



BVT100

# VersaTorr Series

## BVT100 Wide Range Vacuum Gauge

Ultra-wide range vacuum measurement  
from 1000 Torr to  $7.5 \times 10^{-7}$

VersaTorr extends the performance of MEMS-based vacuum gauge measurement by combining advances in Micro-Pirani/Piezo sensor design with active temperature compensation and advanced digital signal processing to greatly enhance the accuracy and working range by up to 3 decades.

The BVT100 can be used for a wide variety of vacuum applications providing 9 decades of vacuum measurement with precise gas independent measurement from 1.5 to 1000 Torr.

### Features & Benefits

- Ultra-wide vacuum measurement from atmosphere to  $7.5 \times 10^{-7}$  minimizes the need for multiple vacuum gauges and separate atmospheric switch for system simplification, space and cost savings.
- Compact solution for: Mass spectrometers, Scanning electron microscopes, Furnace heat treatment, PVD coating of glass, optics & tools, Refrigeration manufacturing and service & Semiconductor processing equipment.
- <20 ms, highly repeatable response enables system pump-down and vent-up cycle time optimization.
- Up to three independent, programmable solid-state relays for system interlocks and control
- User configurable analog output scaling to emulate competitive vacuum gauges for maximum flexibility and inventory reduction.
- Digital serial interface for diagnostics, predictive maintenance, data acquisition and gauge programming
- Drop-in upgrade for first generation competitive MEMS vacuum gauges

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Product Page](#)

Performance	
Measurement Range	7.5 × 10 <sup>-7</sup> to 1000 Torr
Sensor Measurement Ranges	7.5 × 10 <sup>-7</sup> to 1.125 Torr 1.125 to 1.5 Torr 1.5 to 1000 Torr
	MEMS Pirani thermal conductivity Blended MEMS Pirani/Piezo MEMS Piezo resistive diaphragm
Accuracy	±25% of reading ±5% of reading ±1% of reading ±0.5% of reading ±0.25% of reading ±0.5% of reading
	7.5 × 10 <sup>-6</sup> to 7.49 × 10 <sup>-5</sup> 7.5 × 10 <sup>-5</sup> to 7.49 Torr 7.5 to 74.9 Torr 75 to 599 Torr 600 to 824 Torr 825 to 1000 Torr
Hysteresis	1% 0.1%
	7.5 <sup>-4</sup> to 7.5 Torr 7.5 to 900 Torr
Vacuum Temperature Sensor	-20 to +85°C ±1.5°C
	Range Accuracy
Response Time	<20 ms
Temperature Compensation	10 to 50°C
Mechanical	
Materials Exposed to Vacuum	304 stainless steel, Kovar, glass, silicon, nickel, aluminum, SiO <sub>2</sub> , Si <sub>3</sub> N <sub>4</sub> , Gold, Viton, low out-gassing epoxy resin, solder, RO4305
Flange/Fitting	SS 1.4307/AISI 304L
Electrical	
Analog Output Signal (absolute pressure)	0.5 -9.5 Vdc (1V per decade) standard, other selectable/user programmable options <sup>1</sup>
Analog Output Resolution	16 bit (150 μV)
Analog Output Update Rate	124 Hz
Digital Communication	RS232 / RS485
Electrical Connector Options	9-pin HD D-sub, 15-pin HD D-sub, 6-pin Hirschmann or 8 Pin RJ45 / 8P8C
Solid State Relays	
Number of Relays	Up to 3
Set Point Range (absolute)	3.75×10 <sup>-6</sup> to 1000 Torr
Set Point Range (atm. relative)	-770 to +375 Torr
Contact Rating	50 V, 100 mArms / mADC
Approvals	UL Recognized: File E76270 CSA Certified: Certificate 1175739 EN/IEC 60950-1 Certified

<sup>1</sup>The analog output voltage scaling can be ordered preconfigured or user configured via the RS232 / RS485 or VersaTorr User Software

## ENVIRONMENTAL

Ambient Operating Temperature	-20 to 50°C
Bake-out Temperature (non-operating)	120°C
Humidity	98%, non-condensing
Over Pressure Limit	14.5 psia
Protection Rating, EN 60529 / A2:2013	IP40
Mounting Orientation	Any

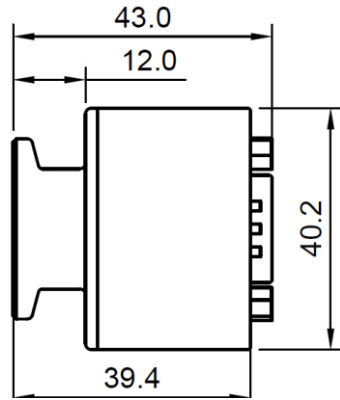
## CERTIFICATIONS

CE	EMC directive 2014/30/EU
RoHS	Directive EU 2015/863

## 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)

**Dimensions (DN16KF flange with 15-pin HD D-sub)**

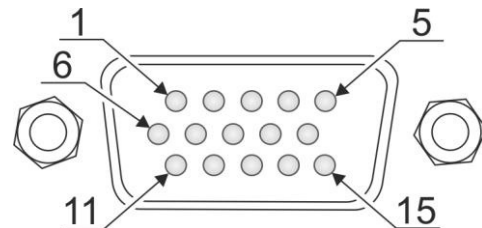


All dimensions in mm.

