



BVT275

# VersaTorr Series

## BVT275 Wide Range Dual Vacuum Gauge

$5 \times 10^{-3}$  to 1333 mbar /  $3.75 \times 10^{-3}$  to 1000 Torr

The BVT275 vacuum gauge establishes new standards with an all-in-one wide range measurement solution for a wide selection of vacuum applications. It differentiates from any other vacuum gauges by offering an overall cost-effective gas independent measurement from  $5.0 \times 10^{-3}$  to 1333 mbar.

In vacuum applications where the gas composition or type can change, traditional gas dependent Pirani gauges will result in measurement deviation from the actual pressure. The dual sensor gauge uses a precision capacitance diaphragm gauge (CDG) sensor that eliminates the gas dependency and provides accurate measurements also when the gas properties change.

### Features & Benefits

- Ultra-wide measuring range of 6 decades
- Gas independent measurement
- Automatic zeroing of Piezo sensor
- 0-10 VDC programmable voltage output
- Digital RS-232 or RS-485 interface
- Vacuum temperature sensor for diagnostics
- RGB LED color pressure indicator

## Contamination containment

Particulate contamination can occur in applications like vacuum furnaces and physical vapor deposition systems. The optional baffle accessory can prevent such particles from reaching the sensor element and thereby extend the time between maintenance and overall lifetime of the product.

The baffle can be removed for contamination inspection, cleaning, or replacement.

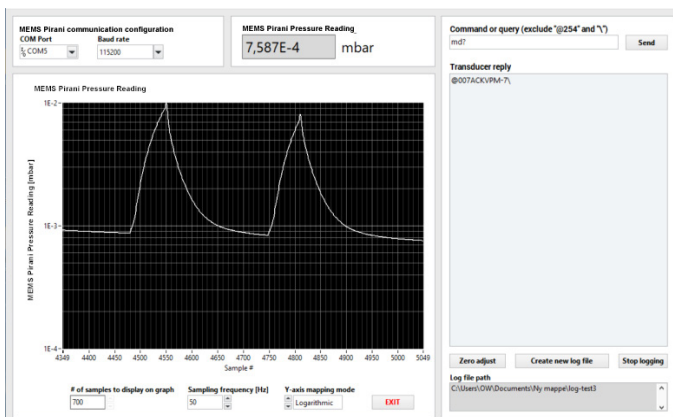


## Programmable settings and parameters

The gauge settings and parameters can be user-programmed to control vacuum system and application process parameters.

The digital RS-232 or RS-485 serial interface can be used for diagnostics, predictive maintenance, service, calibration, setpoint configuration, analog output scaling and acquisition of real-time vacuum pressure measurements for on-screen visualization.

The serial USB programmer in combination with the free, intuitive configuration software is a plug-and-play solution for gauge programming, real-time measurements, and diagnostics.

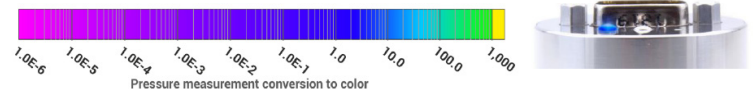


## Analog voltage output

The analog output scaling feature enables amplified signal in a limited pressure range. Furthermore, a wide selection of analog output scaling options to emulate other vendors vacuum gauges and transducers is available.

## RGB LED for pressure indication

The VersaTorr Series introduces a new approach for visually determining the measured pressure by a multi-color LED that smoothly changes color throughout the pressure range. This selectable visual function is a low-cost alternative to integrated displays and provides a rough indication of the measured pressure. It also provides a clear visual warning if the vacuum system is pressurized above ambient pressure.



## Reliable and robust setpoint relay control

The three independent solid-state switch relays can be used for external control of pumps, valves, safety interlock circuits and other external equipment. The basic control uses on/off regulation with a programmable setpoint and hysteresis value. Each solid-state relay offers both normally closed and normally open contacts.

Compared to electro-mechanical relays, the solid-state relays offer superior reliability and faster switching time while providing arc free contacts and generating no EMI (electromagnetic interference) when switching contacts.

The dual vacuum gauge relays are designed to last and are UL listed, CSA recognized, and EN/IEC 60950-1 certified for maximum confidence when used to control critical vacuum processes and high-cycle applications.

