Agilent

Agilent TwisTorr Medium-TMP Rack Controller

User Manual

Notices

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Instrument Manufacturing

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Operating Temperature

Operating Temperature: +5°C ÷ +45°C
Storage Temperature: -20°C ÷ +70°C

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Safety Notices

CAUTION

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

WARNING

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

Contents

1 Istruzioni per l’uso

Informazioni su questo manuale

Validità

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

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

Per una corretta installazione e avvio/arresto, consultare il paragrafo "Installazione".

Per un uso tecnico più dettagliato, consultare il capitolo "Technical Information".

NOTA

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

Definizioni e terminologia

Definizione di Attenzione, Avvertenza e Nota

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

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

AVVERTENZA

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

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

Simboli di avvertenza

Di seguito si riporta un elenco di simboli che vengono visualizzati insieme agli avvisi del TwisTorr Medium-TMP Rack Controller. Viene mostrato anche il pericolo che descrivono.

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

Presenza di tensioni pericolose

Pericolo generico

Dichiarazione Europea di Conformità

Sito di produzione

Certificazione CSA

Waste Electrical and Electronic Equipment

Certificazione RoHS China

Marcatura UK CA

Istruzioni per l'uso

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

I seguenti simboli appaiono sullo strumento per vostra informazione.

	Pericolo generico
CE	Certificazione CE
	Certificazione CSA
	Certificazione RoHS China
	Waste Electrical and Electronic Equipment
UK CA	UK CA Marking

Sicurezza

Questa sezione contiene le informazioni, prescritte dalla Direttiva bassa tensione 2014/35/UE, che sono essenziali per la conformità e il rispetto delle norme di sicurezza sia in generale che in relazione all'uso specifico del prodotto.

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

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

Uso corretto

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

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

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

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

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

Uso improprio

Agilent Technologies declina ogni responsabilità derivante dall'uso improprio del TwisTorr Medium-TMP Rack Controller.

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

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

Attrezzatura di protezione

Non essendo prevista alcuna manutenzione per questo dispositivo, non sono necessari altri dispositivi di protezione.

AVVERTENZA **Rischio di lesioni dovute alla caduta di oggetti**

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

- **Trasportare i controller con due mani.**

Linee guida di sicurezza per i Controller di pompe turbomolecolari

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

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

Trasporto & Immagazzinamento

Durante il trasporto e l'immagazzinamento del TwisTorr Medium-TMP Rack non devono essere superate le seguenti condizioni ambientali:

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

Descrizione del prodotto

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Agilent prima dell'utilizzo dell'apparecchiatura.

Agilent si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche.

I controller della serie TwisTorr Medium-TMP Rack sono dei convertitori di frequenza, controllati da un microprocessore, realizzati con componenti a stato solido e con capacità di autodiagnostica e autoprotezione.

Caratteristiche del controller:

- Regolazione automatica della tensione di ingresso
- Operatività frontale / remota / seriale
- Pilotaggio a 24 Vcc della ventola di raffreddamento pompa
- Pilotaggio delle valvole
- Lettura della velocità della pompa in seguito a comando di arresto (lettura velocità di arresto).

Nei paragrafi seguenti sono riportate tutte le informazioni necessarie per garantire la sicurezza dell'operatore durante l'uso di questa apparecchiatura. Informazioni più dettagliate sono contenute nel capitolo "Technical Information".

Installazione

Preparazione per l’installazione

Il TwisTorr Medium-TMP Rack Controller viene fornito in un imballo protettivo speciale; se si presentano segni di danni, che potrebbero essersi verificati durante il trasporto, contattare l'ufficio vendite locale.

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

Non disperdere l'imballo nell'ambiente. Il materiale è completamente riciclabile e risponde alla direttiva CEE 94/62 e successive modifiche.

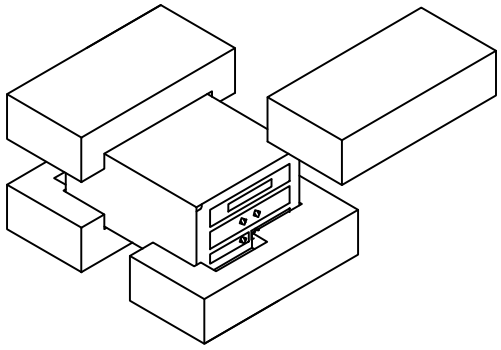


Figura 1 Imballo dei controller

Set-up

AVVERTENZA

Il Controller deve essere alimentato mediante un cavo di alimentazione a tre fili (vedere tabella delle parti ordinabili) con una spina di tipo approvato a livello internazionale ai fini della sicurezza dell'utente. Utilizzare sempre questo cavo di alimentazione ed inserire la spina in una presa con un adeguato collegamento di terra onde evitare scariche elettriche e per rispettare le specifiche CE. All'interno del controller si sviluppano alte tensioni che possono recare gravi danni o la morte. Prima di eseguire qualsiasi operazione di installazione o manutenzione del controller scollegarlo dalla presa di alimentazione.

AVVERTENZA

Cavo di alimentazione: il cavo corretto per il cablaggio elettrico è un cavo a tre fili (Ph+N+Terra).

La sezione del cavo deve essere almeno 1,0 mm^2 in caso di alimentazione 240 Vac o 2 mm^2 in caso di alimentazione 120 Vac per una lunghezza del cavo di riferimento pari a 3 m.

NOTA

Non installare e/o utilizzare il controller in ambienti esposti ad agenti atmosferici (pioggia, gelo, neve), polveri, gas aggressivi, in ambienti esplosivi o con elevato rischio di incendio.

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

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

In ogni caso occorre che l'aria di raffreddamento possa circolare liberamente intorno all'apparato.

ATTENZIONE

Il TwisTorr Medium-TMP Rack appartiene alla seconda categoria di installazione (o sovratensione) prevista dalla normativa EN 61010-1. Connettere quindi il dispositivo ad una linea di alimentazione che soddisfi tale categoria.
Il TwisTorr Medium-TMP Rack ha dei connettori per gli ingressi/uscite e per la comunicazione seriale che devono essere connessi ai circuiti esterni in modo che nessuna parte sotto tensione sia accessibile.
Assicurarsi che l'isolamento del dispositivo connesso al TwisTorr Medium-TMP Rack abbia un isolamento adeguato anche in condizione di guasto singolo come previsto dalla normativa EN 61010-1.

Per l'installazione degli accessori opzionali, vedere il capitolo "Technical Information".

Fissaggio del TwisTorr Medium-TMP Rack Controller

In questo paragrafo sono riportate le principali procedure operative. Prima di azionare il Controller, eseguire le connessioni elettriche e collegare il manicotto di pre vuoto facendo riferimento al capitolo "Technical Information".

AVVERTENZA

Per evitare danni alle persone ed all'apparato, prima di avviare la pompa, assicurarsi di avere correttamente effettuato il fissaggio della pompa al sistema da vuoto, secondo le istruzioni riportate del manuale della pompa (capitolo Installazione).

NOTA

Una volta collegato alla tensione di linea, per azionare il controller (e quindi per avviare la pompa) in modo semplice, collegare sul connettore J1 (Input-Output) il connettore di accoppiamento pre-cablato che viene fornito insieme al controller. Il connettore di accoppiamento pre-cablato è un modo semplice e veloce per consentire il comando del controller senza dover implementare altre connessioni esterne cablate come Serial Com o onboard I/O.
La pompa primaria e la pompa turbo possono essere attivate contemporaneamente.

Comandi, Indicatori e Connettori

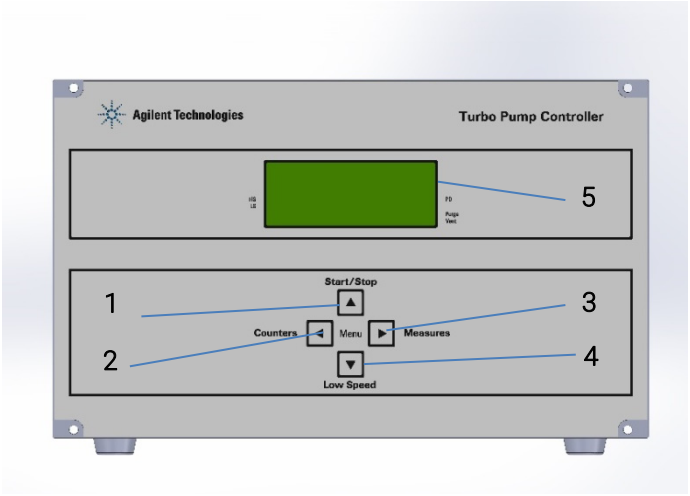


Figura 2 Pannello Frontale del TwisTorr Medium-TMP Rack Controller

Le funzioni dei tasti dipendono dal contesto (finestra principale, menu di configurazione, ecc.).

1	Pulsante per la selezione delle modalità START, STOP, RESET. E' attivo solo se è stato selezionato il controllo mediante pannello frontale. Premendo una volta questo pulsante si attiva la fase di avvio; premendolo di nuovo si arresta la pompa. Se la pompa si arresta automaticamente per un errore, questo pulsante deve essere premuto una prima volta per resettare il controller e una seconda volta per riavviare la pompa.
2	Pulsante per visualizzare sul display il numero del ciclo, il tempo ciclo, la vita operativa della pompa e il numero di serie.
3	Pulsante per visualizzare sul display la corrente, la temperatura, la potenza e la velocità di rotazione della pompa. E' sempre attivo indipendentemente dalla modalità operativa selezionata.
4	Pulsante per la selezione delle modalità HIGH/LOW SPEED. E' attivo solo se è stato selezionato il controllo mediante pannello frontale. Premendolo ripetutamente si commuta la modalità tra HIGH SPEED e LOW SPEED.
5	Display alfanumerico LCD retroilluminato: matrice di punti, 4 righe x 16 caratteri.

I pulsanti 2 e 3, se premuti contemporaneamente per almeno 2 secondi, consentono di accedere al menu di configurazione del controller. Nell'ambiente di configurazione tutti e quattro i pulsanti permettono di navigare nel menu e cambiare i valori dei parametri.

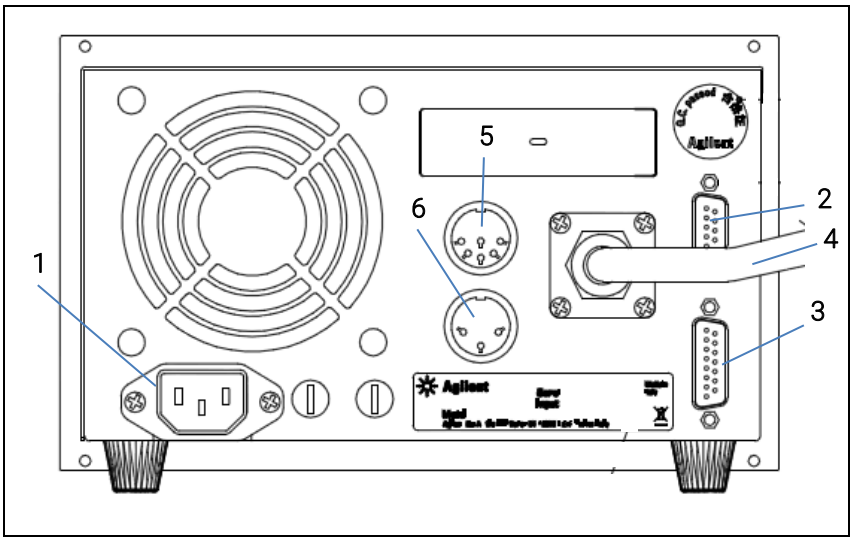


Figura 3 Pannello Posteriore dei TwisTorr Medium-TMP Rack Controller

1	Modulo di alimentazione del controller, comprendente fusibili, presa di alimentazione e filtro EMC.
2	Porta di comunicazione RS-232 / RS-485.
3	Connettore per i segnali logici di input/output con uscita analogica programmabile (il connettore di accoppiamento viene fornito con l'apposito ponticello di richiusura dell'Interlock).
4	Cavo pompa.
5	Connettore di uscita per il controllo delle valvole.
6	Connettore di uscita per ventilatore.

Avvio e funzionamento del Controller TwisTorr Medium-TMP Rack

Accensione del Controller

Per accendere il controller è sufficiente inserire il cavo di alimentazione nella presa di rete.

Avvio della Pompa

Per avviare la pompa occorre abilitare l'ingresso di interlock e premere il pulsante START del pannello frontale.

NOTA

Per avviare la pompa è necessario abilitare la connessione di interlock di sicurezza. A tale scopo collegare al connettore J1 l'apposito connettore in dotazione.

Arresto della Pompa

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

Manutenzione

Il TwisTorr Medium-TMP Rack non richiede alcuna manutenzione. Qualsiasi intervento deve essere eseguito da personale autorizzato. Prima di effettuare qualsiasi intervento sul sistema scollegarlo dall'alimentazione.

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

AVVERTENZA

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

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

Messaggi di errore

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

Tab. 1 Messaggi di errore

Messaggio	Descrizione	Azione correttiva
CHECK CONNECTION TO PUMP	Malfunzionamento nel collegamento tra pompa e controller.	Verificare i collegamenti tra pompa e controller. Premere due volte il pulsante START per riavviare la pompa.
PUMP WAITING INTERLOCK	È attivo il segnale di interlock presente sul connettore J1 a causa dell'interru-zione del corto circuito tra il pin 3 ed il pin 9 e tra il pin 4 e pin 15 del connettore P1, o a causa dell'apertura del segnale di interlock esterno.	Ripristinare il corto circuito tra il pin 3 ed il pin 9 e tra il pin 4 e pin 15 del connettore J1, o chiudere il segnale di interlock esterno.
FAULT: PUMP OVERTEMP.	La temperature del cuscinetto superiore della pompa ha superato i 60 °C.	Attendere che la temperatura ritorni al di sotto della soglia. Premere due volte il pulsante START per riavviare la pompa.
FAULT: CONTROLLER OVERTEMPERATURE	La temperatura del trasformatore del controller ha superato i 65 °C.	Attendere che la temperatura ritorni al di sotto della soglia. Premere due volte il pulsante START per riavviare la pompa.
FAULT: TOO HIGH LOAD	Durante il funzionamento normale la corrente assorbita dalla pompa è maggiore di quella programmata.	Verificare che il rotore della pompa abbia la possibilità di ruotare liberamente. Verificare che la lunghezza del cavo pompa sia stata impostata correttamente. Premere due volte il pulsante START per riavviare la pompa.
FAULT: SHORT CIRCUIT	Durante il funzionamento normale (dopo la fase di avvio) è stata rilevata una condizione di corto circuito sul circuito di potenza.	Verificare i collegamenti tra pompa e controller. Premere due volte il pulsante START per riavviare la pompa.
OVERVOLTAGE	Si è verificato un guasto nella sezione di alimentazione del controller, o il controller ha ricevuto un segnale spurio.	Premere due volte il pulsante START per riavviare la pompa. Se il messaggio si ripresenta rivolgersi in Agilent per la manutenzione.

Smaltimento

Significato del logo "WEEE" presente sulle etichette.

Il simbolo qui sotto riportato è applicato in ottemperanza alla direttiva CE denominata "WEEE".

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

Figura 4 Logo "WEEE"

Per maggiori informazioni consultare:

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

Servizio Post Vendita

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

vpt-customercare@agilent.com

vpl-customercare@agilent.com

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

2 Betriebsanleitung

Informationen über diese Betriebsanleitung

Gültigkeit

Diese Betriebsanleitung enthält die Anweisungen für die Benutzer der TwisTorr Medium-TMP Rack Controller mit besonderer Bezugnahme auf die Begriffe für Sicherheit, Betrieb und Wartung auf der ersten Ebene, auf die Wartungsarbeiten beschränkt, für die der Benutzer verantwortlich ist.

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

Für eine korrekte Installation und Start/Stopp der Absatz „Installation“ konsultieren.

Für eine detailliertere technische Verwendung das Kapitel „Technical Information“ konsultieren.

HINWEIS

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

Definitionen und Terminologie

Definition von Vorsicht, Warnung und Hinweis

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

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

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

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

Warnsymbole

Das Folgende ist eine Liste von Symbolen, die in Verbindung mit den Warnungen auf dem TwisTorr Medium-TMP Rack Controller angezeigt werden. Die von ihnen beschriebene Gefahr wird ebenfalls angezeigt.

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

Allgemeine Gefahr

Allgemeine Gefahr

Europäische Konformitätserklärung

Herstellungsbetrieb

CSA certification

Elektro- und Elektronikaltgeräte

RoHS-Chinazertifizierung

UK CA-Kennzeichnung

Betriebsanleitung

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

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

	Allgemeine Gefahr
CE	CE-Zertifizierung
	CSA-Zertifizierung
	RoHS-Chinazertifizierung
	Elektro- und Elektronikaltgeräte
UK CA	UK CA-Kennzeichnung

Sicherheit

Dieser Abschnitt enthält die in der Maschinenrichtlinie 2014/35/UE vorgeschriebenen Informationen, die für die Einhaltung der Sicherheitsbestimmungen im Allgemeinen und in Bezug auf den spezifischen Einsatz der Maschine von wesentlicher Bedeutung sind.

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

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

Sachgemäße Verwendung

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

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

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

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

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

Unsachgemäße Anwendung

Agilent Technologies lehnt jede Verantwortung ab, die sich aus der unsachgemäßen Benutzung vom TwisTorr Medium-TMP Rack Controller ergibt.

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

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

Schutzausrüstung

Da für dieses Gerät keine Wartung vorgesehen ist, ist keine weitere Schutzeinrichtung erforderlich.

WARNUNG **Verletzungsgefahr durch herunterfallende Gegenstände**

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

- **Controller mit zwei Händen transportieren.**

Sicherheitsrichtlinien für Turbomolekularpumpen-Steuergeräte

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

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

Transport und Lagerung

Beim Betrieb müssen folgende Umgebungsbedingungen eingehalten werden:

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

Produktbeschreibung

Dieser Apparat ist für Fachbetriebe bestimmt. Vor Gebrauch sollte der Benutzer dieses Handbuch sowie alle weiteren mitgelieferten Zusatzdokumentationen genau lesen. Bei Nichtbeachtung - auch teilweise - der enthaltenen Hinweise, unsachgemäßem Gebrauch durch ungeschultes Personal, nicht autorisierten Eingriffen und Missachtung der einheimischen, hier zur Geltung kommenden Bestimmungen übernimmt die Firma Agilent keinerlei Haftung. Die Controller der Serie TwisTorr Medium-TMP Rack Controller sind mikroprozessor-gesteuerte Frequenzwandler.