**Connector Pin Outs**

**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>

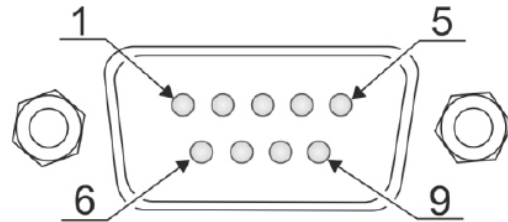


(1) Optional relay

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

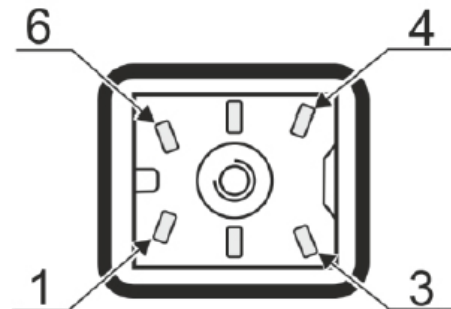
Pin	Description
1	Relay 1 NO (normally open contact) <sup>(1)</sup>
2	Relay 1 NC (normally closed contact) <sup>(1)</sup>
3	Supply voltage 12-30 VDC
4	Supply voltage – (return)
5	Analog voltage signal +
6	Relay 1 Common(1)
7	RS-232 Transmit / RS-485 (-)
8	Analog voltage signal – (return)
9	RS-232 Receive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

(1) Optional relay



### 6 Pin Hirschmann connector

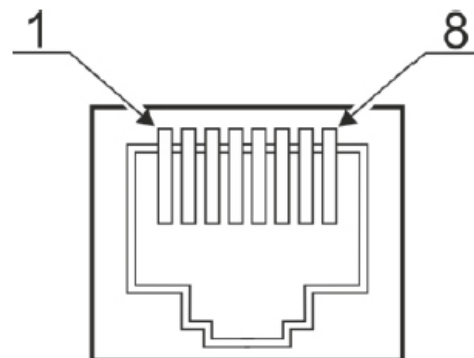
Pin	Description
1	Identification resistor (3K)
2	Analog voltage signal +
3	Analog voltage signal – (return)
4	Supply voltage 12-30 VDC
5	Supply voltage – (return)
6	Chassis



### 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	BVT100	VersaTorr MEMS Pirani Transducer
II. Units	1	Torr
	2	mbar
	3	Pascal
III. Programable Relays	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	VCR4F
	5	DN16KF Extended
	6	DN16KF with light baffle
	7	DN16KF with heavy duty baffle
V. Electrical Connector	1	9 Pin D-sub male (up to 1 relay)
	2	15 pin HD D-sub male (up to 3 relays)
	3	15 pin HD D-Sub male / dual analog out (up to 3 relays)
	4	6 pin Hirschmann, ID res 3K (no relay options)
	5	6 pin Hirschmann, ID res 5.1K (no relay options)
	6	6 pin Hirschmann, ID res 9.1K/11.1K (no relay options)
	7	8 pin RJ45 / FCC68, ID Res 27K (up to 2 relays)
	8	8 pin RJ45 / FCC68, ID Res 36K (up to 2 relays)
	9	8 pin RJ45 / FCC68, ID Res 43K (up to 2 relays)
VI Digital Interface	1	RS-232 / Brooks Vacuum Transducer Communicator
	2	RS-485 / Brooks Vacuum Transducer Communicator
	3	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 emulation)
	C	0.375 to 5.659 VDC (MKS GP275 emulation)
	D	1.0-9 VDC (MKS 523 emulation emulation)
	E	1.9-10 VDC (Inficon PSG55x, Leybold TTR91 emulation)
	F	1.5-8.5 VDC (Pfeiffer TPR260/27x/28x emulation)
	G	1.9-9.1 VDC (Edwards APG100XLC emulation)
	H	1.9-9.1 VDC (Edwards APG100XM emulation)
	J	0-10 VDC 0.1Torr FS (Capacitance manometer emulation)
	K	0-10 VDC 1 Torr FS (Capacitance manometer emulation)
	L	0-10 VDC 10 Torr FS (Capacitance manometer emulation)
	M	0-10 VDC 100 Torr (Capacitance manometer emulation)
	N	0-10 VDC 1000 Torr (Capacitance manometer emulation)
	VIII. Customer Special Request	XXXX

Part number	Description
BVT-XXX-(model number)	Accredited calibration certificate from DAkkS lab
<b>Brooks Vacuum Transducer USB programmer</b>	
BVT-S4-15DS-01	Brooks Vacuum Transducer USB programmer, 15p HD D-sub connector
BVT-S4-9DS-01	Brooks Vacuum Transducer USB programmer, 9p D-sub connector
BVT-S4-9DS-01	Brooks Vacuum Transducer USB programmer, 8p FCC68/RJ45
BVT-S4-HM-01	Brooks Vacuum Transducer USB programmer, 6p Hirschmann
<b>RS232 / RS485 USB-to-Serial converter for BVT100 transducers</b>	
BVT-RS2-15DS-01	RS232 communicator USB, 15p HD D-sub connector
BVT-RS4-15DS-01	RS485 communicator USB, 15p HD D-sub connector
BVT-RS2-9DS-01	RS232 communicator USB, 9p D-sub connector
BVT-RS4-9DS-01	RS485 communicator USB, 9p D-sub connector
<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 measurement 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 customer 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.

#### TRADEMARKS

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