## Customized settings

The gauge can be delivered with a custom configuration to match specific application requirements. Examples of pre-configured options include measurement range, vacuum pressure unit, setpoint configuration and output signal scaling. Customized products will be assigned a unique part number for easy and simple future reordering.

| SPECIFICATIONS                                        |                                                                                              |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Measuring range                                       | $5 \times 10^{-3}$ to 1,333 mbar ( $3.75 \times 10^{-3}$ to 1000 Torr)                       |
| Measuring principle $5.0 \times 10^{-3}$ to 3.99 mbar | Capacitance diaphragm gauge (CDG)                                                            |
| Measuring principle 4 to 5 mbar                       | Blended CDG / Piezo reading                                                                  |
| Measuring principle 5 to 1333 mbar                    | MEMS piezo resistive diaphragm                                                               |
| Accuracy 1E-2 to 800 mbar                             | 0.5% of reading                                                                              |
| Accuracy 800 to 1099 mbar                             | 0.25% of reading                                                                             |
| Accuracy 1100 to 1200 mbar                            | 0.5% reading                                                                                 |
| Vacuum temperature sensor accuracy                    | +/- 1.5 °C                                                                                   |
| Transducer temperature sensor range                   | -20 to + 85°C                                                                                |
| Transducer temperature sensor accuracy                | +/- 1.5°C                                                                                    |
| Analog output resolution                              | 16 bit (150 $\mu$ V)                                                                         |
| Analog output update rate                             | 124 Hz                                                                                       |
| Response time                                         | <20 ms                                                                                       |
| Temperature compensation                              | +10 to +50 °C                                                                                |
| Solid state relay set point range (absolute)          | $1 \times 10^{-2}$ to 1,333 mbar ( $7.5 \times 10^{-3}$ to 1000 Torr)                        |
| Solid state relay contact rating                      | 50 V, 100 mA <sub>rms</sub> / mA <sub>DC</sub>                                               |
| Solid state relay contact endurance                   | Unlimited (no mechanical wear)                                                               |
| Solid state relay approvals                           | UL Recognized: File E76270<br>CSA Certified: Certificate 1175739<br>EN/IEC 60950-1 Certified |

## ENVIRONMENT CONDITIONS

|                                      |                     |
|--------------------------------------|---------------------|
| Operating ambient temperature        | -20 to +50 °C       |
| Media temperature                    | -20 to +50 °C       |
| Storage ambient temperature          | -20 to +80 °C       |
| Bake-out temperature (non-operating) | +80 °C              |
| Maximum media pressure               | 4 bar absolute      |
| Mounting position                    | Arbitrary           |
| Protection rating, EN 60529/A2:2013  | IP40                |
| Humidity, IEC 68-2-38                | 98%, non-condensing |

## POWER SUPPLY

|                             |                              |
|-----------------------------|------------------------------|
| Supply voltage              | 12-30 VDC                    |
| Power consumption           | 350 mW (max)                 |
| Reverse polarity protection | Yes                          |
| Overvoltage protection      | Yes                          |
| Internal fuse               | 100 mA (thermal recoverable) |

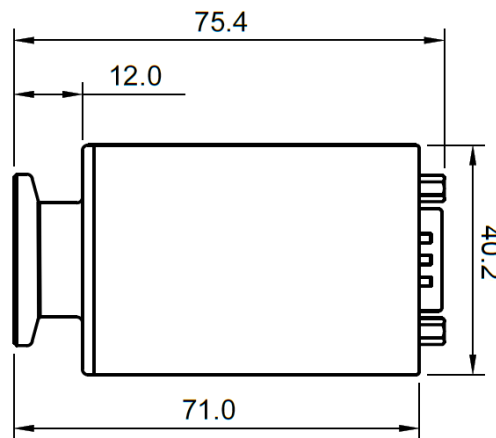
## MATERIALS

|                                         |                                                                                                                            |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Enclosure                               | SS 1.4307 / AISI 304L / Aluminum 6061                                                                                      |
| Vacuum Process flange (media wetted)    | SS 1.4307 / AISI 304L                                                                                                      |
| Vacuum exposed materials (media wetted) | 304 Stainless steel, Kovar, glass, silicon, Al <sub>2</sub> O <sub>3</sub> , gold, Viton®, solder, RO4305, vitreous silica |
| Process leak tightness (ISO 27895:2009) | <1·10 <sup>-9</sup> mbar·l/s                                                                                               |

## APPROVALS

|                 |                          |
|-----------------|--------------------------|
| CE              | EMC directive 2014/30/EU |
| RoHS compliance | Directive EU 2015/863    |

## Dimensions (DN16KF flange)



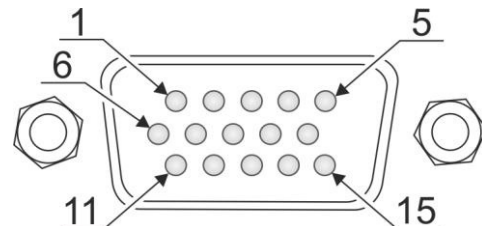
All dimensions in mm.