Controllereigenschaften:

- Automatische Einstellung der Eingangsspannung
- Konsol-, Fern- und serielle Operationen
- Steuerung 24 Vws des Gebläses der Kühlpumpe
- Steuerung der Entlüftungsventile
- Auslesen der Pumpgeschwindigkeit nach Stoppbefehl (Lesen der Stoppgeschwindigkeit).

In den folgenden Abschnitten sind alle erforderlichen Informationen für die Sicherheit des Bedieners bei Anwendung des Geräts aufgeführt.

Detaillierte Informationen sind im Abschnitt "Technical Information" enthalten.

Installation

Vorbereitung zum Einbau

Der TwisTorr Medium-TMP Rack Controller wird mit einer speziellen Schutzverpackung geliefert. Eventuelle Transportschäden müssen der zuständigen örtlichen Verkaufsstelle gemeldet werden.

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

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

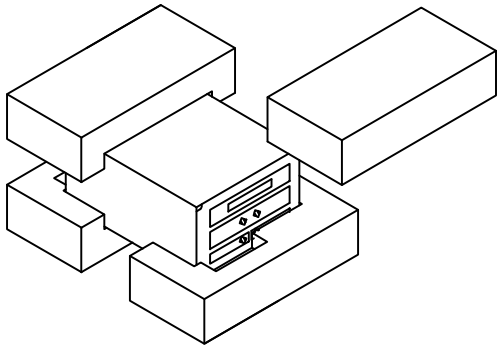


Abbildung 5 Verpackung der Controller

Set-up

WARNUNG

Der Controller muss mit einem dreiadrigen Netzkabel (siehe Bestelltabelle) mit international zur Sicherheit des Benutzers zugelassenem Stecker angeschlossen werden. Es sollte immer dieses Netzkabel benutzt werden, das an eine korrekt geerdete Steckdose anzuschließen ist, um den CE Richtlinien zu entsprechen und Stromschläge zu vermeiden. Im Inneren des Controllers entstehen hohe Spannungen, die schwere Verletzungen verursachen und lebensgefährlich sein können. Vor jedem Montage- bzw. Wartungseingriff muss deshalb der Netzstecker gezogen werden.

WARNUNG

Netzkabel: Das geeignete Kabel für die Stromleitung ist ein dreiadriges (Ph+N+Erde) Kabel.

Der Kabelquerschnitt muss mindestens 1,0 mm^2 bei einer Netzspannung von 240 Vac oder 2 mm^2 bei einer Netzspannung von 120 Vac bei einer Referenzkabellänge von 3 m betragen.

HINWEIS

Den Controller nicht in Umgebungen mit Witterungseinflüssen (Regen, Frost, Schnee), Staub, aggressiven Gasen, in explosionsgefährdeten Umgebungen oder mit hoher Brandgefahr installieren und/oder verwenden.

Beim Betrieb müssen folgende Umgebungsbedingungen eingehalten werden:

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

In jedem Fall ist es erforderlich, dass die Kühlluft kann frei um das Gerät zirkulieren.

VORSICHT

TwisTorr Medium-TMP Rack wird in die zweite Installationskategorie (Überspannung) der Norm EN 61010-1, eingestuft. Die Vorrichtung muss an eine Netzlinie angeschlossen werden, die dieser Kategorie entspricht.
TwisTorr Medium-TMP Rack verfügt außer den, für die serielle Kommunikation vorgesehenen Konnektoren, auch Ausgangs- und Eingangskonnektore, die mit den äußeren Schaltungen verbunden werden müssen, sodass kein Teil unter Spannung zugänglich sein kann.
Sicherstellen, dass die Isolierung der mit dem TwisTorr Medium-TMP Rack verbundenen Vorrichtung, auch im Einzelschadenfall, so wie von Norm EN 61010-1 vorgesehen, eine angebrachte Isolierung besitzt.

Für die Installation der Options-Nebeneinrichtungen, beachten Sie bitte den Abschnitt "Technical Information"

Montage von TwisTorr Medium-TMP Rack Controller

In diesem Absatz werden die wichtigsten Funktionsverfahren angegeben. Bevor Sie den Kontroller aktivieren, schließen Sie die Elektroanschlüsse an und schließen Sie die freie Muffe an, wie im Benutzerhandbuch beschrieben.

WARNUNG

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

HINWEIS

Nach Anschluss an die Netzspannung können Sie den Regler leicht bedienen (und dann um die Pumpe zu starten) indem Sie den mit dem Regler mitgelieferten vorverdrahteten Gegenstecker an den J1-Stecker (Eingang-Ausgang) anschließen.

Der vorverdrahtete Gegenstecker ist eine einfache und schnelle Möglichkeit, den Regler zu bedienen ohne dass dazu andere verdrahtete externe Verbindungen wie Serial Com oder onboard I/O benötigt werden. Die Vorpumpe und die Turbopumpe können gleichzeitig eingeschaltet werden.

Steuerungen, Anzeigen und Verbinden des Controllers

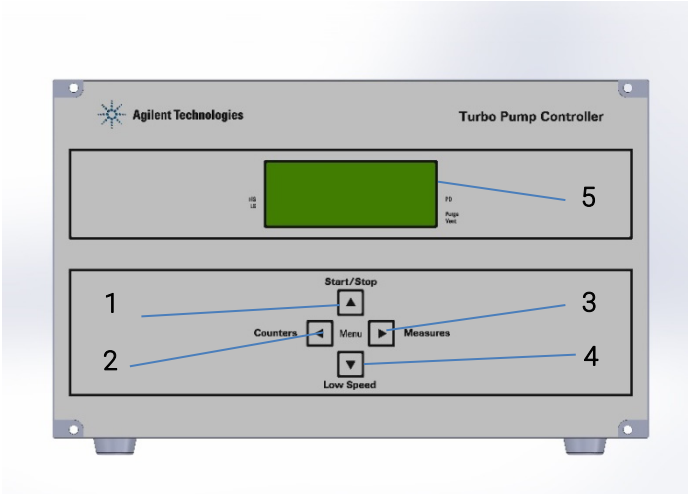


Abbildung 6 Fronttafel der TwisTorr Medium-TMP Rack Controller

Die Funktionen der Tasten sind kontextabhängig (Hauptfenster, Konfigurationsmenü etc.).

1	Taste für die Einstellung des Modus START, STOP, RESET. Sie ist nur aktiv, wenn der Steuermodus auf Fronttafel eingestellt ist. Bei einmaligem Drücken wird die Startphase aktiviert. Bei nochmaligem Drücken stoppt die Pumpe. Bei automatischem Pumpenstopp durch Störung muss diese Taste ein erstes Mal zur Controller-Rücksetzung und dann ein zweites Mal zum Neustarten der Pumpe gedrückt werden.
2	Taste für die Anzeige der Anzahl und der Dauer der Zyklen, des Pumpenbetriebs und der Seriennummer.
3	Taste zur Anzeige der Netzversorgung, der Temperatur, der Leistung und der Rotations-geschwindigkeit der Pumpe. Sie ist immer aktiv, unabhängig vom gewählten Betriebs-modus.
4	Taste für die Einstellung des Modus HIGH/LOW SPEED. Sie ist nur aktiv wenn der Steuermodus auf Fronttafel eingestellt ist. Bei mehrmaligem Drücken geht man taktweise von HIGH SPEED auf LOW SPEED über.
5	Alphanumerisches Flüsssigkristall (LCD)-Display mit Rückbeleuchtung: Punktmatrix, 4 Zeilen x 16 Stellen.

Bei gemeinsamer, mindestens 2 Sekunden langer Betätigung der Tasten 2 und 3 gelangt man in das Konfigurationsmenü des Controllers. Hier können alle vier Tasten zur Steuerung und Veränderung der Werte der Parameter verwendet werden.

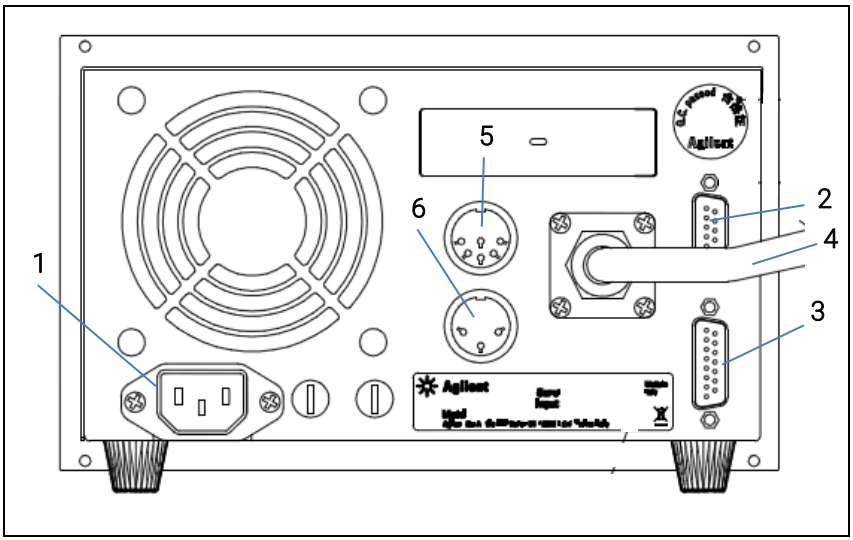


Abbildung 7 Rückseitige Tafel der TwisTorr Medium-TMP Rack Controller

1	Versorgungsmodul des Controllers, umfaßt die Schutzsicherung, den Netzstecker und den EMC-Filter.
2	Kommunikation -Port RS-232 / RS-485.
3	Verbinder der logischen Signale Input/Output mit programmierbarem Analogausgang (der Kupplungs-verbinder wird mit einer Wiederveschließbrücke der "Interlock" geliefert)
4	Pumpenkabelverbindung.
5	Ausgangsverbinder zur Kontrolle der Entlüftungsventile.
6	Ausgangsverbinder für das externe Gebläse.

Inbetriebnahme und Betrieb des Controller TwisTorr Medium-TMP Rack

Einschalten des Controllers

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

Pumpenstart

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

HINWEIS

Zum Starten der Pumpe die Sicherheits-Interlockverbindung aktivieren. Zu diesem Zweck den Verbinder J1 an den mitgelieferten Verbinder anschließen.

Pumpenstopp

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

Wartung

Für den TwisTorr Medium-TMP Rack ist keine Wartung erforderlich. Jeder Eingriff unterliegt autorisiertem Personal. Vor jedem Eingriff, die elektrische Versorgung unterbrechen. Bei einem Störfall kann der Reparaturservice Agilent oder der Service “Agilent Advanced Exchange service” in Anspruch genommen werden, durch den man einen regenerierten Kontroller als Ersatz für den defekten erhält.

WARNUNG

Trennen Sie den Kontroller vor jedem beliebigen Eingriff vom Netz.

Im Falle einer Verschrottung des Systems, muss diese nach den nationalen Vorschriften erfolgen.

Fehlermeldungen

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

Tab. 2 Fehlermeldungen

Meldung	Beschreibung	Behebung
CHECK CONNECTION TO PUMP	Fehlfunktion der Pumpen-Controller Verbindung.	Überprüfen Sie die Anschlüsse der Pumpe an den Controller. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
PUMP WAITING INTERLOCK	Das Interlock-Signal auf dem Verbinder J1 ist wegen der Kurzschluss-unterbrechung zwischen Pin 3 und Pin 9 und zwischen Pin 4 und Pin 15 des Verbinders P1 oder wegen der Öffnung des externen Interlock-Signals aktiv.	Den Kurzschluss zwischen Pin 3 und Pin 9 und zwischen Pin 4 und Pin 15 des Verbinders J1 rücksetzen oder das externe Interlock-Signal schließen.
FAULT: PUMP OVERTEMP.	Die Temperatur des oberen Lagers bzw. der Pumpe hat 60 °C überschritten.	Warten bis die Temperatur unter den Schwellenwert gesunken ist. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
FAULT: CONTROLLER OVERTEMPERATURE	Die Temperatur des Controller-Trafos hat 65 °C überschritten.	Warten bis die Temperatur unter den Schwellenwert gesunken ist. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
FAULT: TOO HIGH LOAD	Während des Normalbetriebs (nach der Startphase) ist die Pumpen-stromaufnahme größer als die vorgesehene.	Sicherstellen, daß der Pumpenrotor ungehindert drehen kann. Prüfen Sie, ob die Länge des Pumpenkabels richtig eingestellt wurde. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
FAULT: SHORT CIRCUIT	Während des normalen Betriebes (nach der Startphase) wurde ein Kurzschluss im Leistungskreis festgestellt.	Die Verbindung zwischen Pumpe und Controller prüfen. Die Pumpe durch zweimalige Betätigung der START-Taste neustarten.
OVERVOLTAGE	Im Bereich der Stromversorgung des Controllers ist eine Störung aufgetreten oder der Controller selbst hat ein Problem mit dem Netzstrom.	Die Taste START zweimal drücken, um die Pumpe wieder anzufahren. Falls die Meldung nochmals auftritt, die Firma Agilent zur Instandsetzung zu Rate ziehen.

Entsorgung

Bedeutung des „WEEE“ Logos auf den Schildern.

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

Dieses Symbol (nur in den EU-Ländern gültig) zeigt an, dass das betreffende Produkt NICHT zusammen mit Haushalts- oder Industriemüll entsorgt werden darf, sondern einem speziellen Sammelsystem zugeführt werden muss. Der Endabnehmer sollte daher den Lieferanten des Geräts - d. h. die Muttergesellschaft oder den Wiederverkäufer - kontaktieren, um den Entsorgungsprozess zu starten, nachdem er die Verkaufsbedingungen geprüft hat.

Abbildung 8 Logo „WEEE“

Für weitere Informationen siehe:

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

Service

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

vpt-customercare@agilent.com

vpl-customercare@agilent.com

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

3 Mode d’emploi

À propos de ce manuel

Validité

Le présent manuel contient les instructions destinées aux utilisateurs du TwisTorr Medium-TMP Rack Controller, notamment celles relatives à la sécurité, au fonctionnement et à la maintenance de premier niveau, dans la limite des activités de maintenance incombant à l’utilisateur.

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

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

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

NOTE

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

Définitions et terminologie

Signification des messages d’attention, d’avertissement et des notes

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

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

AVERTISSEMENT

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

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

Symboles d'avertissement

Voici une liste de symboles qui apparaissent en conjonction avec les avertissements sur le TwisTorr Medium-TMP Rack Controller. Le danger qu’ils décrivent est également illustré.

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

Tensions dangereuses

Danger générique

Déclaration européenne de conformité

Site de fabrication

Certification CSA

Déchets d’équipements électriques et électroniques

Certification RoHS Chine

Marquage UK CA

Mode d’emploi

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

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

	Danger générique
CE	Certification CE
	Certification CSA
	Certification RoHS Chine
	Déchets d’équipements électriques et électroniques
UK CA	Marquage UK CA

Sécurité

Cette section contient les informations prescrites par la directive Machines 2014/35/UE, qui est essentielle à la conformité et au respect des règles de sécurité en général ainsi qu’à l’utilisation spécifique du produit.

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

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

Utilisation appropriée

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

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

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

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

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

Utilisation inappropriée

Agilent Technologies décline toute responsabilité en raison de l’utilisation inappropriée du TwisTorr Medium-TMP Rack Controller.

Une utilisation inappropriée entraînera l’annulation de toutes les créances et garanties.

Une utilisation inappropriée est définie comme suit :

- installation de l’appareil à l’aide de matériel de montage inadapté
- utilisation dans un environnement exposé à de la condensation
- utilisation dans un environnement très humide en dehors de la plage spécifiée
- utilisation dans un environnement poussiéreux
- utilisation avec des tensions électriques non-conformes aux spécifications
- utilisation de l’appareil dans des zones exposées à des rayonnements ionisants
- utilisation dans des zones potentiellement explosives
- utilisation de l’appareil dans des systèmes soumis à des contraintes et des vibrations ou des forces périodiques qui affectent l’appareil.

Équipements de protection individuelle

Comme aucune intervention d’entretien n’est prévue sur cet appareil, tout autre équipement de protection n’est pas nécessaire.

AVERTISSEMENT

Risques de blessure dus à la chute d’objets

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

- **Déplacer les contrôleurs en utilisant les deux mains.**

Consignes de sécurité relatives aux contrôleurs de pompes turbomoléculaires

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

AVERTISSEMENT

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

Transport et Emmagasinage

Pendant le transport et le stockage du TwisTorr Medium-TMP Rack, veiller au respect des conditions environnementales suivantes :

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

Description du produit

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

Les contrôleurs de la série TwisTorr Medium-TMP Rack Controller sont des convertisseurs de fréquence, contrôlés par un microprocesseur, réalisés avec des éléments à l'état solide et ayant des capacités d'autodiagnostic et d'autoprotection.

Caractéristiques du contrôleur:

- Réglage automatique de la tension en entrée
- Fonctionnement frontal / à distance / sériel
- Pilotage à 24 Vcc du ventilateur de refroidissement de la pompe
- Pilotage des soupapes d’éjection
- Lecture de la vitesse de la pompe à la suite de la commande d’arrêt (lecture vitesse d’arrêt).

Toutes les informations nécessaires pour garantir la sécurité de l’opérateur lors de l’utilisation de cet appareillage sont indiquées dans les paragraphes suivants.

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

Installation

Préparation pour l’installation

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

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

Ne pas jeter les matériaux d’emballage sans autorisation. Le matériel est recyclable à 100 % et est conforme à la directive 94/62 de la CEE et aux modifications ultérieures.

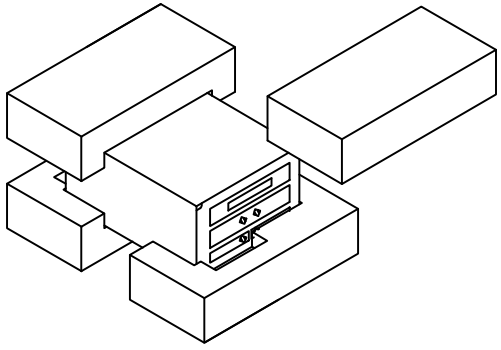


Figure 9 Emballage des Contrôleur

Set-up

AVERTISSEMENT

Le Contrôleur doit être alimenté au moyen d’un câble d'alimentation à trois fils (voir tableau des pièces que l’on peut commander) avec une fiche du type approuvé au niveau international en vue de la sécurité de l’usager. Utiliser toujours ce câble d'alimentation et introduire la fiche dans une prise pourvue d'un branchement au sol approprié à la masse, afin d'éviter toute décharge électrique et de respecter les spécifications CE. A l'intérieur du contrôleur se développent de hautes tensions qui peuvent causer de graves dommages, voire la mort. Avant d'effectuer toute opération d'installation ou d'entretien du contrôleur, le débrancher de la prise d'alimentation.

