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# How to Select Vent Valves for Agilent Turbo Pumps



Agilent TwisTorr Turbo Pumps

## Abstract

This technical overview is a guide to help users when selecting the proper Agilent vent valve according to the controller in use. In addition, it provides useful information about the compatibility between existing vent valve models and controller types.

## Introduction

Agilent turbomolecular pump users can vent the pump using the standard manual vent screw. Alternatively, they can take advantage of an automatic and safe venting procedure.
This provides: (a) automatic handling of the pump's ramp down time, avoiding inrush (from wrong and excessive manual venting), and (b) protection against gas back streaming from the fore line (where impurities and hydrocarbon residuals can be present).

Automatic vent valves are normally used as accessories for safe and proper venting of the Agilent turbopumps, to maximize the pump's reliability and improve user experience.

Vent valves can be classified in different ways:

- External or Integrated

- With normally open (NO) or normally closed (NC) logic

- With 0.5 mm or 1.2 mm orifice

Different valve models are available in the Agilent portfolio, according to the turbopump controller in use. Extension cables to connect the vent valve to a specific controller are also available.

This technical overview presents the available choices, starting with the valve type, and details compatibility with controllers.

# Vent Valves for Onboard Controllers

The appropriate vent valve type to connect to the different Agilent TwisTorr onboard controllers is displayed in Figure 1. A list of vent valves and their compatibility with the TwisTorr onboard controllers is outlined in Table 1.
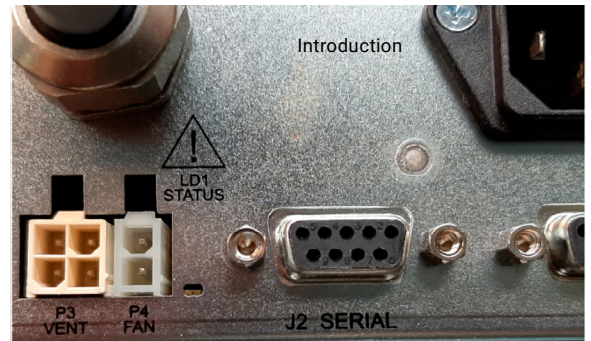
*Note: extension cables are not available to connect these vent valves and controllers. Instead, an Agilent TwisTorr 305-IC Fan/Vent Adapter kit is required (see Figure 2).*
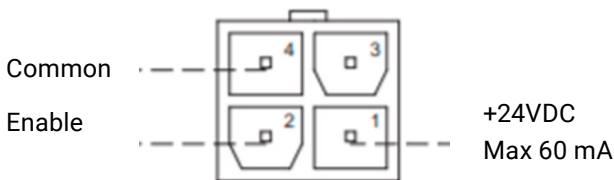
(A)



Valve used on

Vent Valve with Molex connector
0.5/1.2 mm – NO/NC



TwisTorr 305 FS onboard controller
with TwisTorr 305-IC Fan/Vent Adapter kit*



TwisTorr Medium-TMP onboard controller for
TwisTorr 404 FS, 704 FS, and 804 FS turbo pumps

(B)



Common

Enable

+24VDC
Max 60 mA

Figure 1. (A) Vent valve for Agilent TwisTorr onboard controllers.
(B) A dedicated 24-VDC connector to control the optional vent valve.

## Table 1. Compatibility of Agilent vent valves with Agilent TwisTorr onboard controllers

| Vent Valve Part Number | Description | Connector Type | TwisTorr 305-IC Fan/Vent Adapter Kit* Required | TwisTorr 305 FS Onboard Controller | TwisTorr Medium-TMP Onboard Controller (for 404 FS, 704 FS, 804 FS) |
|---|---|---|---|---|---|
| | | | | Part Number | Part Number |
| | | | | X3507-64130 | X3512-64006 |
| | | | | X3507-64131 | X3512-64016 |
| 9699834 | N.O. orifice 1.2 mm | Molex | Yes | Yes | Yes |
| 9699834M006 | N.O. orifice 0.5 mm | Molex | Yes | Yes | Yes |
| 9699834M010 | N.C. orifice 1.2 mm | Molex | Yes | Yes | Yes |
| 9699834M011 | N.C. orifice 0.5 mm | Molex | Yes | Yes | Yes |