## Connector Pin Outs

### BVT275 15 Pin HD D-sub RS-232 / RS-485

| Pin | Description                                         |
|-----|-----------------------------------------------------|
| 1   | RS-232 Transmit / RS-485 (-)                        |
| 2   | RS-232 Receive / RS-485 (+)                         |
| 3   | Supply voltage 12-30 VDC                            |
| 4   | Supply voltage – (return)                           |
| 5   | Analog voltage signal +                             |
| 6   | Analog voltage signal – (return)                    |
| 7   | Relay 1 NO (normally open contact) <sup>(1)</sup>   |
| 8   | Relay 1 Common <sup>(1)</sup>                       |
| 9   | Relay 1 NC (normally closed contact) <sup>(1)</sup> |
| 10  | Relay 2 NC (normally closed contact) <sup>(1)</sup> |
| 11  | Relay 2 Common <sup>(1)</sup>                       |
| 12  | Relay 2 NO (normally open contact) <sup>(1)</sup>   |
| 13  | Relay 3 NC (normally closed contact) <sup>(1)</sup> |
| 14  | Relay 3 Common <sup>(1)</sup>                       |
| 15  | Relay 3 NO (normally open contact) <sup>(1)</sup>   |

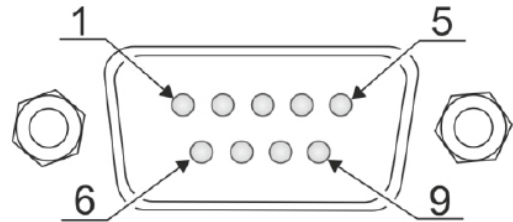
(1) Optional relay



## BVT275 9 Pin D-sub RS-232 / RS-485

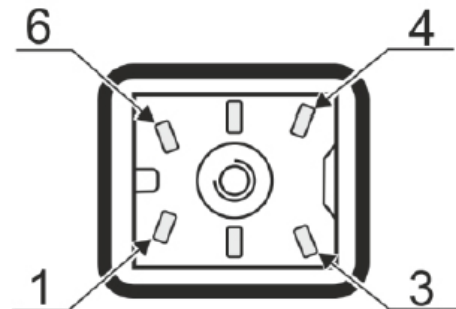
| Pin | Description                                         |
|-----|-----------------------------------------------------|
| 1   | Relay 1 NO (normally open contact) <sup>(1)</sup>   |
| 2   | Relay 1 NC (normally closed contact) <sup>(1)</sup> |
| 3   | Supply voltage 12-30 VDC                            |
| 4   | Supply voltage – (return)                           |
| 5   | Analog voltage signal +                             |
| 6   | Relay 1 Common <sup>(1)</sup>                       |
| 7   | RS-232 Transmit / RS-485 (-)                        |
| 8   | Analog voltage signal – (return)                    |
| 9   | RS-232 Receive / RS-485 (+)                         |

(1) Optional relay



## BVT275 6 Pin Hirschmann connector

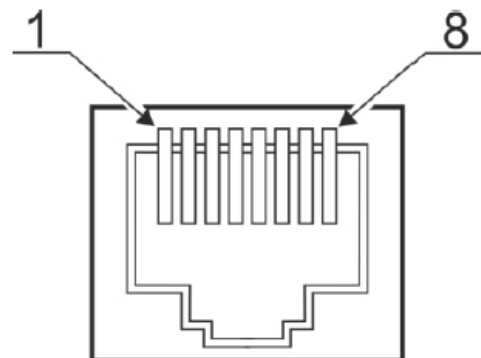
| Pin | Description                      |
|-----|----------------------------------|
| 1   | Identification resistor (3K)     |
| 2   | Analog voltage signal +          |
| 3   | Analog voltage signal – (return) |
| 4   | Supply voltage 12-30 VDC         |
| 5   | Supply voltage – (return)        |
| 6   | Chassis                          |



## BVT275 8 Pin RJ45 / 8P8C

| Pin | Description                                       |
|-----|---------------------------------------------------|
| 1   | Supply voltage 12-30 VDC                          |
| 2   | Supply voltage – (return)                         |
| 3   | Analog pressure voltage signal +                  |
| 4   | Analog pressure voltage signal – (return)         |
| 5   | Supply voltage – (return)                         |
| 6   | Relay 2 NO (normally open contact) <sup>(1)</sup> |
| 7   | Relay 1 NO (normally open contact) <sup>(1)</sup> |
| 8   | Relay COMMON                                      |