AVERTISSEMENT

Cordon d’alimentation électrique : le câble correct du raccordement électrique est un câble à trois fils (Ph+N+Terre). La section des fils doit être au moins de 1,0 mm^2 en présence d’une tension d’alimentation de 240 Vca ou de 2 mm^2 si la tension d’alimentation est de 120 Vca, en présence d’un câble de référence d’une longueur égale à 3 m.

NOTE

Ne pas installer et/ou utiliser le contrôleur dans des environnements exposés aux agents atmosphériques (pluie, gel, neige), à la poussière, aux gaz agressifs, dans des environnements explosifs ou à haut risque d'incendie.

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

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

Il est en tout cas nécessaire que l'air de refroidissement puisse circuler librement à l'intérieur de l'appareil.

ATTENTION **Le TwisTorr Medium-TMP Rack appartient à la deuxième catégorie d'installations (ou surtension) prévue par la norme EN 61010-1. De ce fait, brancher le dispositif à une ligne d'alimentation compatible avec cette catégorie. Le TwisTorr Medium-TMP Rack dispose de connecteurs pour les entrées/sorties et pour la communication en série qui doivent être branchés aux circuits extérieurs de façon qu'aucune partie sous tension ne soit accessible.**

S'assurer que l'isolation du dispositif branché au TwisTorr Medium-TMP Rack a une isolation appropriée même en condition de panne individuelle selon les termes de la norme EN 61010-1.

Pour l'installation d'accessoires en option, voir la section "Technical Information".

Montage du Contrôleur TwisTorr Medium-TMP Rack

Ce paragraphe présente les principales procédures opérationnelles. Avant d’actionner le Contrôleur, procéder aux branchements électriques et brancher le manchon de prévide en se référant au Manuel d’instructions.

AVERTISSEMENT

Pour éviter tous dommages aux personnes et à l'appareil, avant de démarrer la pompe, assurez-vous d'avoir correctement fixé la pompe au système de vide, conformément aux instructions fournies dans le manuel de la pompe (chapitre Installation).

NOTE Une fois connecté à la tension de ligne, pour faire fonctionner le contrôleur (et donc démarrer la pompe) de manière très simple, connectez sur le connecteur J1 (Entrée-Sortie) le connecteur homologue précâblé qui est fourni avec le contrôleur.

Le connecteur homologue précâblé est un moyen simple et rapide de permettre au contrôleur d'être utilisé sans avoir besoin de mettre en œuvre d'autres connexions externes câblées comme Serial Com ou onboard I/O.

La pompe à pré-vide et la pompe turbo peuvent être mises en marche simultanément.

Commandes, Indicateurs et Connecteurs du Contrôleur

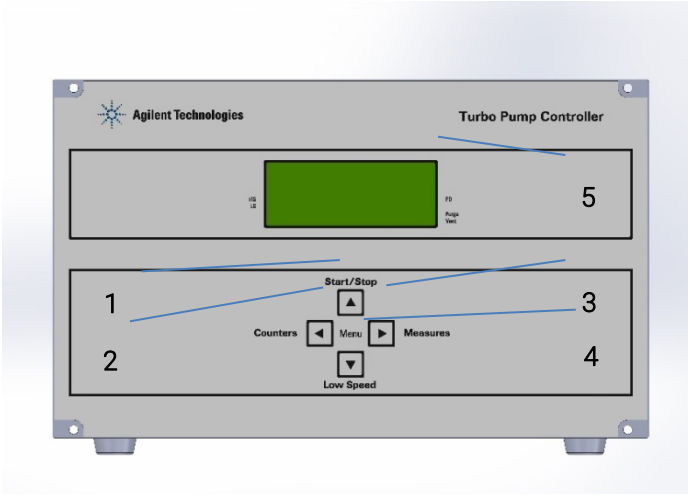


Figure 10 Tableau Frontal des TwisTorr Medium-TMP Rack Controller

Les fonctions des touches dépendent du contexte (fenêtre principale, menu de configuration, etc.).

1	Bouton de sélection des modalités START, STOP, RESET. Il est actif seulement si le contrôle depuis le tableau fontal a été sélectionné. Une première pression de ce bouton active la phase de mise en marche; une deuxième pression provoque l’arrêt de la pompe. Si la pompe s’est arrêtée automatiquement à cause d’une panne, il faut appuyer sur ce bouton une première fois pour effectuer la mise à zéro du contrôleur et une deuxième fois pour remettre la pompe en marche.
2	Bouton rappelant sur l’afficheur les paramètres de cycle number, cycle time et pump life et numéro de série.
3	Bouton permettant de rappeler sur l’afficheur les paramètres de pump current, pump temperature, pump power et rotational speed. Il est toujours actif indépendamment du type de mode de fonctionnement choisi.
4	Bouton de sélection des modalités HIGH/LOW SPEED. Il est actif seulement si le contrôle depuis le tableau fontal a été sélectionné. En le pressant plusieurs fois on commute la modalité entre HIGH SPEED et LOW SPEED.
5	Ecran alphanumérique à cristaux liquides rétro-illuminé: matrice de points, 4 lignes x 16 caractères.

Pour accéder au menu de configuration du contrôleur, il suffit de presser en même temps les boutons 2 et 3 pendant au moins 2 secondes. Dans le domaine de configuration, les quatre boutons permettent de surfer à l’intérieur du menu et de changer les valeurs des paramètres.

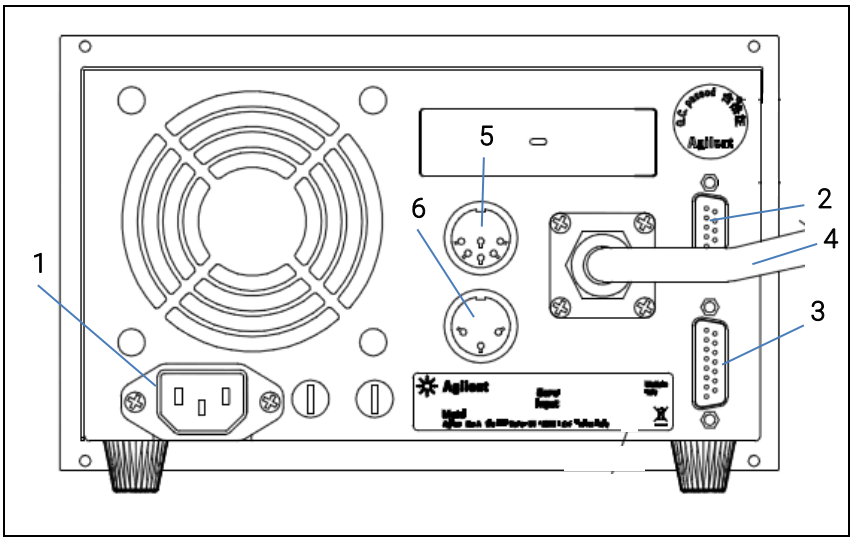


Figure 11 Figure 3 Tableau Arrière des Contrôleurs TwisTorr Medium-TMP Rack

1	Module d’alimentation du contrôleur comprenant les fusibles, la prise d’alimentation et le filtre EMC.
2	Porte de communication RS-232 / RS-485.
3	Connecteur pour les signaux logiques de input/output avec sortie analogique programmable (le connecteur d’accouplement est fourni avec la barrette de fermeture spéciale de l’"Interlock").
4	Câble pour la pompe.
5	Connecteur de sortie pour le contrôle des soupapes d’éjection.
6	Connecteur de sortie pour ventilateur externe.

Démarrage et utilisation du Contrôleur TwisTorr Medium-TMP Rack

Allumage du Contrôleur

Pour allumer le contrôleur, il suffit de brancher la fiche du câble d’alimentation à une prise électrique appropriée.

Mise en marche de la Pompe

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

NOTE Pour mettre en marche la pompe, il faut habiliter la connexion de l’interlock de sécurité. Par conséquent relier le connecteur J1 au connecteur spécial en dotation.

Arrêt de la Pompe

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

Entretien

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

AVERTISSEMENT

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

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

Messages d'erreur

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

Tab. 3 Messages d'erreur

Message	Description	Intervention
CHECK CONNECTION TO PUMP	Dysfonctionnement de la connexion entre la pompe et le contrôleur.	Vérifier les branchements entre la pompe et le contrôleur. Presser deux fois l'interrupteur START pour réactiver la pompe.
PUMP WAITING INTERLOCK	Le signal d’interlock situé sur le connecteur P1 est actif à cause de la coupure du court-circuit entre le pin 3 et le pin 9 et entre le pin 4 et le pin 15 du connecteur P1, ou à cause de l’ouverture du signal d’interlock extérieur.	Rétablir le court-circuit entre le pin 3 et le pin 9 et entre le pin 4 et le pin 15 du connecteur J1, ou fermer le signal d’interlock extérieur.
FAULT: PUMP OVERTEMP.	La température du palier supérieur de la pompe a dépassé 60 °C.	Attendre que la température retourne au-dessous du seuil. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
FAULT: CONTROLLER OVERTEMPERATURE	La température du transformateur du contrôleur a dépassé 65 °C.	Attendre que la température retourne au-dessous du seuil. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
FAULT: TOO HIGH LOAD	Au cours du fonctionnement normal, le courant consommé par la pompe est plus grand que celui qui a été programmé.	S'assurer que le rotor de la pompe a la possibilité de tourner librement. Contrôler que la longueur du câble pompe ait été configurée correctement. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
FAULT: SHORT CIRCUIT	Durant un fonctionnement normal (après la phase de démarrage), un court-circuit a été détecté sur le circuit de puissance.	Vérifier les connexions entre la pompe et le contrôleur. Presser deux fois l'interrupteur START pour remettre la pompe en marche.
OVERVOLTAGE	Une panne a été détectée dans la section d’alimentation du contrôleur ou bien le contrôleur a enregistré un problème d’alimentation provenant du réseau.	Appuyer deux fois sur le bouton START pour faire redémarrer la pompe. Si le message est réaffiché vous adresser à la société Agilent pour l’entretien.

Élimination

Signification du logo « DEEE » présent sur les étiquettes.

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

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

Figure 12 Logo « DEEE »

Pour plus de précisions, veuillez consulter :
http://www.agilent.com/environment/product/index.shtml

Service

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

vpt-customercare@agilent.com

vpl-customercare@agilent.com

Vous devez remplir le formulaire de “Request for Return” pour retourner votre pompe à Agilent pour l’entretien (fourni à la fin du présent manuel).

4 Instrucciones de uso

Acerca del manual

Validez

Este manual enumera las instrucciones para los usuarios de la bomba TwisTorr Medium-TMP Rack Controller, con particular referencia a la información relacionada con la seguridad, la operación y el mantenimiento de primer nivel que está limitado a las operaciones de mantenimiento que son responsabilidad del usuario.

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

Para una instalación y arranque/parada correctos, consulte el párrafo "Instalación".

Para un uso técnico más detallado, consulte el capítulo “Technical Information”.

NOTA

1 Este manual contiene información útil para que todo el personal que utilice la bomba TwisTorr Medium-TMP Rack Controller pueda operarla de manera segura y garantizar un rendimiento perfecto, durante toda su vida útil.

2 Guarde este manual, junto con todas las publicaciones relacionadas, en un lugar conocido y accesible para todos los operadores/personal de mantenimiento.

Definiciones y terminología

Definición de Precaución, Advertencia y Nota

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

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

ADVERTENCIA

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

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

Símbolos de advertencia

La siguiente es una lista de los símbolos que aparecen en conjunto con las advertencias en la bomba TwisTorr Medium-TMP Rack Controller. También se muestra el peligro que describen.

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

Voltajes peligrosos

Peligro genérico

Declaración Europea de Conformidad

Lugar de fabricación

Certificación CSA

Equipo de Desecho Eléctrico y Electrónico

Certificación China RoHS

Marca UK CA

Instrucciones de uso

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

Los siguientes símbolos aparecen en el instrumento para su información.

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

Seguridad

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

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

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

Uso correcto

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

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

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

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

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

Uso incorrecto

Agilent Technologies niega cualquier responsabilidad derivada del uso incorrecto del TwisTorr Medium-TMP Rack Controller.

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

El uso incorrecto se define como:

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

Equipo de protección

Como no se prevé mantenimiento para este dispositivo, no es necesario ningún otro equipo de protección.

ADVERTENCIA

Riesgo de lesiones debido a la caída de objetos

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

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

Pautas de seguridad para Controler de bombas turbomoleculares

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

ADVERTENCIA

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

Transporte y almacenamiento

Durante el transporte y el almacenamiento del TwisTorr Medium-TMP Rack no pueden ser superadas las siguientes condiciones ambientales:

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

Descripción del producto

Este equipo 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 TwisTorr Medium-TMP 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
- 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 más información consultar el capítulo “Technical information”.

Instalación

Preparación para instalación

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

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

El material es 100% reciclable y cumple con la Directiva EEC 94/62 y modificaciones posteriores.

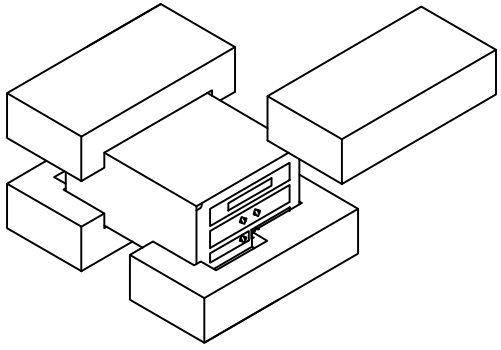


Figura 13 Embalaje de los Controlers

Puesta en marcha

ADVERTENCIA

El Controler debe ser alimentado mediante un cable de tres hilos (ver tabla de los componentes que pueden ser ordenados) con una clavija del tipo aprobado a nivel internacional con la finalidad de respetar las normas correspondientes a la seguridad del usuario. Utilizar siempre este cable de alimentación e introducir la clavija en un enchufe con una conexión de masa adecuada para evitar descargas eléctricas. y respetar las especificaciones CE. Dentro del controler se desarrollan altas tensiones que pueden causar graves daños o la muerte. Antes de efectuar cualquier operación de instalación o mantenimiento del controler desconectarlo del enchufe de alimentación.

ADVERTENCIA

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

La sección del cable debe ser de al menos 1,0 mm^2 en el caso de una fuente de alimentación de 240 Vac o 2 mm^2 en el caso de una fuente de alimentación de 120 Vac para una longitud de cable de referencia de 3 m.

NOTA

No instale y/o utilice el Controler en ambientes expuestos a agentes atmosféricos (lluvia, helada, nieve), polvo, gases agresivos, en ambientes explosivos o con alto riesgo de incendio.

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

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

En cualquier caso, es necesario que el aire de refrigeración pueda circular libremente alrededor del aparato.

PRECAUCIÓN **El TwisTorr Medium-TMP Rack pertenece a la segunda categoría de instalación (o sobretensión) prevista por la normativa EN 61010-1. Conectar, por lo tanto, el dispositivo a una línea de alimentación que cumpla con los requisitos de dicha categoría. El TwisTorr Medium-TMP Rack está dotado de conectores para entradas/salidas y para la comunicación que deben ser conectados a los circuitos externos de forma que ninguna parte bajo tensión sea accesible. Comprobar que el aislamiento del dispositivo conectado al TwisTorr Medium-TMP Rack sea el adecuado incluso ante condiciones de avería individual tal como previsto en la normativa EN 61010-1.**

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

Montaje del TwisTorr Medium-TMP Rack Controller

En este párrafo se han incluido los principales procedimientos operativos. Antes de accionar el TwisTorr Medium-TMP Rack, realice las conexiones eléctricas y conecte el manguito de pre-vacío siguiendo las instrucciones en la sección “Technical Information”.

ADVERTENCIA

Para evitar lesiones a las personas y daños al equipo, antes de poner en marcha la bomba, asegúrese de haber fijado correctamente la bomba al sistema de vacío, de acuerdo con las instrucciones proporcionadas en el manual de la bomba (capítulo Instalación).

NOTA

Una vez conectado a la línea de voltaje, para operar el controlador (y por lo tanto poner en marcha la bomba) de una manera muy simple, conecte en el conector J1 (Entrada-Salida) el conector de acoplamiento precableado que se suministra junto con el controlador.

El conector de acoplamiento precableado es una forma simple y rápida de permitir que el controlador sea operado sin tener la necesidad de implementar otras conexiones externas cableadas como Serial Com o onboard I/O.

La bomba pre-vacío y la bomba turbo pueden encenderse simultáneamente.

Mandos, Indicadores y Conectores del Controler

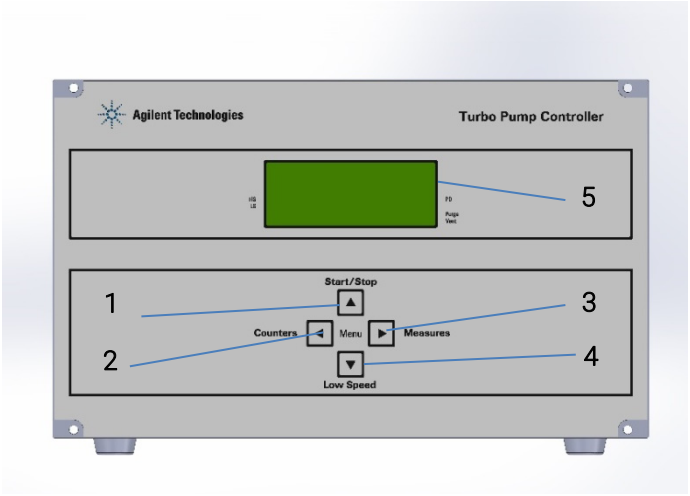


Figura 14 Panel Frontal del Controler TwisTorr Medium-TMP Rack Controller

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.

