : _____

E-MAIL: _____

PROBLEM / SUGGESTION :

_____

_____

_____

_____

_____

REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.):

_____

_____

_____

DATE _____

CORRECTIVE ACTION PLAN / ACTUATION (by AGILENT VPD) LOG N° _____

_____

_____

_____

_____

_____

_____

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

Agilent Technologies

Agilent Technologies

Vacuum Products Division
Instructions for returning products

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.

2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).

3) **Important steps for the shipment of returning product:**
   - Remove all accessories from the core product (e.g. inlet screens, vent valves).
   - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
   - If ordering an Advance Exchange product, **please use the packaging from the Advance Exchange to return the defective product.**
   - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
   - Agilent Technologies is not responsible for returning customer provided packaging or containers.
   - **Clearly label package with RA number**. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.

4) Return only products for which the RA was issued.

5) **Product being returned under a RA must be received within 15 business days.**

6) **Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information.** Customer is responsible for freight charges on returning product.

7) Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED **REQUEST FOR RETURN** FORM TO YOUR NEAREST LOCATION:

EUROPE:	**NORTH AMERICA:**	**PACIFIC RIM:**
Fax: 00 39 011 9979 330		
Fax Free: 00 800 345 345 00	Fax: 1 781 860 9252	please visit our website for individual
Toll Free: 00 800 234 234 00	Toll Free: 800 882 7426, Option 3	office information
vpt-customercare@agilent.com	vpl-ra@agilent.com	http://www.agilent.com

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please read important policy information on Page 3 that applies to all returns.

1) CUSTOMER INFORMATION

Company Name:	**Contact Name:**
Tel: **Email:**	**Fax:**
Customer Ship To:	**Customer Bill To:**
Europe only: **VAT reg. Number:**	USA/Canada only: ☐ **Taxable** ☐ **Non-taxable**

2) PRODUCT IDENTIFICATION

Product Description	Agilent P/N	Agilent S/N	Original Purchasing Reference

3) TYPE OF RETURN (**Choose one from each row** and supply Purchase Order if requesting a billable service)

3A. ☐ Non-Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form):

3B. ☐ Exchange ☐ Repair ☐ Upgrade ☐ Consignment/Demo ☐ Calibration ☐ Evaluation ☐ Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.
Call Agilent Technologies to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

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

☐ **HAS** pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

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

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

_____

NOTE: If a product is received at Agilent 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 Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Print Name: **Authorized Signature: .....** **Date:**

5) FAILURE INFORMATION:

Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms):
Detailed Description of Malfunction: (Please provide the error message)
Application (system and model):

I understand and agree to the terms of Section 6, Page 3/3.
Print Name: **Authorized Signature: .....** **Date:**

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please use these Failure Mode to describe the concern about the product on Page 2.

TURBO PUMPS and TURBO CONTROLLERS

APPARENT DEFECT/MALFUNCTION		POSITION	PARAMETERS	
- Does not start	- Noise	- Vertical	Power:	Rotational Speed:
- Does not spin freely	- Vibrations	-Horizontal	Current:	Inlet Pressure:
- Does not reach full speed	-Leak	-Upside-down	Temp 1:	Foreline Pressure:
- Mechanical Contact	-Overtemperature	-Other:	Temp 2:	Purge flow:
- Cooling defective	-Clogging	.....	OPERATING TIME:	

ION PUMPS/CONTROLLERS

- Bad feedthrough	- Poor vacuum
- Vacuum leak	- High voltage problem
- Error code on display	- Other

VALVES/COMPONENTS

- Main seal leak	- Bellows leak
- Solenoid failure	- Damaged flange
- Damaged sealing area	-Other

LEAK DETECTORS

- Cannot calibrate	-No zero/high backround
- Vacuum system unstable	- Cannot reach test mode
- Failed to start	- Other

INSTRUMENTS

- Gauge tube not working	- Display problem
- Communication failure	- Degas not working
- Error code on display	- Other

SCROLL AND ROTARY VANE PUMPS

- Pump doesn't start	- Noisy pump (describe)
- Doesn't reach vacuum	- Over temperature
- Pump seized	- Other

DIFFUSION PUMPS

- Heater failure	- Electrical problem
- Doesn't reach vacuum	- Cooling coil damage
- Vacuum leak	- Other

Section 6) *ADDITIONAL TERMS*

Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.