Note: Extension cable not available
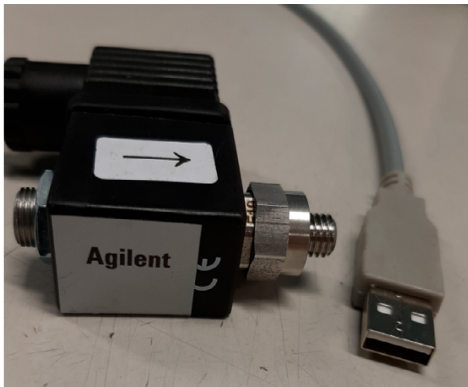
*Part number X3514-68001 (Figure 2).



Figure 2. Agilent TwisTorr 305-IC Fan/Vent Adapter kit required for vent valves.

# Vent Valves for TwisTorr AG Rack Controllers

The appropriate vent valve type to connect to the different Agilent TwisTorr AG rack controllers is displayed in Figure 3.

A list of vent valves and their compatibility with the TwisTorr AG controllers is outlined in Table 2. A list of extension cables available is outlined in Table 3.
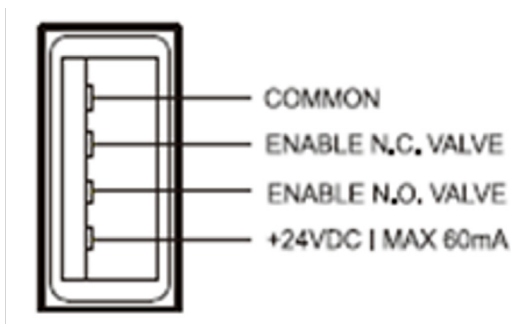
(A)



Vent Valve with USB connector
0.5/1.2 mm – NO/NC

Valve used on



TwisTorr 74 FS, 84 FS AG rack controllers

(B)





TwisTorr 74 FS, 84 FS, and 304 FS AG rack controllers and Agilent TwisTorr 305 remote controller

Figure 3.
(A) Vent valve for Agilent TwisTorr active gauge (AG) rack controllers.
(B) A dedicated 24-VDC connector to control the optional vent valve (see orderable parts). The vent valve can be driven automatically by controller, or by serial line.

## Table 2. Compatibility of Agilent vent valves with Agilent AG rack controllers

| Vent Valve Part Number | Description | TwisTorr 74 FS AG Rack Controller | TwisTorr 84 FS AG Rack Controller | TwisTorr 304 FS AG Rack Controller | TwisTorr 305 Remote Controller |
|---|---|---|---|---|---|
| | | Part Number | Part Number | Part Number | Part Number |
| | | X3508-64301 | X3508-64001 | X3506-64002 | X3506-64130 |
| | | X3508-64022 | X3508-64002 | X3506-64003 | X3506-64131 |
| 9699844 | N.O. orifice 0.5 mm | Yes | Yes | Yes | Yes |
| 9699844M001 | N.C. orifice 0.5 mm | Yes | Yes | Yes | Yes |

Nomenclature: starting with the TwisTorr 305,  the rack-mountable controllers are referred to as "remote".
Connector type: **USB**

## Table 3. Extension cables available

| Part Number | Length (m) |
|---|---|
| 9699941 | 5 |
| 9699941M003 | 10 |
| 9699941M001 | 15 |
| 9699941M005 | 20 |
| 9699941M007 | 30 |
| 9699941M004 | 50 |

# Vent Valves for TwisTorr 74 FS and 84 FS Onboard AG Controllers

The valves mentioned in Table 2 are also compatible with the Agilent TwisTorr 74 FS and 84 FS onboard controllers, as shown in Table 4. Extension cables available for these connections are displayed in Table 5.