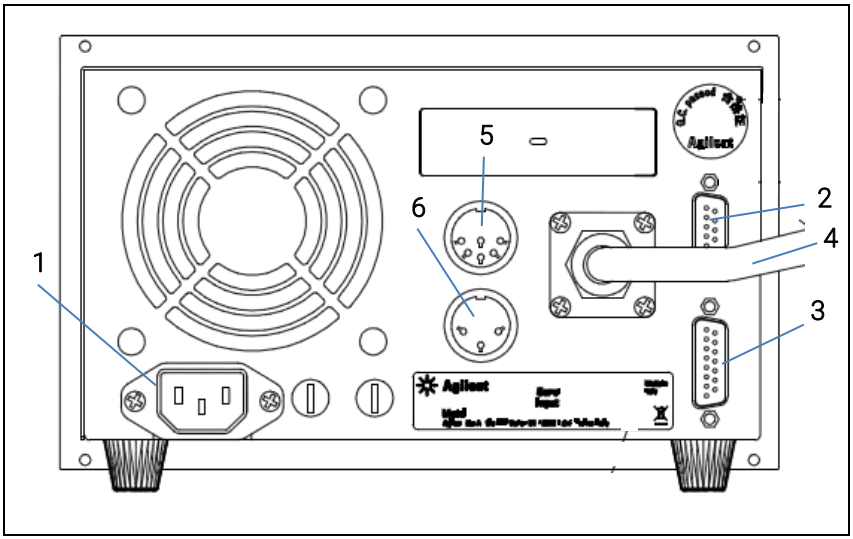


Figura 15 Panel Trasero del TwisTorr Medium-TMP Rack Controller

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.
6	Conector de salida para ventilador externo.

Puesta en marcha y funcionamiento del TwisTorr Medium-TMP Rack Controller

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

El TwisTorr Medium-TMP Rack no necesita ningún tipo de mantenimiento. Cualquier tipo de intervención sobre el sistema deberá ser realizado por personal autorizado. Antes de efectuar cualquier intervención sobre el sistema, es necesario desconectarlo de la alimentación. En caso de avería, es posible ponerse en contacto con el servicio de reparación Agilent o el servicio “Agilent advance exchange service” que permite obtener un controlador regenerado en sustitución del averiado.

ADVERTENCIA

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

En caso de que un sistema debiera ser desguazado, proceder a su eliminación respetando las normas nacionales específicas.

Mensajes de error

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

Tab. 4 Mensajes de error

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.
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.

Eliminación

Significado del logo “WEEE” que se encuentra en las etiquetas.

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

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

Figura 16 Logotipo “WEEE”

Para más información, consulte:

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

Servicio

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

vpt-customercare@agilent.com

vpl-customercare@agilent.com

Es obligatorio completar la “Request for Return” para devolver su bomba a Agilent para mantenimiento (proporcionada al final del presente manual).

5 使用说明

关于本手册

有效性

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

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

要了解正确的安装方法及如何启动/停止，请参阅“安装”章节。

有关更详细的技术应用，请参阅“Technical Information”。

注意

1 本手册包含有用信息，确保所有使用 TwisTorr Medium-TMP Rack Controller 的人员可以安全操作，在设备整个寿命期内发挥完美效率。

2 将本手册和所有相关出版物放置在所有操作员、维护人员方便访问的位置。

定义与术语

小心、警告和注意的定义

本手册的一些重要参考内容用背景色突出显示。

小心 **程序开始前，提示小心消息，如果不遵守过程指示，可能导致设备损坏。**

警告 **警告消息提醒操作员注意特定过程或做法，如果执行错误，可能导致人员重伤。**

注意 注意旨在让人注意重要信息，提供具体步骤的更多详细信息。

警告符号

以下是在 TwisTorr Medium-TMP Rack Controller 上与警告一起显示的符号列表。还显示了这些符号所指的危险。

三角形符号表示警告。在文档或仪器警告旁边可能出现的符号含义如下：

表示危险电压

一般危险

欧洲符合性声明

生产现场

CSA 认证

废弃电气和电子设备t

RoHS中国认证

UK CA 打標

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

以下符号会出现在仪器上以供您参考。.

	一般危险
CE	CE认证
	CSA 认证
	RoHS中国认证
	废弃电气和电子设备
UK CA	UK CA 打標

安全

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

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

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

正确使用

本手册包含机器安全工作需要遵守的重要警告和安全说明。

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

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

必须由了解相关风险的专业技术人员执行任何调整或维护操作。

必须由 Agilent 授权人员执行产品维修。

使用不当

对于因不正确使用 TwisTorr Medium-TMP Rack Controller 而造成的任何后果，安捷伦科技公司 (Agilent Technologies)不承担任何责任。

使用不当将导致所有责任保证和索赔保证失效。 使用不当的定义为：

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

防护装备

由于此设备无需维护，因此不需要任何其他保护设备。

警告

坠落物体造成伤害的风险

手动运输真空控制器时，存在负载滑落和坠落的危险。

- 双手携带控制器。

涡轮分子泵控制器安全指南

用户不应打开以下操作手册中所述的涡轮分子泵控制器，以避免可能损坏内部组件的风险。

警告

为避免损坏设备并防止操作人员受伤，应严格遵守本手册中提供的安装说明！

运输及存储

运输和存储控制器时，应满足以下环境要求：

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

产品描述

本设备供专业人员使用。 在操作设备之前，用户应阅读本说明手册和安捷伦提供的任何其他附加信息。 安捷伦对因不遵守（甚至部分遵守）这些说明、未经培训的人员不当使用、未经授权干扰设备或任何违反特定国家标准规定的行为而发生的任何事件概不负责。

TwisTorr 中型 TMP 机架控制器是微处理器控制的固态变频器，具有自诊断和自保护功能。

控制器功能:

- 输入电压自动设置
- 前端/远程/串行操作
- 24 Vdc 泵风扇冷却驱动
- 排气和吹扫阀驱动
- 停止命令后的泵速读数（停止速度读数）

下文包含在使用设备时保证操作员安全所需的所有信息。

详细信息在“Technical information”一章中提供。

安装

安装准备

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

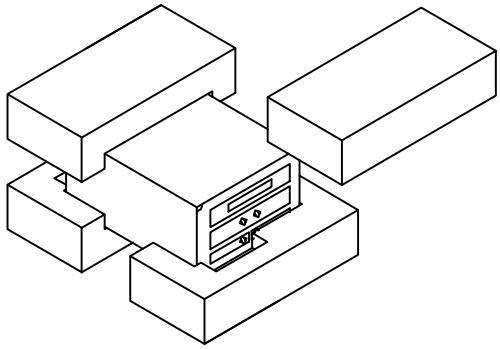


图 17　控制器包装

设置

警告

为了用户安全，涡轮控制器 必须由 3 线电源线（请参阅可订购的零件表）和插头（国际认可）供电。 始终使用此电源线并将插头插入具有接地功能的适配插座中，以避免电击并符合 EC 要求。 控制器内部产生的高压会可能导致严重的人身伤害甚至死亡。 在安装或维修本机之前，请务必将其与插座断开。

警告

电源线：正确的电线电缆是三芯 (Ph+N+Earth) 电缆。

对于等于 3 m 的参考电缆长度，在 240 Vac 电源电压的情况下，导线截面必须至少为 1.0 mm^2 或在 120 Vac 电源电压的情况下至少为 2 mm^2。

注意

請勿在暴露於大氣因素（雨、霜、雪）、灰塵、腐蝕性氣體、爆炸性環境或具有高火災風險的環境中安裝和/或使用控制器。

在操作过程中，必须遵守以下环境条件：

- 温度：从 0°C至+40°C;
- 相对湿度： 0 - 95 % （无冷凝）。

在任何情况下，冷却空气都是必要的 可以在设备周围自由循环。

小心

TwisTorr Medium-TMP Rack 板载控制器属于 EN 61010-1 标准的第二安装（或过电压）类别。 因此，请将设备连接到符合上述类别的电源线。TwisTorr Medium-TMP Rack 板载控制器具有输入/输出和串行通信连接器，必须将其连接到外部电路，以使电子板的带电部件无法被接触到。 根据 EN 61010-1 标准，即使发生单个故障，也要确保连接到 TwisTorr Medium-TMP Rack 板载控制器的设备充分绝缘。

有关可选配件的安装，请参阅附录“Technical Information”。

TwisTorr Medium-TMP Rack Controller 遥控器安装

本段详细介绍了主要操作程序。 请参考涡轮泵说明手册，在操作涡轮控制器之前，进行所有真空歧管和电气的连接。

警告

为避免人身伤害和设备损坏，在启动泵之前，请确保已按照泵手册（安装章节）中的说明将泵正确固定到真空系统上。

注意

连接到线路电压后，要以非常简单的方式操作控制器（然后启动泵），请在 J1（输入-输出）连接器上连接与控制器一起提供的预接线配对连接器。

预接线的配对连接器是一种允许控制器操作 的简单快捷的方法，而无需实施其他有线外部连接，如串行通信或远程输入/输出。

主泵和渦輪泵可以同時啟動。

控件、指示器和连接器

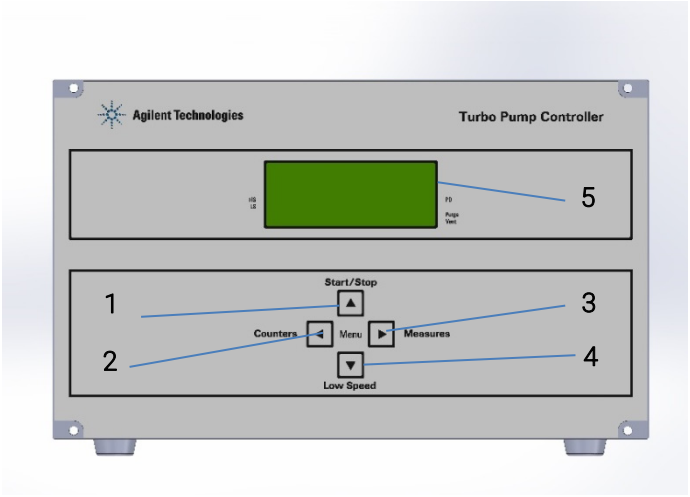


图 18 TwisTorr 中温机架控制器前面板

按键功能取决于具体情况（主窗口、配置菜单等）。

1	用于启动、停止、复位模式选择的键盘按钮。 仅在选择了前面板操作时才有效。 通过按下一次，开始阶段开始； 如果再次按下它会停止泵。 如果泵因故障而自动停止，则必须按下该按钮一次以重置控制器并再次按下该按钮以重新启动泵。
2	键盘按钮可在显示屏上调用循环编号、循环时间和泵寿命和序列号。
3	键盘按钮可在显示屏上调用泵电流、泵温度、泵功率、转速。 无论选择何种操作模式，它始终处于活动状态。
4	用于选择高速/低速模式的键盘按钮。 仅在选择了前面板操作时才有效。 反复按下，在“高速”和“低速”之间切换。
5	LCD 背光字母数字显示：点阵 4 行 x 16 个字符。

如果同时按下按钮 2 和 3 至少 2 秒，则可以访问控制器配置菜单。 在配置环境中，所有四个按钮都允许导航菜单和更改参数值。

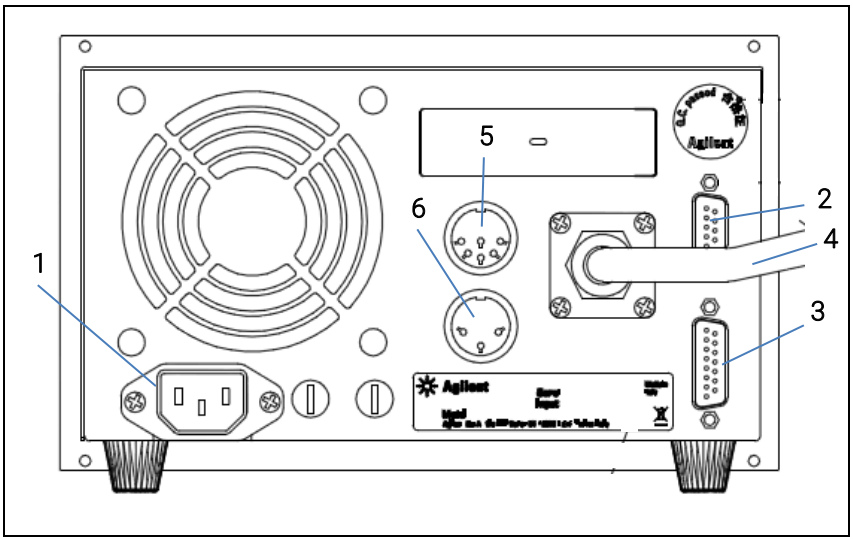


图 19 TwisTorr 中型 TMP 机架控制器后面板

1	控制器电源输入模块由电源保险丝、电源插座和 EMC 滤波器组成。
2	RS-232 / RS-485 通讯端口连接器。
3	逻辑输入/输出信号连接器加上可编程模拟输出（与互锁链接一起提供的配对连接器）。
4	泵电缆。
5	排气阀和吹扫阀控制输出连接器。
6	外部风扇输出连接器。

TwisTorr Medium-TMP Rack Controller 的启动和运行

控制器启动

如要启动控制器，请将电源线与合适的电源连接。

启动泵

如要启动泵，请确认互锁输入，然后按控制器前面板上的"开始"按钮。

注意

必须启用安全联锁连接才能启动泵。为此，将适当的连接器连接到连接器 J1 提供

Pump Shutdown

停止泵

如要关闭泵，请按控制器前面板上的 "停止" 按钮。

维护

TwisTorr Medium-TMP Rack板载控制器不需要任何维护。 在系统上执行的任何工作都必须由授权人员执行。 在系统上进行任何操作之前，必须将其与电源断开连接。 如果发生故障，可以使用安捷伦维修服务。 可通过安捷伦预先更换服务来替换控制器。

警告

在控制器上进行任何操作之前，请先断开其电源。

控制器报废时，必须按照国家具体标准进行处理。

错误信息

对于某种类型的故障，控制器将自我诊断错误并显示下表中描述的消息。

表 5　错误信息

信息	描述	修复动作
CHECK CONNECTION TO PUMP	泵和控制器之间的连接错误。	检查控制器和泵之间的连接。 按"START"按钮两次以启动泵。
PUMP WAITING INTERLOCK	J1 连接器的互锁信号由 P1 连接器的针脚 3 和 9 之间或针脚 4 和 15 之间的链路中断，或者因为外部互锁信号打开而激活。	复位 J1 连接器的 3-9 脚和 4-15 脚短路，或关闭外部联锁信号。
FAULT: PUMP OVERTEMP.	泵上轴承温度超过 60 °C。	等到温度降至阈值以下。 按"START"按钮两次以启动泵
FAULT: CONTROLLER OVERTEMPERATURE	控制器内部温度超过 65 °C。	等到温度降至阈值以下。 检查泵电缆长度是否设置正确。 按"START"按钮两次以启动泵。
FAULT: TOO HIGH LOAD	在正常操作中，泵汲取的电流高于设定值。	检查泵转子是否可以自由旋转。 按"START"按钮两次以启动泵。
FAULT: SHORT CIRCUIT	在正常运行期间（启动阶段之后），在电源电路中检测到短路情况。	检查泵转子是否可以自由旋转。 按"START"按钮两次以启动泵。
OVERVOLTAGE	控制器电源部分出现故障，或控制器受到电源干扰。	检查泵转子是否可以自由旋转。 按"START"按钮两次以启动泵。

处置

标签中的“WEEE”徽标含义。

按照 EC WEEE（废电子电气设备）指令应用以下符号。

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

图 **20** “**WEEE**”徽标

有关更多信息，请参考：

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

服务

客户如需要后期的更换或维修服务，敬请联系当地经销商，或直接发送电子邮件至:

vpt-customercare@agilent.com

vpl-customercare@agilent.com

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

6 取扱説明書

この説明書について

有効期

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

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

正しい設置と起動/停止に関しては、「設置」の段落を参照ください。

技術的な使用に関しての詳細は、「Technical Information」を参照ください。

注

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

定義と用語

警告・注意・注の定義

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

注意

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

警告

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

注

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

警告の記号

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

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

危険な電圧

包括的な危険

CE適合宣言書

製造所

CSA 認証

廃電気・電子製品に関するEU WEEE指令

中国RoHS 指令認証

UK CAマーキング

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

参考情報として、下記の記号は装置上に示されます。.

	包括的な危険
CE	CE認証
	CSA 認証
RoHS	EU RoHS指令認証
	中国RoHS 指令認証
	廃電気・電子製品に関するEU WEEE指令
UK CA	UK CAマーキング

安全性

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

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

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

適切な使用

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

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

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

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

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

不適切な使用

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

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

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

保護装具

この装置にはメンテナンスは想定されていないため、他の保護装具は必要ありません。

警告

落下物による怪我の危険性

真空コントローラーを手で運ぶ際に、荷物が滑って落下する危険性があります。

- **コントローラーは両手で持ち運んでください。**

ターボ分子ポンプ コントローラーの安全ガイドライン

以下の操作マニュアルに記載されているとおり、ターボ分子ポンプコントローラーは、内部コンポーネントが損傷するリスクを回避するために、使用者は開けないでください。

警告

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

运输及存储

コントローラーを輸送、保存する時は、下記の環境仕様を超過してはいけません：

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

製品説明

この機器は、専門家による使用を目的としています。ユーザーは、機器を操作する前にこの説明マニュアルとAgilent により提供されるその他の追加情報を熟読する必要があります。Agilentは、部分的であったとしても、これらの説明書に従わないこと、訓練を受けていない者による不適切な使用、機器への認められていない干渉、または特定の国内基準で規定されていることに反する行動により生じた事象について責任を負いません。

TwisTorr ミディアム-TMP ラックコントローラーは、マイクロプロセッサーで制御される、自己診断および自己保護機能を備えたソリッドステートの周波数変換器です。

コントローラーの機能：

- 入力電圧自動設定
- 前面 / リモート / 連続操作
- 24 Vdc ポンプファン クーリングドライブ
- ベント & パージ バルブドライブ
- 停止コマンド後のポンプスピードの表示 (停止スピードの表示)

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

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

取り付け

取り付けの準備

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

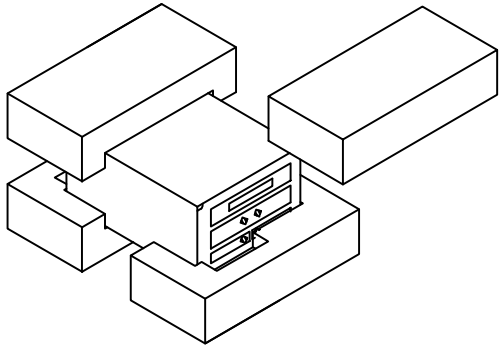


図 21　　コントローラーの梱包

取り付け

警告

使用者の安全のために、ターボコントローラー は。３本のワイヤー電源コード（注文可能な部品を参照）とプラグ（国際的に認可されたもの）で電源が供給されなければいけません。電気ショックを避け、また CE 要件を満たすために、常にこの電源コードを使用し、適切な接地接続の電源ソケットにプラグを挿入してください。コントローラー内で発達した高電圧は、重大な損傷や死亡を引き起こす可能性があります。ユニットを取り付ける前または修理する前には常に、ソケットから接続を断ってください。