(1) Optional relay



| Code Description               | Code Option | Option Description                             |
|--------------------------------|-------------|------------------------------------------------|
| I. Base Model                  | BVT275      | VersaTorr Dual Sensor Vacuum Gauge             |
| II. Units                      | 1           | Torr                                           |
|                                | 2           | mbar                                           |
|                                | 3           | Pascal                                         |
| III. Setpoints                 | 0           | None                                           |
|                                | 1           | 1x Solid State Relay                           |
|                                | 2           | 2x Solid State Relay                           |
|                                | 3           | 3x Solid State Relay                           |
| IV. Vacuum Flange              | 1           | DN16KF                                         |
|                                | 2           | DN25KF                                         |
|                                | 3           | NPT 1/8"                                       |
|                                | 4           | VCR4                                           |
|                                | 5           | DN16KF Extended                                |
|                                | 6           | DN16KF with light baffle                       |
|                                | 7           | DN16KF with heavy duty baffle                  |
|                                | 8           | DN25KF with light baffle                       |
|                                | 9           | DN25KF with heavy duty baffle                  |
| V. Electrical Connector        | 1           | 9 Pin D-sub male                               |
|                                | 2           | 15 pin HD D-sub male                           |
|                                | 3           | 15 pin HD D-Sub male / dual analog out         |
|                                | 4           | 6 pin Hirschmann, ID res 3K                    |
|                                | 5           | 6 pin Hirschmann, ID res 5.1K                  |
|                                | 6           | 6 pin Hirschmann, ID res 9.1K/11.1K            |
|                                | 7           | 8 pin RJ45 / FCC68, ID Res 27K                 |
|                                | 8           | 8 pin RJ45 / FCC68, ID Res 36K                 |
|                                | 9           | 8 pin RJ45 / FCC68, ID Res 43K                 |
| VI Digital Interface           | 1           | RS-232 / Brooks Vacuum Transducer Communicator |
|                                | 2           | RS-485 / Brooks Vacuum Transducer Communicator |
| VII. Analog Output             | A           | 0.5 - 9.5 (1 V/dec)                            |
|                                | B           | 1.0-9 VDC 1 VDC/Dec (MKS 901P/925/910          |
|                                | C           | 0.375 to 5.659 VDC (MKS GP275)                 |
|                                | D           | 1.0-9 VDC (MKS 523)                            |
|                                | E           | 1.9-10 VDC (Inficon PSG55x, Leybold TTR91)     |
|                                | F           | 1.5-8.5 VDC (Pfeiffer TPR260/27x/28x)          |
|                                | G           | 1.9-9.1 VDC (Edwards APG100XLC)                |
|                                | H           | 1.9-9.1 VDC (Edwards APG100XM)                 |
|                                | J           | 0-10 VDC 0.1Torr FS Capacitance manometer      |
|                                | K           | 0-10 VDC 1 Torr FS Capacitance manometer       |
|                                | L           | 0-10 VDC 10 Torr FS Capacitance manometer      |
|                                | M           | 0-10 VDC 100 Torr Capacitance manometer        |
|                                | N           | 0-10 VDC 1000 Torr Capacitance manometer       |
| VIII. Customer Special Request | XXXX        |                                                |

| Part number                                  | Description                                                  |
|----------------------------------------------|--------------------------------------------------------------|
| BVT-XXX-(model number)                       | Accredited calibration certificate from DAkkS lab.           |
| <b>RS232 / RS485 USB-to-Serial converter</b> |                                                              |
| BVT-RS2-15DS-01                              | RS232 communicator USB, 15p HD D-sub connector               |
| BVT-WPRS4-15DS-01                            | RS485 communicator USB, 15p HD D-sub connector, Power Supply |
| BVT-RS2-9DS-01                               | RS232 communicator USB, 9p D-sub connector                   |
| BVT-WPRS4-9DS-01                             | RS485 communicator USB, 9p D-sub connector, Power Supply     |
| <b>Cables</b>                                |                                                              |
| BVT-F15DSM15DS-003                           | 15 p HD D-sub female to 15 p D-sub male with 3 m cable       |
| BVT-F15DSM15DS-005                           | 15 p HD D-sub female to 15 p D-sub male with 5 m cable       |
| BVT-F15DSM15DS-010                           | 15 p HD D-sub female to 15 p D-sub male with 10 m cable      |
| BVT-F9DSM15DS-003                            | 9 p D-sub female to 15 p D-sub male with 3 m cable           |
| BVT-F9DSM15DS-005                            | 9 p D-sub female to 15 p D-sub male with 5 m cable           |
| BVT-F9DSM15DS-010                            | 9 p D-sub female to 15 p D-sub male with 10 m cable          |

## Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com) to locate the service location nearest to you.

### START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

### SEMINARS AND TRAINING

Brooks Instrument can provide seminars and dedicated training to engineers, end users, and maintenance persons. Please contact your nearest sales representative for more details. Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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#### Global Headquarters

##### Brooks Instrument

407 West Vine Street  
Hatfield, PA  
19440-0903 USA

Toll-Free (USA): 888-554-FLOW  
T: 215-362-3500

[BrooksAM@BrooksInstrument.com](mailto:BrooksAM@BrooksInstrument.com)

A list of all Brooks Instrument locations and contact details can be found at [www.BrooksInstrument.com](http://www.BrooksInstrument.com)

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