## Table 4. Compatibility of Agilent vent valves with Agilent TwisTorr 74 FS and 84 FS onboard controllers

| Vent Valve Part Number | Description | TwisTorr 74 FS Onboard Controller | TwisTorr 84 FS Onboard Controller |
|---|---|---|---|
| | | Part Number | Part Number |
| | | X3508-64030 | X3509-64000 |
| | | X3508-64021 | X3509-64001 |
| 9699844 | N.O. orifice 0.5 mm | Yes | Yes |
| 9699844M001 | N.C. orifice 0.5 mm | Yes | Yes |

*Connector type: USB*

## Table 5. Extension cables available

| Part Number | Length (m) |
|---|---|
| 9699941 | 5 |
| 9699941M003 | 10 |
| 9699941M001 | 15 |
| 9699941M005 | 20 |
| 9699941M007 | 30 |
| 9699941M004 | 50 |

# Vent Valves for Medium Rack Controllers

The appropriate vent valve type to connect to the different Agilent TwisTorr Medium-TMP rack controllers is displayed in Figure 4.

A list of vent valves and their compatibility with the TwisTorr Medium-TMP rack controllers is outlined in Table 6. A list of extension cables available for these connections is outlined in Table 7.



Valve used on



Vent Valve Circular connector
1.2 mm ID – N.O/N.C

TwisTorr Medium-TMP rack controller for TwisTorr 404 FS, 704 FS, and 804 FS turbo pumps.

Figure 4. Vent valve for Agilent TwisTorr Medium-TMP rack controllers.

# Vent Valves for TwisTorr Medium-TMP Rack Controllers

## Table 6. Compatibility of Agilent vent valves with Agilent TwisTorr Medium-TMP rack controllers

| Vent Valve Part Number | Description | Voltage | TwisTorr Medium-TMP Rack Controller (for 404 FS, 704 FS, 804 FS) | Agilent Turbo-V1K-G Rack Controller | Agilent Turbo-V2300 Rack Controller |
|---|---|---|---|---|---|
| | | | Part Number | Part Number | Part Number |
| | | | X3501-64006 | X3501-64005 | X3501-64004 |
| | | | X3501-64016 | | |
| X3501-68002 | N.O. orifice 1.2 mm | 24 V | Yes | - | - |
| X3501-68022 | N.C. Orifice 1.2 mm | 24 V | Yes | - | - |

*Note: Vent valve has a 5 m long cable.*

## Table 7. Vent valve rack extension cables available

| Part Number | Length (m) |
|---|---|
| X3501-68054 | 10 |
| X3501-68064 | 15 |
| X3501-68074 | 20 |
| X3501-68084 | 30 |
| X3501-68094 | 75 |

## Turbo-V 2K-G and 3K-G Pumps with Integrated Controller

Agilent Turbo-V 2K-G and 3K-G pump and controllers are also available (Table 8).
Features of these systems include:

- The controller is integrated in the pump body.
- The purge-vent valves are integrated, factory installed, and fully controlled through the electronics (serial I/O–Profibus if available).
- Complete setting is possible for both vent and purge:
    a. Automatic: completely operated by the microprocessor according to pump status
    b. On command: delay time/opening delay/opening time fully configurable

*Full list of commands is available in the user manual.*

## Table 8. Agilent Turbo-V 2K-G and 3K-G pump and controller part numbers

| Turbo-V 2K-G Pump and Controller Part Number | Turbo-V 3K-G Pump and Controller Part Number |
|---|---|
| 9698871 | 9698888 |
| 9698873 | 9698889 |

## Conclusions:

Agilent can provide an automatic and safe solution for the proper venting of Agilent turbopumps.

An array of Agilent vent valves is available according to the turbopump controller in use, as well as extension cables to connect the vent valves to the controller.

These accessories can help maximize a pump's reliability and improve user experience in order to optimize your laboratory's workflow.

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