警告

電源コード：電気配線に適したケーブルは、3 線（Ph + N + Earth）ケーブルです。

3 m と同等の長さの標準ケーブルに対して、ワイヤー部分は 240Vac の供給電圧の場合は 1.0mm^2 以上、120Vac の供給電圧の場合は 2 mm^2 ある必要があります。

注

コントローラは、大気中の物質（雨、霜、雪）、粉塵、腐食性ガスにさらされる環境、爆発性の環境、または火災の危険性が高い環境に設置したり、使用したりしないでください。

操作中、下記の環境状況は遵守されなければいけません：

- 温度： 0 °C から+40 °Cまで;
- 相対湿度： 0 - 95 % （結露なし）

穴を通して自由に通気が取れるように所定の位置に設置されなければいけません。

注意

TwisTorr Medium-TMP Rack オンボード は、EN 61010-1 規格の第 2 取り付け（または過電圧）カテゴリーに属します。したがって、上記のカテゴリーに準拠する主電源ラインに機器を接続してください。TwisTorr Medium-TMP Rack オンボードには、電子ボードの通電部分にアクセスできないように外部回路に接続する必要がある入力/出力およびシリアル通信コネクターがあります。EN 61010-1 規格による単一故障の場合でも、の TwisTorr Medium-TMP Rack オンボードに接続されている機器の分離が十分であることを確認してください。

オプションのアクセサリの取り付けについては、“Technical Information” を参照してください。

TwisTorrMedium-TMP onboard Controller の取り付け

この章は、主な操作手順について詳しく説明します。ターボコントローラーを操作する前に、ターボポンプの取扱説明書を参照して、すべての真空マニホールドと電気接続を行ってください。

警告

人への損傷や機器への損傷を避けるために、ポンプを始動する前に、ポンプのマニュアル（「設置」の章）に記載されている指示に従って、ポンプが真空システムに正しく固定されていることを確認してください。

注

線間電圧に接続したら、非常に簡単な方法でコントローラーを操作するには、（そしてポンプを始動するために）コントローラーに付属している配線済みの相手側コネクタを J1（入出力）コネクタに接続します。

配線済みの相手側コネクタは、シリアルコムやリモート I / O などの他の配線された外部接続を行う必要なく、コントローラを操作 できるようにする簡単で迅速な方法です。

プライマリポンプとターボポンプを同時に起動できます。

コントロール、インジケーター、コネクター

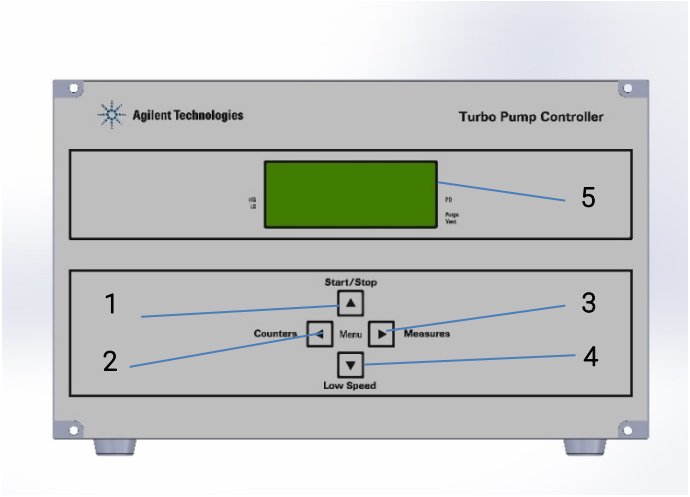


図 22 TwisTorr ミディアム-TMP ラックコントローラーの前面パネル

重要な機能は状況により異なります (メインのウィンドウ、構成メニューなど)。

1	開始、停止、リセットモードを選択する用のキーボードプッシュボタン。前面パネルの操作が選択されている場合にのみアクティブになります。一度押すと起動フェーズが開始します；もう一度押すとポンプが停止します。 故障によりポンプが自動的に停止した場合は、このプッシュボタンを 1 回押してコントローラーをリセットし、2 回目を押してポンプを再始動する必要があります。
2	キーボードのプッシュボタンで、サイクル番号、サイクル時間、ポンプ寿命、シリアル番号をディスプレイに表示します。
3	キーボードのプッシュボタンで、ポンプの電流、ポンプの温度、ポンプの出力、回転速度をディスプレイに表示します。 選択された操作モードに関係なく、常にアクティブです。
4	高速/低速モードを選択する用のキーボードプッシュボタン。前面パネルの操作が選択されている場合にのみアクティブになります。繰り返し押し、高速と低速を切り替えます。
5	LCD バックライトの英数字ディスプレイ：ドットマトリックス 4 列 x 16 文字。

プッシュボタンの2と3を少なくとも2秒間一緒に押すと、コントローラー構成メニューにアクセスできるようになります。 構成環境では、4つのボタンすべてで、メニューをナビゲートし、パラメーターの値を変更することができます。

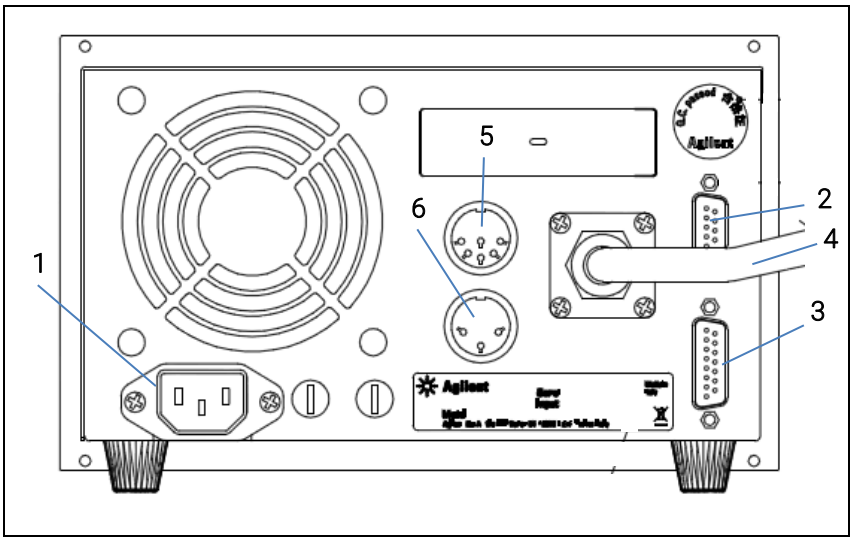


図 23 TwisTorr ミディアム-TMP ラックコントローラーの背面パネル

1	主電源のヒューズ、主電源のソケット、EMC フィルターで構成されるコントローラー電源入力モジュール。
2	RS-232 / RS-485 コミュニケーションポートコネクター。
3	ロジック入力/出力信号のコネクターとプログラム可能なアナログ出力（インターロックリンクに付属の組み合わせコネクター）。
4	ポンプケーブル。
5	ベントバルブとパージバルブのコントロール出力コネクター。
6	外部ファン出力コネクター。

TwisTorr Medium-TMP Rack Controller コンパクトの起動と操作

コントローラーの起動

コントローラーを起動するには、電源ケーブルを適切な電源プラグに接続してください。

ポンプの開始

ポンプを開始するには、インターロック入力を確認して、コントローラーフロントパネル上の「開始」のプッシュボタンを押してください。

注

ポンプを始動するには、安全インターロック接続を有効にする必要があります。これを行うには、適切なコネクタをコネクタ J1 に接続します

供給。

ポンプの停止 Pump Shutdown

ポンプを停止するには、コントローラーフロントパネル上の「停止」のプッシュボタンを押してください。

メンテナンス

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

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

警告

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

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

エラーメッセージ

特定のタイプの障害の場合、コントローラーはエラーを自己診断し、以下の表に説明されるメッセージが表示されます。

表. 6　エラーメッセージ

メッセージ	説明	修復アクション
CHECK CONNECTION TO PUMP	ポンプとコントローラーの接続が間違っています。	コントローラとポンプ間の接続を確認してください。 開始のプッシュボタンを 2 回押して、ポンプを始動させます。
PUMP WAITING INTERLOCK	J1 コネクターのインターロック信号は、P1 コネクターのピン 3 と 9 の間、またはピン 4 と 15 の間のリンクが中断された場合に、または外部インターロック信号が開いているために、アクティブになります。	J1 コネクターのピン 3 – 9 の間およびピン 4 - 15 の間の短絡をリセットするか、または外部インターロック信号を閉じます。
FAULT: PUMP OVERTEMP.	ポンプのアッパーベアリング温度が 60 °C を超えています。	温度がしきい値以下になるまで待ちます。 開始のプッシュボタンを 2 回押して、ポンプを始動させます。
FAULT: CONTROLLER OVERTEMPERATURE	コントローラーの内部温度が 65 °C を超えています。	温度がしきい値以下になるまで待ちます。 ポンプケーブルの長さが正しく設定されていることを確認してください。 開始のプッシュボタンを 2 回押して、ポンプを始動させます。
FAULT: TOO HIGH LOAD	通常の作動では、ポンプによって引き出される電流はプログラムされたものよりも大きくなります。	ポンプローターが自由に回転することを確認してください。 開始のプッシュボタンを 2 回押して、ポンプを始動させます。
FAULT: SHORT CIRCUIT	通常の機能中（起動フェーズ後）に、電源回路でショート状態が検出されました。	ポンプとコントローラー間の接続と不足を確認してください。 開始のプッシュボタンを 2 回押して、ポンプを始動させます。
OVERVOLTAGE	コントローラーの電源供給部に異常が生じたか、または主電源からコントローラーに障害が生じました。	開始ボタンを 2 回押して、ポンプを再開させます。 メッセージが再び表示される場合は、Agilent にメンテナンスを依頼してください。

処分

ラベルに記載の ″WEEE″ ロゴの意味。

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

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

図 24　ロゴ ″WEEE″

詳細は、下記サイトを参照してください。

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

サービス

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

vpt-customercare@agilent.com

vpl-customercare@agilent.com

“Request for Return”の申請の完了には、サービス提供のためにお客様のポンプをAgilentへ返送する必要があります。（このマニュアルの最後に提供されています）。

7 Instructions for Use

About this manual

Validity

This manual lists the instructions for the users of the TwisTorr Medium-TMP Rack Controller, with particular reference to the notions relating to safety, operation and first level maintenance, limited to maintenance operations for which the user is responsible.

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

For a correct installation and start/stop, please refer to "Installation" paragraph.

For more detailed technical use, please refer to "Technical Information".

NOTE

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

Definitions and terminology

Definition of Caution, Warning and Note

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

CAUTION

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

WARNING

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

NOTE

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

Warning Symbols

The following is a list of symbols that appear in conjunction with warnings on the TwisTorr Medium-TMP Rack Controller. The hazard they describe is also shown.

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

Dangerous voltages

Generic hazard

European Declaration of Conformity

Manufacturing Site

CSA certification

Waste Electrical and Electronic Equipment

RoHS China certification

UK CA Marking

Instructions for Use

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

The following symbols appear on the instrument for your information.

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

Safety

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

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

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

Proper use

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

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

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

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

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

Improper use

Agilent Technologies declines all responsibility, deriving from the improper use of the TwisTorr Medium-TMP Rack Controller.

Improper use will cause all claims for liability and warranties to be forfeited. Improper use is defined as:

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

Protective equipment

As no maintenance is foreseen for this device, any other protective equipment is not needed.

WARNING

Risk of injury through falling objects

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

- **Carry controllers two-handed.**

Safety guideline for Turbomolecular Pump Controllers

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

WARNING

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

Transport & Storage

When transporting and storing the TwisTorr Medium-TMP Rack, the following environmental conditions should not be exceeded:

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

Product description

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 TwisTorr Medium-TMP 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 Valve drive
- Pump speed reading after stop command (stop speed reading)

The following paragraphs contain all the information necessary to guarantee operator safety when using the equipment.

For detailed information, refer to the "Technical Information" section.

Installation

Preparation for installation

The TwisTorr Medium-TMP Rack Controller is supplied in a special protective packing. If this shows signs of damage which may have occurred during transport, contact your local sales office.

When unpacking the controller ensure that it is not dropped or subjected to any form of impact.

Do not dispose of the packing materials in an unauthorized manner. The material is 100 % recyclable and complies with EEC Directive with EEC Directive 94/62 and subsequent amendments.

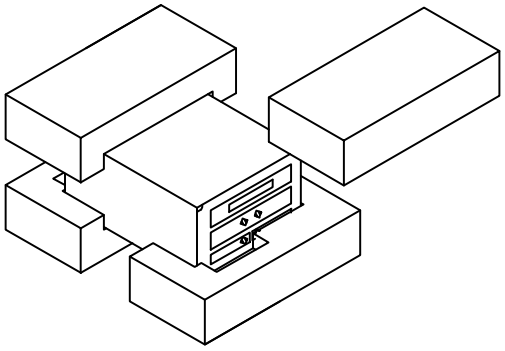


Figure 25 Controllers Packing

Set-up

WARNING

For user safety, the Controller must be powered by a 3-wire power cord (see Accessories and Spare Parts Table) and plug (internationally approved). Always use this power cord and insert the plug in a socket with a suitable ground connection to avoid electrical shock and to comply with EC requirements . The high voltage developed inside the controller can cause severe injury or death. Before installing or servicing the unit, always disconnect it from the socket.

WARNING

Power supply cord: the correct cable for electrical wiring is a three wires (Ph+N+Earth) cable.

The wire section has to be at least 1.0 mm^2 in case of 240 Vac supply voltage or 2 mm^2 in case of 120 Vac supply voltage for a reference cable length equal to 3 m.

NOTE

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 complied with:

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

In any case it is necessary that the cooling air can circulate freely around the apparatus.

CAUTION

The TwisTorr Medium-TMP Rack Controller belongs to the second installation (or overvoltage) category of the EN 61010-1 standard. Therefore, connect the device to a mains line that complies with the above category. The TwisTorr Medium-TMP Rack has Input/Output and serial communication connectors that must be connected to external circuits in such a way that no live parts of electronic board are accessible. Make sure that the insulation of the device connected to the TwisTorr Medium-TMP Rack is adequate even in the case of a single fault as per the EN 61010-1 standard.

For installation of optional accessories, see "Technical Information" section.

TwisTorr Medium-TMP Rack Controller Mounting

This paragraph details the main operating procedures. Prior to operating the Controller, make all vacuum manifold and electrical connections, referring to the Turbo pump instruction manual.

WARNING

To avoid damage to people and damage to the equipment, before starting the pump, make sure that you have correctly fastened the pump to the vacuum system, according to the instructions given in the pump manual (chapter Installation).

NOTE

Once connected to the line voltage, to operate the controller (and then to start the pump) in a very simple way, connect on the J1 connector (Input-Output) the pre-wired mating connector that is supplied together with the controller.

The pre-wired mating connector is a simple and quick way to allow the controller to be operated without having the need to implement other wired external connections like Serial Com or onboard I/O.

The forepump and turbo pump can be switched on at the same time.

Controls, Indicators and Connectors

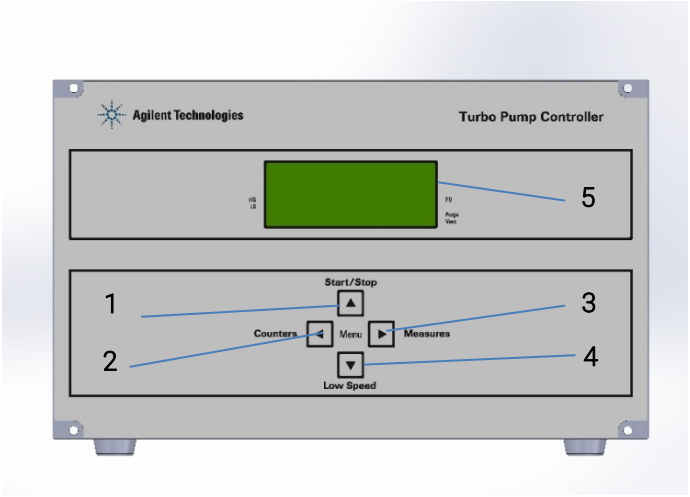


Figura 26 TwisTorr Medium-TMP Rack Controller Front Panel

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.

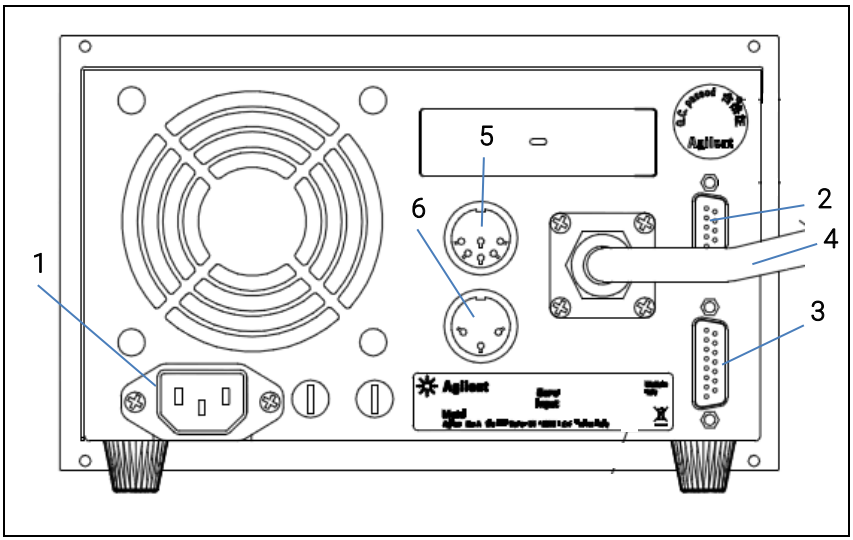


Figura 27 TwisTorr Medium-TMP Rack Controller Rear Panel

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 control output connector.
6	External Fan output connector.

Startup and Operation of the TwisTorr Medium-TMP Rack Controller

Controller Startup

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

Starting the Pump

To start the pump, confirm the interlock input and press the START pushbutton 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 STOP push-button on the controller front panel.

Maintenance

The TwisTorr Medium-TMP Rack does not require any maintenance. Any work performed on the system must be carried out by authorized personnel. Before carrying out any operation on the system, it must be disconnected from the power supply. If a fault occurs, 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 controller is to be scrapped, it must be disposed off in accordance with the specific national standards.

Error Messages

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

Tab. 7 Error Messages

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.
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.

Disposal

Meaning of the "WEEE" logo found in labels.

The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.