Sales and Service Offices

United States
Agilent Technologies
Vacuum Products Division
121 Hartwell Avenue
Lexington, MA 02421 - USA Tel.: +1 781 861 7200
Fax: +1 781 860 5437
Toll-Free: +1 800 882 7426

Benelux
Agilent Technologies Netherlands B.V.
Vacuum Products Division
Herculesweg 8
4338 PL Middelburg
The Netherlands
Tel.: +31 118 671570
Fax: +31 118 671569
Toll-Free: 00 800 234 234 00

Canada
Central coordination through:
Agilent Technologies
Vacuum Products Division
121 Hartwell Avenue
Lexington, MA 02421 - USA
Tel.: +1 781 861 7200
Fax: +1 781 860 5437
Toll-Free: +1 800 882 7426

China
Agilent Technologies (China) Co. Ltd
Vacuum Products Division
No.3, Wang Jing Bei Lu, Chao Yang District
Beijing, 100102, China
Tel: +86 (0)10 64397888
Fax: +86 (0)10 64391318
Toll free: 800 820 3278

France
Agilent Technologies France
Vacuum Products Division
7 Avenue des Tropiques
Z.A. de Courtaboeuf - B.P. 12
91941 Les Ulis cedex - France
Tel.: +33 (0) 1 69 86 38 84
Fax: +33 (0) 1 69 86 29 88
Toll free: 00 800 234 234 00

Germany and Austria
Agilent Technologies
Sales & Services GmbH & Co. KG
Vacuum Products Division
Lyoner Str. 20
60 528 Frankfurt am Main
GERMANY
Tel: +49 69 6773 43 2230
Fax: +49 69 6773 43 2250

India
Agilent Technologies India Pvt. Ltd.
Vacuum Products Division
G01. Prime corporate Park,
230/231, Sahar Road, Opp.
Blue Dart Centre,
Andheri (East), Mumbai – 400 099.India
Tel: +91 22 30648287/8200
Fax: +91 22 30648250
Toll Free: 1800 113037

Italy
Agilent Technologies Italia S.p.A.
Vacuum Products Division
Via F.lli Varian 54
10040 Leini, (Torino) - Italy
Tel.: +39 011 997 9111
Fax: +39 011 997 9350
Toll-Free: 00 800 234 234 00

Japan
Agilent Technologies Japan, Ltd.
Vacuum Products Division
8th Floor Sumitomo Shibaura Building
4-16-36 Shibaura Minato-ku
Tokyo 108-0023 - Japan
Tel.: +81 3 5232 1253
Fax: +81 3 5232 1710
Toll-Free: 0120 655 040

Korea
Agilent Technologies Korea, Ltd.
Vacuum Products Division
Shinsa 2nd Bldg. 2F
966-5 Daechi-dong
Kangnam-gu, Seoul
Korea 135-280
Tel: +82 (0)2 3452 2455
Fax: +82 (0)2 3452 3947
Toll free: 080 222 2452

Mexico
Agilent Technologies
Vacuum Products Division
Concepcion Beistegui No 109
Col Del Valle
C.P. 03100 – Mexico, D.F.
Tel.: +52 5 523 9465
Fax: +52 5 523 9472

Singapore
Agilent Technologies Singapore Pte. Ltd,
Vacuum Products Division
Agilent Technologies Building,
1 Yishun Avenue 7,
Singapore 768923
Tel : (65) 6215 8045
Fax : (65) 6754 0574

Southeast Asia
Agilent Technologies Sales Sdn Bhd
Vacuum Products Division
Unit 201, Level 2 uptown 2,
2 Jalan SS21/37, Damansara Uptown
47400 Petaling Jaya,
Selangor, Malaysia
Tel : +603 7712 6106
Fax: +603 6733 8121

Taiwan
Agilent Technologies Taiwan Limited
Vacuum Products Division (3F)
20 Kao-Shuang Rd.,
Pin-Chen City, 32450
Taoyuan Hsien , Taiwan, R.O.C.
Tel. +886 34959281
Toll Free: 0800 051 342

UK and Ireland
Agilent Technologies UK, Ltd.
Vacuum Products Division
6 Mead Road
Oxford Industrial Park
Yarnton, Oxford OX5 1QU – UK
Tel.: +44 (0) 1865 291570
Fax: +44 (0) 1865 291571
Toll free: 00 800 234 234 00

Other Countries
Agilent Technologies Italia S.p.A.
Vacuum Products Division
Via F.lli Varian 54
10040 Leini, (Torino) - Italy
Tel.: +39 011 997 9111
Fax: +39 011 997 9350
Toll-Free: 00 800 234 234 00

Customer Support & Service

NORTH AMERICA:
Toll Free: 800 882 7426, Option 3
vpl-ra@agilent.com
EUROPE:
Toll Free: 00 800 234 234 00
vpt-customercare@agilent.com
PACIFIC RIM:
please visit our website for individual office information http://www.agilent.com

Worldwide Web Site, Catalog and Order On-line:
www.agilent.com
Representative in most countries

1/12

Printed in ITALY
06/2013
Publication Number: 87-901-033-01

Agilent Technologies