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

Figure 28 Logo "WEEE"

For more information refer to:

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

Service

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

vpt-customercare@agilent.com

vpl-customercare@agilent.com

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

8 Technical Information

Description of the TwisTorr Medium-TMP Rack Controller

The TwisTorr Medium-TMP Rack controller models are:

- X3501-64006 TwisTorr Medium-TMP One Speed rack controller
- X3501-64016 TwisTorr Medium-TMP rack controller, for use with TwisTorr 404, 704, 804 FS turbo pumps, 120-220 V

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

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. 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.

Technical specification

The following table lists the main technical data of the TwisTorr Medium-TMP Rack Controller.

Table 8 TwisTorr Medium-TMP Rack Controller Technical Specification

TwisTorr Medium-TMP Rack Controller Technical data	
Input: Voltage Frequency Power	 100 ÷ 240 Vac (±10 %), 1-phase 50 to 60 Hz 800 VA maximum
Output for pump: Power during pump ramp-up Power normal (pump water cooled) Power normal (pump air cooled)	 430 W (+/- 5%) maximum 200 W (+/- 5%) maximum 200 W (+/- 5%) maximum
Operating temperature	5 °C to +40 °C
Storage temperature	-20 °C to +70 °C
Fuse: Mains	 2 x T10 AH (slow blow) 250 V 5x20 fuses
Serial communication	RS232 cable with a 9-pin D type male connector and a 9-pin D type female connector, and related software (optional)
Pump cable	5 meters long fixed cable
In compliance with norms	EN 61010-1 (2010) EN 61326-1 (2013) Emission level : Class B for Residential Application Immunity level : for Industrial Application
Max altitude	2000 m
Protection category	IP 20
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.

WARNING

The pump must be installed in a way that allows an easy interruption of the line voltage.

Power supply cord: the correct cable for electrical wiring is a three wires (Ph+N+Earth) cable. The wire section has to be at least 1 mm^2.

Controller Outline

The outline dimensions for the TwisTorr Medium-TMP Rack Controllers are shown in the following figure.

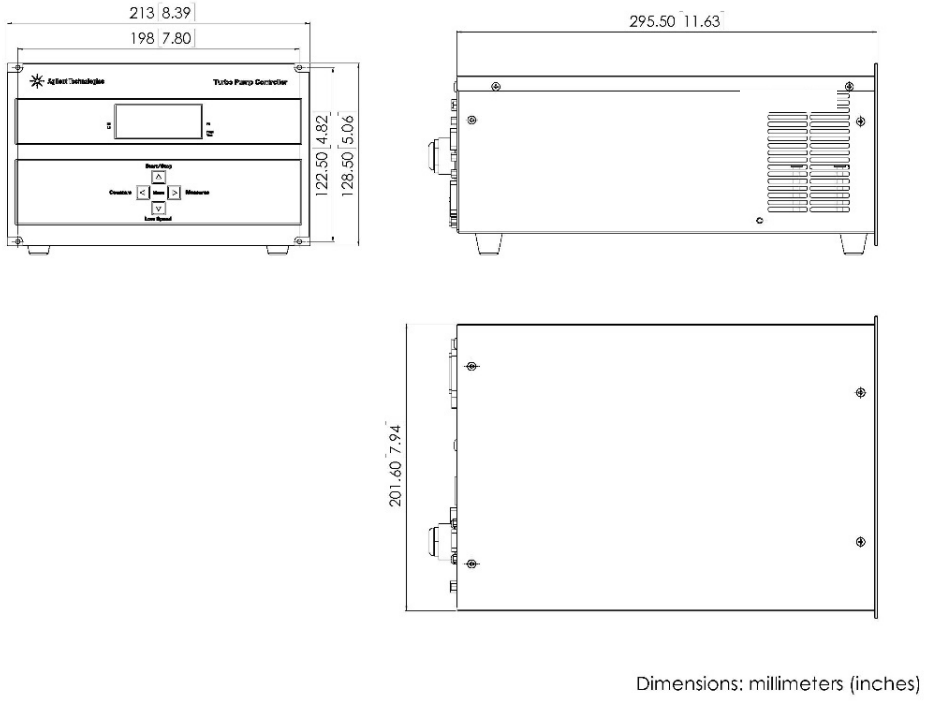


Figure 29 TwisTorr Medium-TMP Rack Controller outline

Fuse Holder Assembly

The following figure shows the location of this assembly.

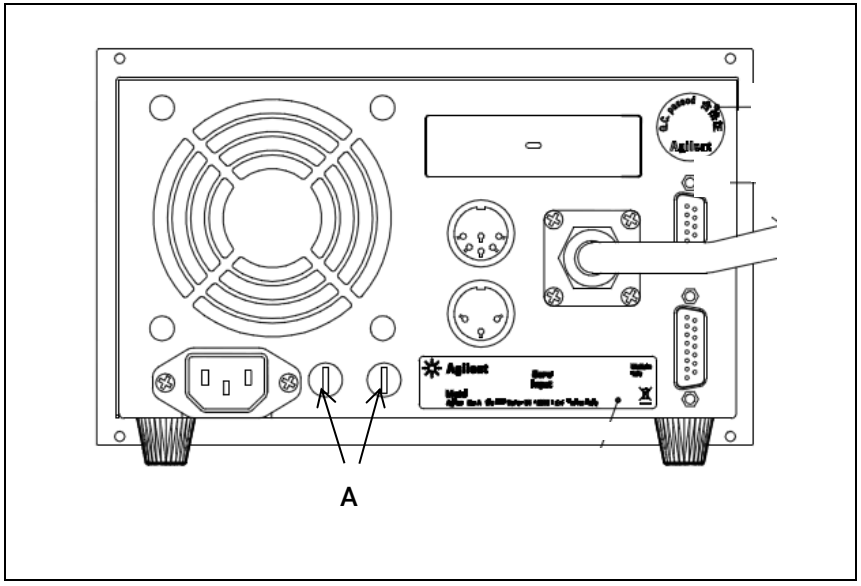


Figure 30 Rear panel

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

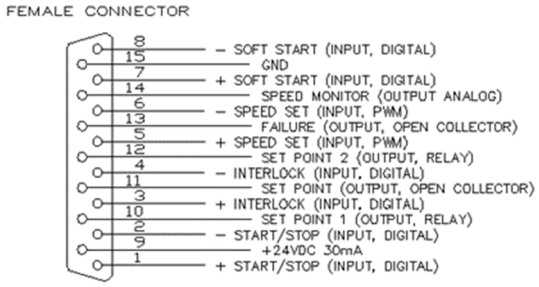


Figure 31 Remote I/O connector

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.

Table 9 Signal characteristics and use

Pin N.	Signal Name	IN-/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	+ 24 vdc	Out
10	SET POINT (RELAY)	Out
11	Programmable set point (open collector)	Out

Pin N.	Signal Name	IN-/OUTPUT
12	Contact: normally open	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.

Signal Description

START/STOP: input signal (opt isolated) to start or stop the pump.
When the controller is configured for 'Front Panel' operation (default mode), the front panel can be used to send 'Start/Stop' commands.
When the controller is configured for 'Remote' operation, using the rear panel mating connector (supplied together with the controller, connects START/STOP positive signal to the +24 Vdc pin and START/STOP negative signal to the Ground pin) it is possible to automatically start the pump as soon as the input supply is fed to the controller ("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).

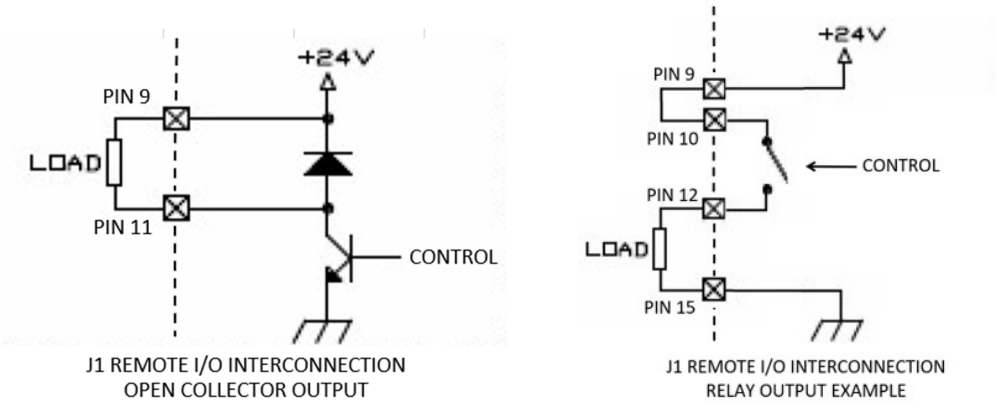


Figure 32 J1 Remote I/O Interconnection (see also fig. 41 Input/Output electrical specification)

	*Control logic (**WIN 104**)*	***High level active***		***Low level active***	
	Control status	*IDLE*	*ACTIVE*	*IDLE*	*ACTIVE*
	Control level	**LOW**	**HIGH**	**HIGH**	**LOW**
LOAD CONNECTIONS (in bold the I/O connector pins)	***Open collector** circuit nodes:* *- voltage supply** *- **Programmable set point (J1, pin11)*** *allows for connection to GND*	circuit **OPEN** **Load** stays **OFF** or **Normally Open contact**	circuit **CLOSED** triggers **Load energized**	circuit **CLOSED** **Load** stays **energized** or **Normally Closed contact**	circuit **OPEN** triggers **Load OFF**
	Relay** circuit nodes:* *- voltage supply** *- **Set point relay 1 (J1, pin10) *- **Set point relay 2 (J1, pin12)*** *- GND***				

* voltage supply available on connector J1, pin 9
** GND available on connector J1, pin 15

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

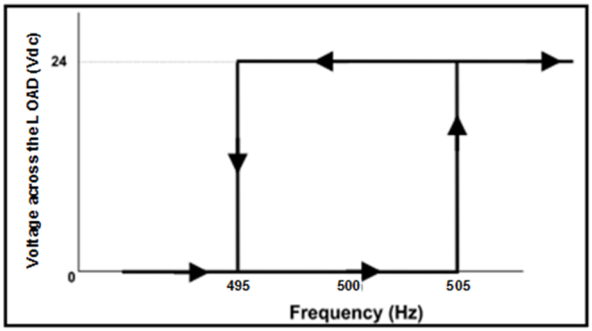


Figure 33

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: 643 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 % (toff/T) corresponding to a rotational frequency from 680 Hz to FMAX Hz linearly. With duty cycle <25 % rotational frequency = 680 Hz, with duty cycle >75 % rotational frequency = 825 Hz for X3501-64016 or 714 Hz for X3501-64006.

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 (825 or 725 Hz). Low Speed (680 Hz) corresponds to the rotational frequency for a stand by status. Users can set rotational frequency between these two values.

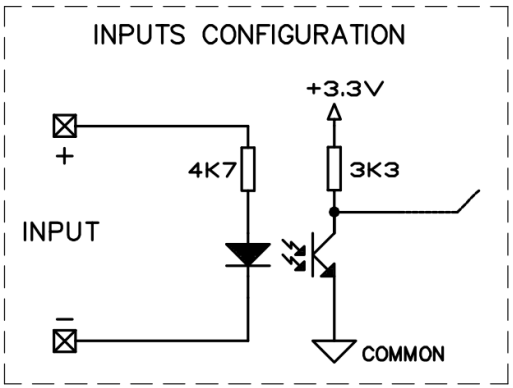


Figure 34

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 680 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, 825 Hz default).

SOFT START: input signal (opt isolated) 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).

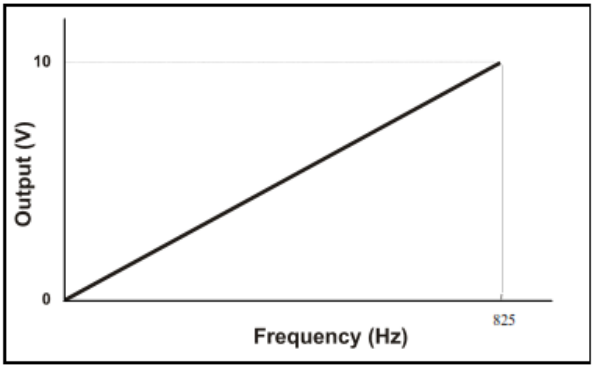


Figure 35

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

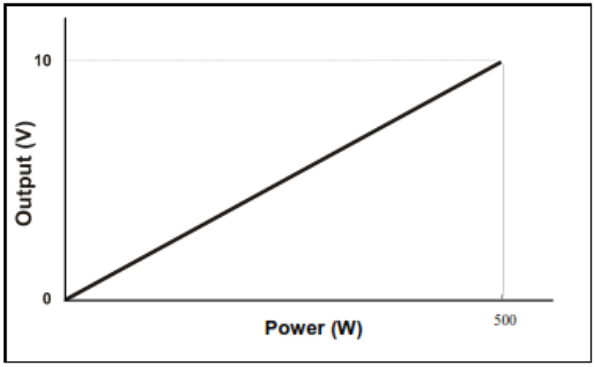


Figure 36

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

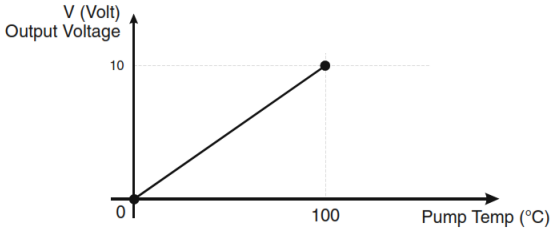


Figure 37

Connection P1 Vent

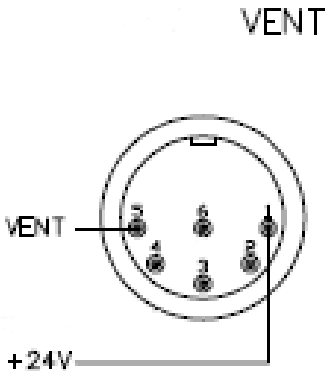


Figure 38

The TwisTorr Medium-TMP Rack Controller can drive as an optional accessory the vent device (model X3501-68002 and X3501-68022). Through P1 connector the controller is able to drive the Vent Valve (Normally Open or Normally Closed) 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 Accessories and Spare Parts table)
See Window Meaning table and HOW TO USE BY FRONT PANEL chapter to know the external fan possible settings.

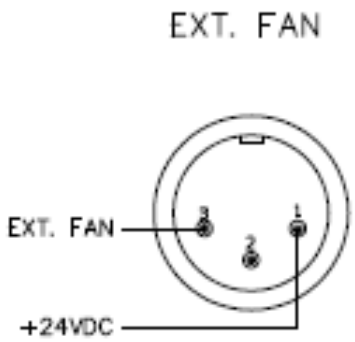


Figure 39

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:

- B-C-D = 3-phase output to pump motor
- E = ground
- A-F-G = Reserved for AGILENT use

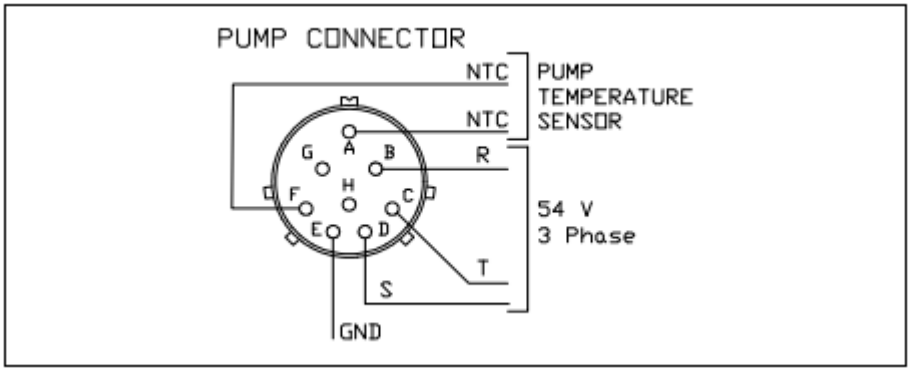


Figure 40 Pump connector

The pump cable can be extended by means of an optional extension cable (see Accessories and Spare 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 200mA)
OUTPUT, OPEN DRAIN VENT	<0.25V		24VDC/200mA	
OUTPUT, OPEN DRAIN EXT FAN	<0.25V		24VDC/500mA	

Figure 41 Input / Output electrical specification

VENT VALVES: the TwisTorr Medium-TMP Rack Controller can drive the Vent valve. The two valves are Normally Closed (N.C.) so if a power fail occurs, the valves will remain closed.

The valve 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.

Vent Valve Operation – Automatic Opening Delay (AUTO TIME)

The vent valve is automatically opened in function of time (WIN 126 = delay and WIN 147 = opening time).

After pump STOP command, the vent valve stays closed for the time set on WIN 126. After the delay, the valve opens for the time set on WIN147. If WIN147 = 0, the valve remains open until next START command. If WIN 147 ≠0, the valve opens for the time indicated. Then it closes until the next START command.

Reference to existing description: AUTOTIME, it's the default setting, WIN 125 = 2.

Vent Valve Operation – Manual Venting (SERIAL COMMAND)

The vent valve is operated manually, either via FRONT panel or via SERIAL command.

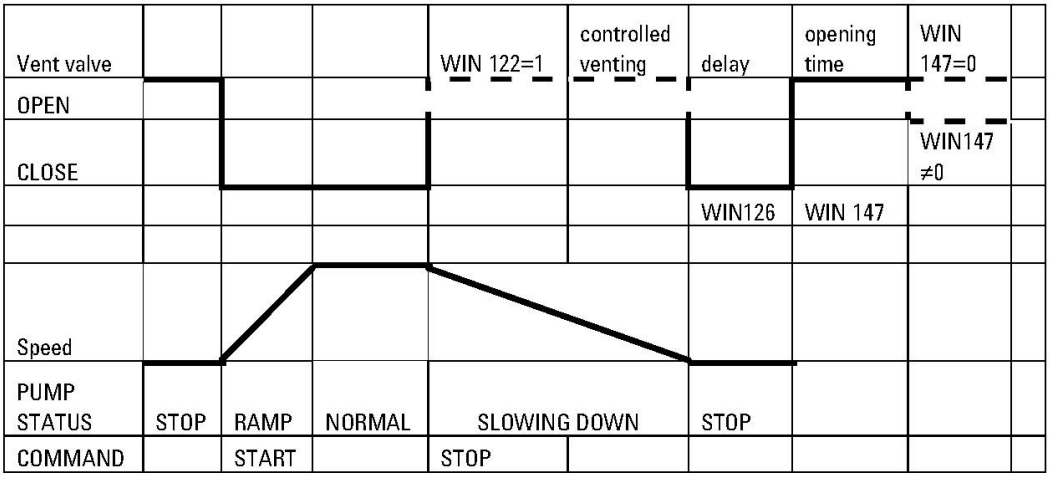
Via SERIAL command, use WIN 122 = 1.

After pump STOP command, the vent valve stays closed waiting for command given to the vent valve (WIN122 = 1 = open). When the command OPEN VALVE is given, the controller performs a CONTROLLED VENTING (see dedicated paragraph) to reduce the rotational speed down to 100 Hz.

After the pump has reached 100Hz, the valve is closed for a time defined by WIN 126 (delay), then it opens as set in WIN 147.

If WIN147 = 0, the valve remains open until next START command. If WIN 147 ≠0, the valve opens for the time indicated. Then it closes until the next START command.

Please refer to following graph:



Reference to existing description: ON COMMAND, WIN 125 = 0.

NOTE

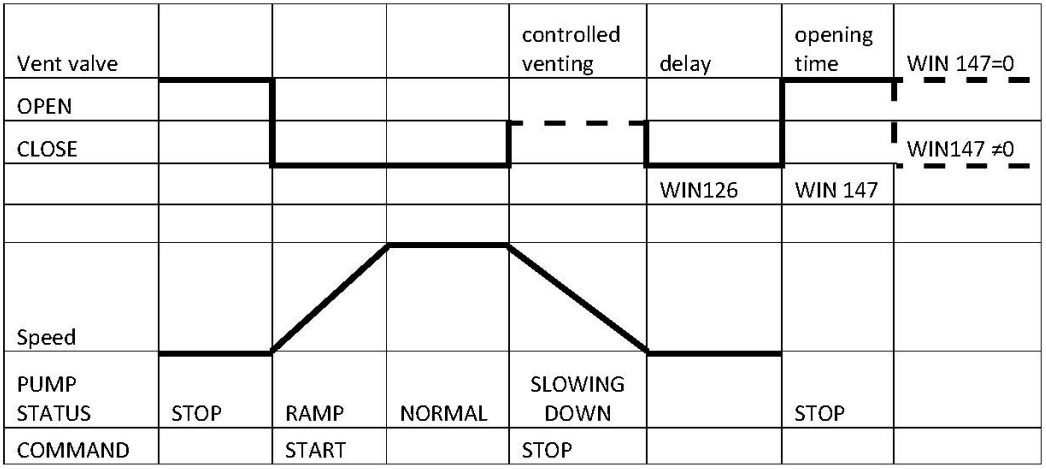
If the pump is STARTING or in NORMAL OPERATION or in AUTOTUNING, the controller rejects the command OPEN VALVE.

Vent Valve Operation – Pulsed Venting (AUTO PUMP SPEED)

After pump STOP command, the controller performs a CONTROLLED VENTING (see dedicated paragraph) to reduce the rotational speed down to 100 Hz. When the pump has reached 100Hz, the valve is closed for a time defined by WIN 126 (delay), then it opens as set in WIN 147.

If WIN147 = 0, the valve remains open until next START command. If WIN 147 ≠0, the valve opens for the time indicated. Then it closes until the next START command.

Please refer to following graph:



Reference to existing description: WIN 125 = 1, Auto Pump Speed.

NOTE

If the pump is STARTING or in NORMAL OPERATION or in AUTOTUNING, the controller rejects the command OPEN VALVE.

Controlled Venting

This function is automatically enabled when the Valve Operating Mode is ON COMMAND (for Manual Venting) or AUTO PUMP SPEED (for Pulsed Venting) WIN 125 = 0 or 1.

This function activates only after STOP command, when the pump is slowing down.

During a controlled venting, the controller modulates the opening time of the vent valve in order to decrease the pump rotational speed. The controller checks every 10 seconds the pump frequency and continues modulating the vent valve opening process until the frequency is < 100 Hz.

Then the vent valve opens according to the delay (WIN 126) and the opening time (WIN 147) set either via front panel or via serial communication.

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 A-plus Software (optional) allows the operator to set all the programmable feature.

Serial Communication (J2 Connector)

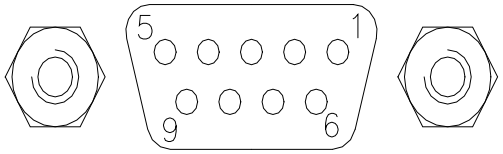


Figure 42

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

Table 10

Pin N.	Signal Name
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 A-plus software (p/n 9699883) is available (optional).

SERIAL CABLE INSTALLATION The supplied serial cable must be installed when the TwisTorr Medium-TMP Rack 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.

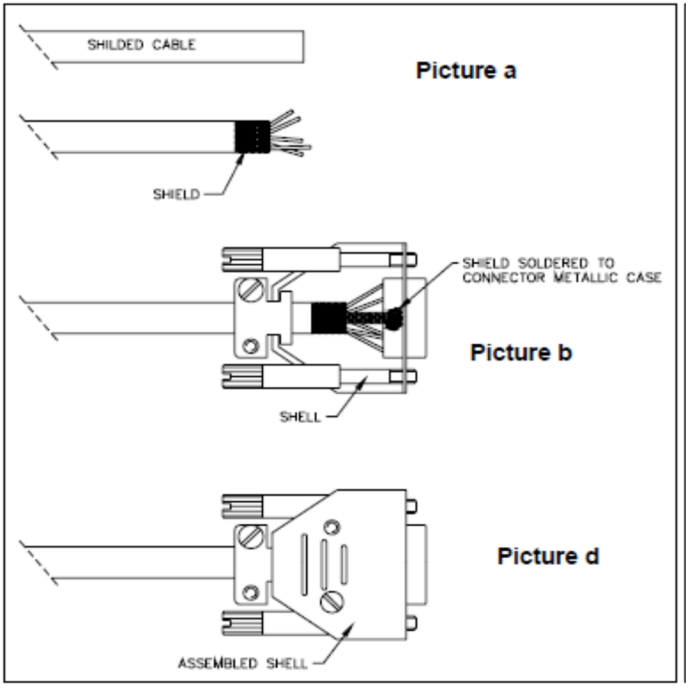


Figure 43

RS 232/RS 485 Communication Description

Both the RS 232 and the RS 485 interfaces are available on the connector P2.

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 serial communication 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:

Table 11

Data Type	Field Length	Valid Characters
Logic (L)	1	'0' = OFF '1' = ON
Numeric (N)	6	'-', '.', '0' . . . '9' right justified with '0'
Alphanumeric (A)	Up to 14	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:

Table 12

Response 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.
Alphanumeric	Up to 14 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 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

Table 13

WIN#	Read/ Write	Type	Meaning	Admitted Values
000	R/W	L	Start/Stop (in remote mode the window is a read only)	Start = 1; Stop = 0
001	R/W	L	Low Speed Activation command	0 = OFF 1 = ON (default = 0)
008	R/W	L	Remote or Serial configuration	Serial = 0 Remote = 1 Front Panel = 2 (default = 2)
100	R/W	L	Soft Start (write only in Stop condition)	YES = 1 NO = 0
101	R/W	N	Set Point type	0 = Frequency 1 = Current 2 = Time (default = 0)
102	R/W	N	Set Point threshold (expressed in Hz, mA or s)	(default = 720)
103	R/W	N	Set Point delay: time between the pump start and the set point check (seconds)	0 to 99999 (default = 0)
104	R/W	L	Set Point signal activation type: the signal can be "high level active" or "low level active"	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)
106	R/W	L	Cooling agent	0 = AIR 1 = WATER (default = 0)
108	R/W	N	Baud Rate	0 = 600 bit/s 1 = 1200 bit/s 2 = 2400 bit/s 3 = 4800 bit/s 4 = 9600 bit/s 5 = 19200 bit/s 6 = 38400 bit/s (default = 4)
110	R/W	L	Interlock type. The interlock can be checked at start or continuously	Impulse = 0 Continuous = 1 (default = 1)
111	R/W	N	Analog output type: output voltage signal proportional to frequency or power or temperature.	0 = Frequency 1 = Power 2 = Temperature (default = 0)
117	R/W	N	Low speed setting [Hz]	680 to WIN 121 (default = 680)

WIN#	Read/ Write	Type	Meaning	Admitted Values
120	R/W	N	Rotational frequency setting (Hz)	680 to WIN 121 (default = 825 for X3512-64016, 714 for X3512-64006)
121	R/W	N	Maximum rotational frequency in Hz (active only in Stop condition)	680 to 825 (default = 825 for X3501-64016, 714 for X3501-64006)
122	R/W	L	Set vent valve on/off (on = closed)	1 = open 0 = close (default = 0)
123 124	Reserved to Agilent service			
125	R/W	N	Valves operating mode	0 = On Command (Serial Command) 1 = Auto Pump Speed 2 = Autotime (default = 2)
126	R/W	N	Vent valve opening delay (expressed in 0.2 sec)	0 to 65535 (corresponding to 0 to 13107 sec) (default = 15)
130	Reserved to Agilent service			
140	R/W	L	Vent Valve selection (N.C./N.O.)	0 = N.C. 1 = N.O. (default = 1)
143	R/W	N	External Fan Configuration	0 = Always ON 1 = Automatic 2 = Serial (default = 0)
144	R/W	L	External Fan activation	0 = OFF 1 = ON (default = 0)
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	N	Gas Load Type	0 = heavy gas (mass >39, i.e. Ar) 1 = light gas (mass <39, i.e. N2) (default = 0)

WIN#	Read/ Write	Type	Meaning	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 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 in Hz	
204	R	N	Pump body temperature n °C	0 to 70
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
208	R	L	Flow/compression working status	0: High Comp 1: High Flow
211	R	N	Controller Internal temperature in °C	
232	R	N	Rotational frequency in Hz	
300	R	N	Cycle time in minutes (set to zero by a reset command)	0 to 999999
301	R	N	Cycle number (set to zero by a reset command)	0 to 9999
302	R	N	Pump life in hours (set to zero by a reset command)	0 to 999999
310 to 399	Reserved to Agilent service			
400	R	A	CRC EPROM (QE)	QE8XXXX (where "XXXX" are variable chars)
402	R	A	CRC Param. (PA)	PA8XXXX (where "XXXX" are variable chars)
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	RS485 Address	0 to 31 (default = 0)
504	R/W	N	Serial type select	0 = RS 232; 1 = RS 485 (default = 0)

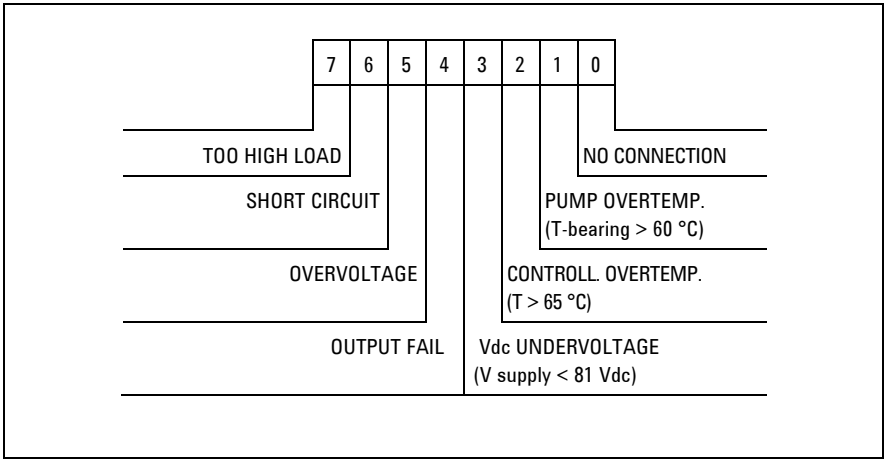


Figure 44 Window N. 206 Bit Description

Soft Start

“Soft Start” mode is provided to start the pump after a protracted stop of the TwisTorr 404/704/804 FS. 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: 200 Hz, 300 Hz, 680 Hz, 714 Hz and 825 Hz. The pump remains at each step for a period of 900 s except the first that last 300 s. A fail condition occurs if the pump is not able to properly spin up the driving frequency (Too High Load Error).

Agilent serial communication software - A-plus

Agilent serial communication 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 this software, you can simultaneously drive and control one Turbo Pump, 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. Serial communication 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.

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 (default value) 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 (Front panel display HICOMP or HIFLOW).
3. Serial setting
   WIN 143=2 the external fan is configured in serial mode, in this condition the fan behavior depends only on WIN 144 value) WIN 144 = 1 external fan ON; WIN 144 = 0 external fan OFF. The WIN 143 default value is 0.

Power Derating Function

An enhanced power derating is implemented to provide the following benefits:

- Immediate auto-detection of changing requirements in the application.
- Dynamic TMP performance adapting to application conditions for customer's process stabilization and speeding-up.
- Always the best "tuning" for TMP pumping technology taking the complete advantage of TwisTorr technology potential.
- Pump components minimized stress by mean of continuous TMP parameters tuning for extended reliability.

The enhanced power derating dynamically adapts per the following functioning parameters:

- Gas type load (selectable WIN 157: see the following "Window Meanings" paragraph).
- Cooling mode (selectable WIN 106: see the following "Window Meanings" paragraph).
- Actual Pump temperature (can be read by WIN 204).
- Actual Driving Frequency (can be read by WIN 203).

Refer to the PUMP manual for further description.

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).

How to Manage 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		
M	E	D	I	U	M		T	U	R	B	O	P	U	M	P
		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 = pump is stopped (ready to operate)
- INTERLOCK = pump is ready to operate but waiting for enabling signal on interlock input
- STARTING = pump has started and it is in ramping phase
- HCOMP = pump is operating subjected to small gas load
- HFLOW = pump is operating subjected to large gas load
- AUTOTUNE = pump is operating subjected to very high gas load condition (for a limited time before entering error status “Too high load”)
- TMP ROTOR STOPPING = pump is ramping down, rotor speed is reduced through the proactive braking routine
- FAIL = pump or controller has entered an error condition (see Fails chapter).

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	X
	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	X
	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	X
			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	X
			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	X
			C	O	N	T	R	O	L	L	E	R			
	F	W			X	X	X	X		X	X	X	X	X	
	P	A			Y	Y	Y	Y		Y	Y	Y	Y	Y	

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

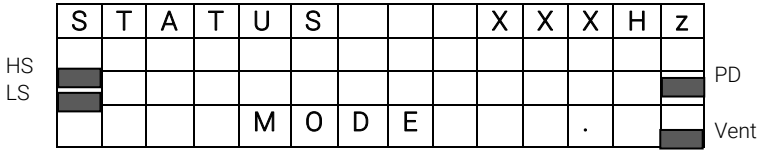
Measures

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	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) – Not used in HCOMP and HFLOW MODE
- **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.

H	C	O	M	P		M	O	D	E		8	1	3	H	z
				M	E	A	S	U	R	E	S				
	P	=	1	3	1	W			T	b	=	2	9	°	C
	I	=	1	.	5	A									

H	F	L	O	W		M	O	D	E		8	1	3	H	z
				M	E	A	S	U	R	E	S				
	P	=	1	3	1	W			T	b	=	2	9	°	C
	I	=	1	.	5	A									

Programming

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

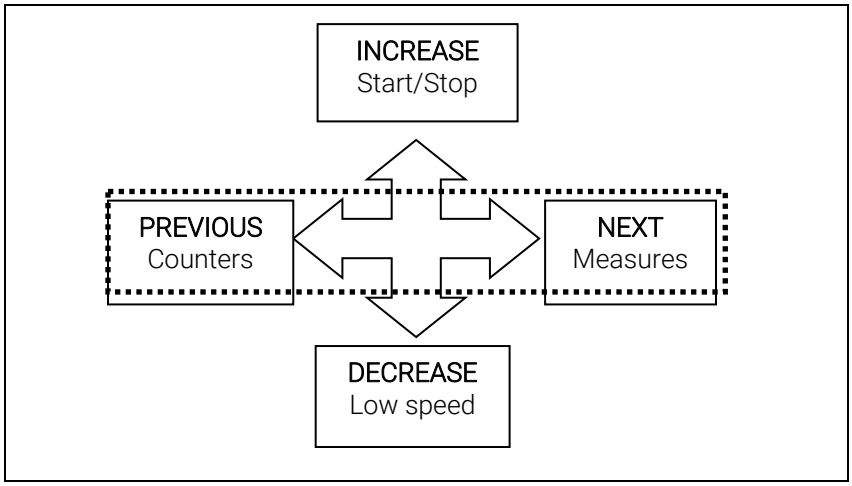


Figure 45

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

- **START/STOP** becomes INCREASE and LOW SPEED becomes 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.

Switching 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

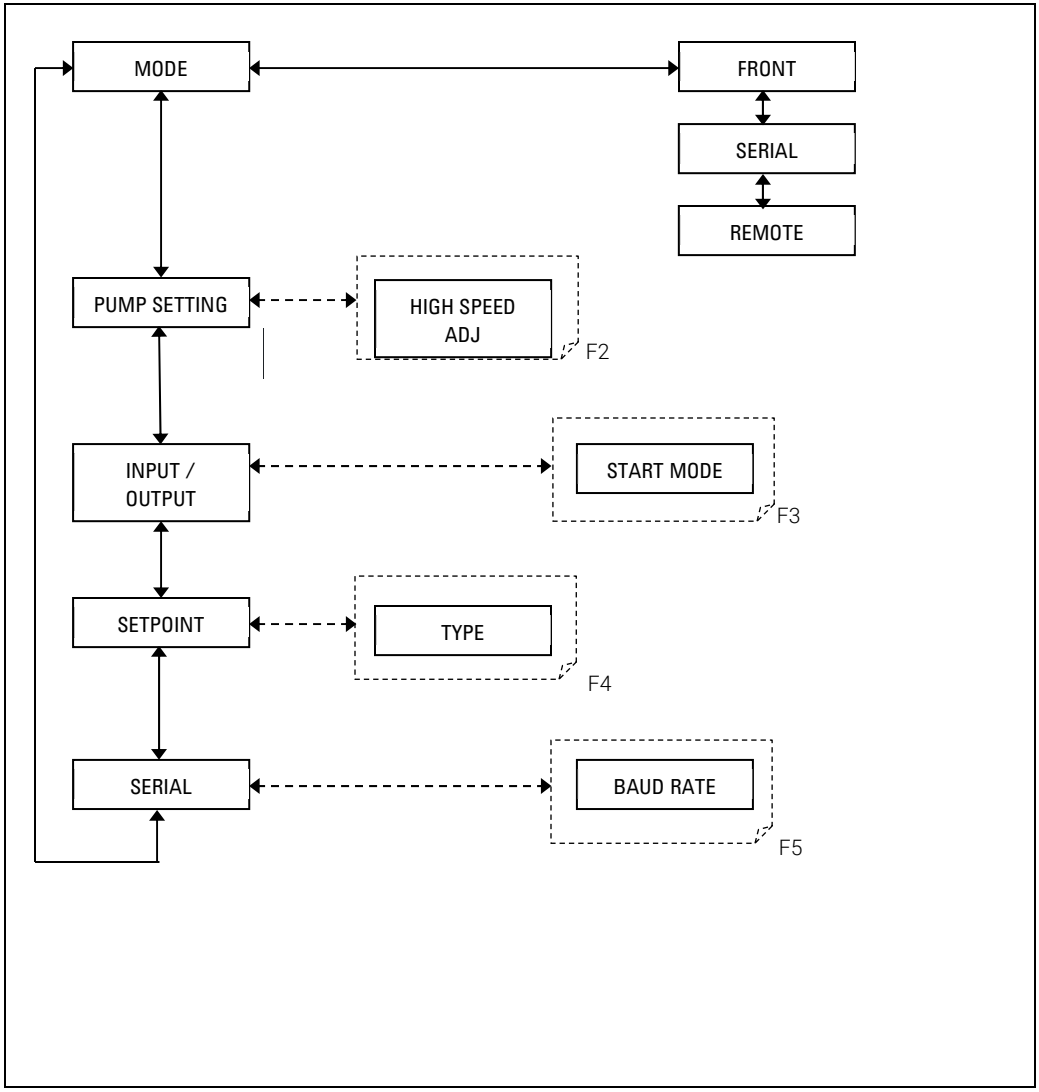


Figure 46

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

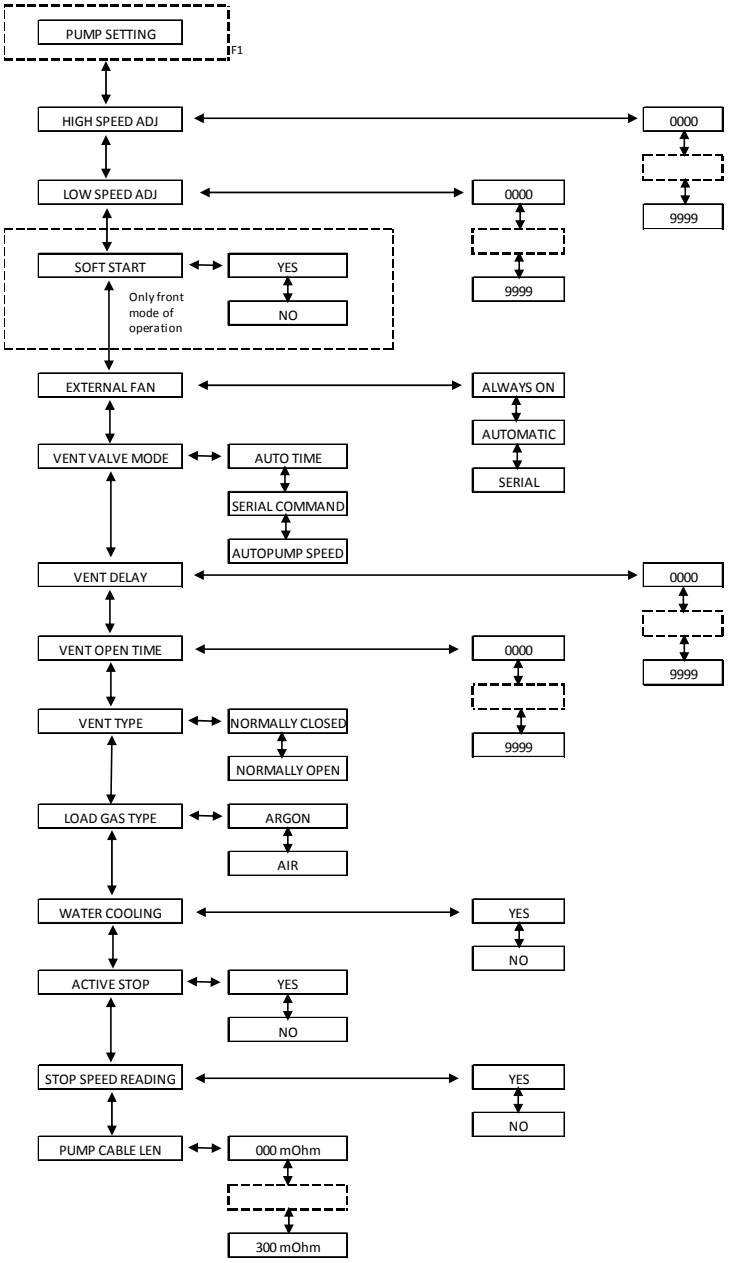


Figure 47

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
- AUTOMATIC: The vent valve behavior is managed by the controller (see Drive the External Fan chapter)
- SERIAL COMMAND: 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 COMMAND: 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: to enable set YES, to disable set NO.

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

INPUT/OUTPUT Menu

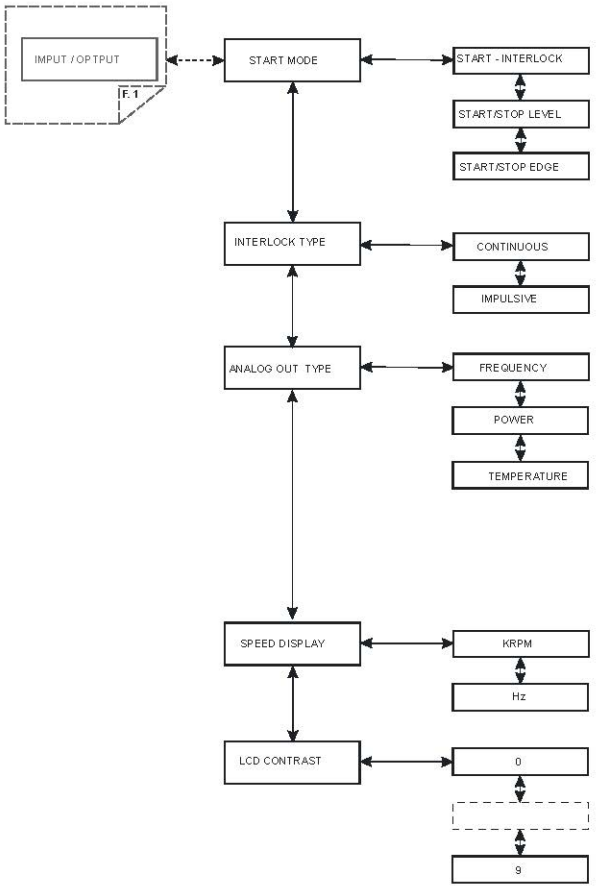


Figure 48

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

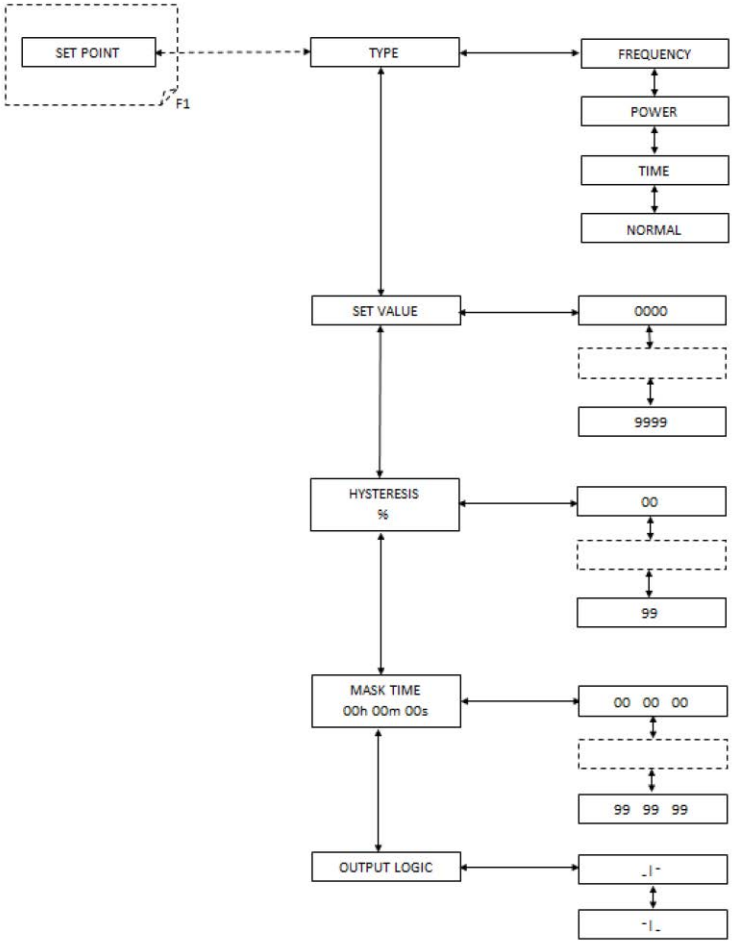


Figure 49

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 (Both HiFlow or HiComp)

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.

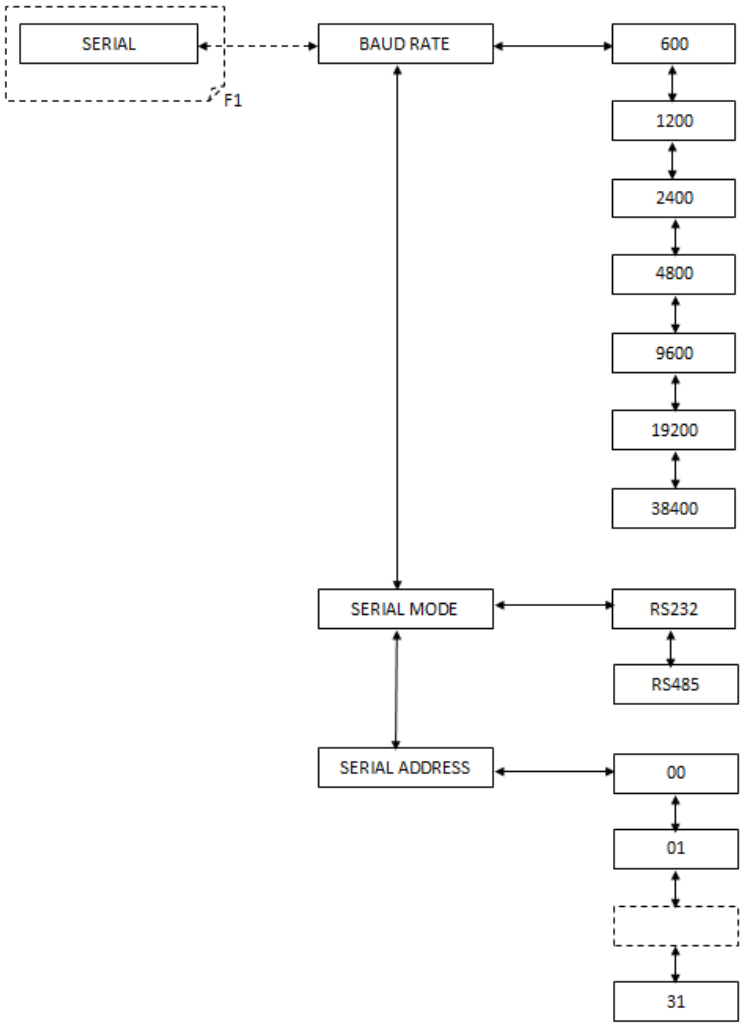


Figure 50

- **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	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 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	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 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	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		
	L	O	W		S	P	E	E	D		A	D	J		
→	S	O	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	O	F	T		S	T	A	R	T			
→	Y	E	S												
	N	O													

DECREASE button (to move down)

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

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
OUTPUT_FAIL	16
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.

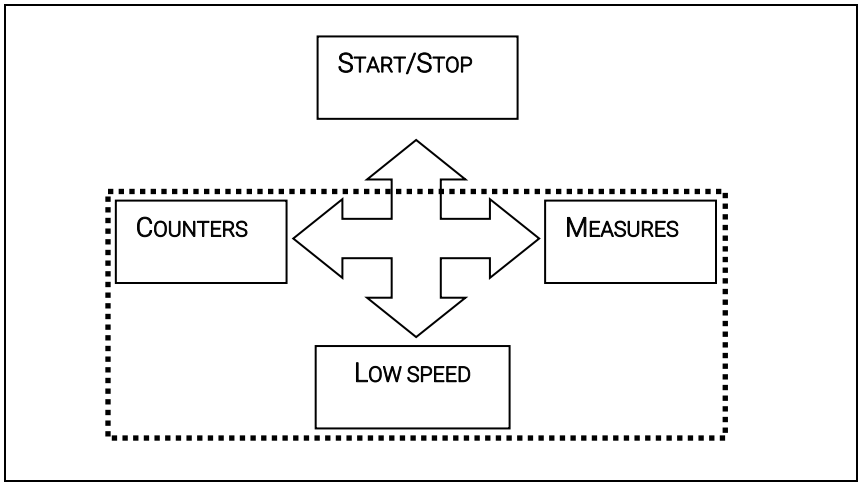


Figure 51

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.

Accessories and Spare Parts

Table 14 Accessories and spare parts

Description	Part Number
TwisTorr Medium-TMP on board Controller	X3501-64016 or X3501-64006
Serial communication software (A-plus) and serial cable kit	9699883
Turbo Rack Air Cooling kit	X3501-68001
Mains cable NEMA plug 3m long	9699958
Mains cable European plug 3m long	9699957
Mains cable UK plug 3m long	X3501- 68005
Vent Valve N.O. (orifice 1.2 mm)	X3501-68002
Vent Valve N.C. (orifice 1.2 mm)	X3501-68022
Profibus Gateway	9699261
Medium-TMP Extension Cable 5m	9699948M001
Medium-TMP Extension Cable 10m	9699948M003
Medium-TMP Extension Cable 15m	9699948M004
Medium-TMP Extension Cable 20m	9699948M002
Medium-TMP Extension Cable 30m	9699948M005
Medium-TMP Extension Cable 50m	9699948M006
Medium-TMP Extension Cable 75m	9699948M009
Medium-TMP Extension Cable 100m	9699948M010
Air Cooling Kit Extension Cable 5m	X3501-68101
Air Cooling Kit Extension Cable 10m	X3501-68051
Air Cooling Kit Extension Cable 15m	X3501-68061
Air Cooling Kit Extension Cable 20m	X3501-68021
Air Cooling Kit Extension Cable 30m	X3501-68011
Air Cooling Kit Extension Cable 50m	X3501-68071
Air Cooling Kit Extension Cable 75m	X3501-68081
Air Cooling Kit Extension Cable 100m	X3501-68091

Table 15 Accessories and spare parts (Continued)

Description	Part Number
Vent valve Rack Extension Cable 5m	X3501-68004
Vent valve Rack Extension Cable 10m	X3501-68054
Vent valve Rack Extension Cable 15m	X3501-68064
Vent valve Rack Extension Cable 20m	X3501-68074
Vent valve Rack Extension Cable 30m	X3501-68084
Vent valve Rack Extension Cable 50m	X3501-68034
Vent valve Rack Extension Cable 75m	X3501-68094
Vent valve Rack Extension Cable 100m	X3501-68104

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.

Complete the attached **Request for Return form** and send it to Agilent Technologies (see below), taking particular care to include the completed **Health and Safety** declaration Section. No work can be started on your unit until we receive a completed copy of this form.
After evaluating the information, Agilent Technologies will provide you with a **Return Authorization (RA) number** via email or fax, as requested. Note: Depending on the type of return, a Purchase Order may be required at the time **the Request for Return is submitted**. We will quote any necessary services (evaluation, repair, special cleaning, eg).

Product preparation

- Remove all accessories from the core product (e.g. inlet screens, vent valves).
- Prior to shipment and if applicable for your product, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
- If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
- Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
- Include a copy of the Health and Safety Declaration in the shipping documentation on the outside of the shipping box of your returning product.
- Clearly label package with RA number. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.
- Return only products for which the RA was issued.

Shipping

- Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information. Customer is responsible for freight charges on returning product.
- Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, ADR, etc.) and carrier requirements.

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

EUROPE:	**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	office information
vpt-customercare@agilent.com	vpl-ra@agilent.com	http://www.agilent.com

TERMS AND CONDITIONS

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

- Unless otherwise pre-negotiated, customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, etc.) and carrier requirements.
- Agilent Technologies is not responsible for returning customer provided packaging or containers.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies within 15 business days. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- Products returned that have not been drained from oil will be disposed.
- A Special Cleaning fee will apply to all exposed products
- If requesting a calibration service, units must be functionally capable of being calibrated.

Agilent Technologies

Vacuum Products Division
Request for Return Form

Customer information		
Company :	Contact Name:	
Address:	Tel:	Fax:
	Email:	

Equipment			
Product description	Agilent PartNo	Agilent Serial No	Original Purchasing Reference
Failure description		Type of process (for which the equipment was used)	

Type of return

☐ Non Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form): _____

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

Health and safety

The product has been exposed to the following substances:
(by selecting 'YES' you MUST complete the table to the right)

Substances (please refer to MSDS forms)

* Agilent will not accept delivery of any product that is exposed to radioactive, biological, explosive substances or dioxins, PCB's without written evidence of decontamination.

		Trade name	Chemical name	Chemical Symbol	CAS Number
Toxic	☐ YES ☐ NO				
Harmful	☐ YES ☐ NO				
Corrosive	☐ YES ☐ NO				
Reactive	☐ YES ☐ NO				
Flammable	☐ YES ☐ NO				
Explosive (*)	☐ YES ☐ NO				
Radioactive (*)	☐ YES ☐ NO				
Biological (*)	☐ YES ☐ NO				
Oxidizing	☐ YES ☐ NO				
Sensitizer	☐ YES ☐ NO				
Other dangerous substances	☐ YES ☐ NO				

Goods preparation

If you have replied YES to one of the above questions. Has the product been purged? ☐ YES ☐ NO
If yes, which cleaning agent/method:

Has the product been drained from oil? ☐ YES ☐ NOT APPLICABLE
I confirm to place this declaration on the outside of the shipping box. ☐

I declare that the above information is true and complete to the best of my knowledge and belief.
I understand and agree to the terms and conditions on page 2 of this document.

Name:	Authorized Signature:
Position:	
Date:	

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.

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Agilent Technologies

In This Book

The manual describes the following:

- Istruzioni per l'uso
- Bedienungshandbuch
- Notice de mode d'emploi
- Manual de istrucciones
- 用户手册
- ユーザーマニュアル
- Instruction for Use
- Technical information

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