DATA SHEET

Vacuum Measurement

BVT100

VersaTorr Series

BVT100 Wide Range Vacuum Gauge

Ultra-wide range vacuum measurement from 1000 Torr to 7.5 x 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 x 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, programable 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 vacuum gauge programing
- Drop-in upgrade for first generation competitive MEMS vacuum gauges

View BVT100 Product Page

Product Specifications

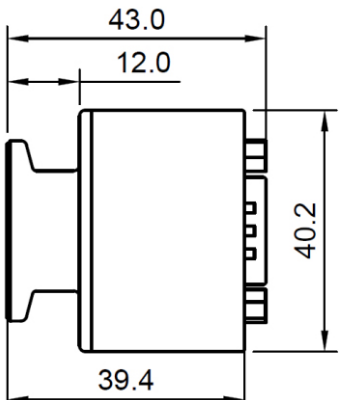
Performance	
Measurement Range	7.5×10^{-7} to 1000 Torr
Sensor Measurement Ranges	
MEMS Pirani thermal conductivity	7.5×10^{-7} to 1.125 Torr
Blended MEMS Pirani/Piezo	1.125 to 1.5 Torr
MEMS Piezo resistive diaphragm	1.5 to 1000 Torr
Accuracy	
7.5×10^{-6} to 7.49×10^{-5}	±25% of reading
7.5×10^{-5} to 7.49 Torr	±5% of reading
7.5 to 74.9 Torr	±1% of reading
75 to 599 Torr	±0.5% of reading
600 to 824 Torr	±0.25% of reading
825 to 1000 Torr	±0.5% of reading
Hysteresis	
7.5^{-4} to 7.5 Torr	1%
7.5 to 900 Torr	0.1%
Vacuum Temperature Sensor	
Range	-20 to +85°C
Accuracy	±1.5°C
Response Time	<20 ms
Temperature Compensation	10 to 50°C
Mechanical	
Materials Exposed to Vacuum	304 stainless steel, Kovar, glass, silicon, nickel, aluminum, SiO_2, Si_3N_4, 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[1]
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^{-6} 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

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

Product Specifications

Environmental	
Ambient Operating Temperature	-20 to 50°C
Bake-out Temperature (non-operating)	120°C
Humidity	98%, non-condensing
Over Pressure Limit	145 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)



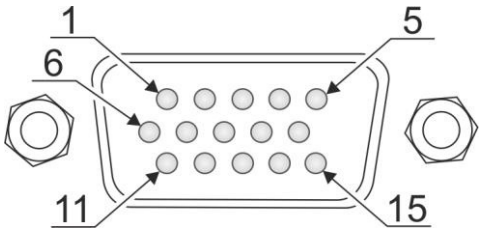
All dimensions in mm.

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) (1)
8	Relay 1 Common (1)
9	Relay 1 NC (normally closed contact) (1)
10	Relay 2 NC (normally closed contact) (1)
11	Relay 2 Common (1)
12	Relay 2 NO (normally open contact) (1)
13	Relay 3 NC (normally closed contact) (1)
14	Relay 3 Common (1)
15	Relay 3 NO (normally open contact) (1)

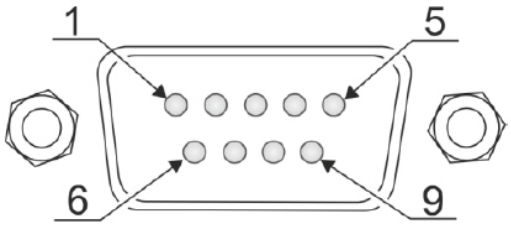
(1) Optional relay



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

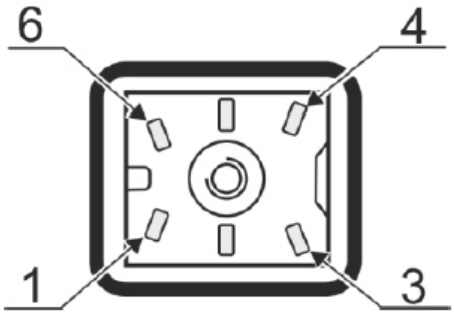
Pin	Description
1	Relay 1 NO (normally open contact)(1)
2	Relay 1 NC (normally closed contact) (1)
3	Supply voltage 12-30 VDC
4	Supply voltage – (return)
5	Analog voltage signal +
6	Relay 1 Common(1)
7	RS-232 Transmit / RS-485 (-)
8	Analog voltage signal – (return)
9	RS-232 Receive / RS-485 (+)

(1) Optional relay



6 Pin Hirschmann connector

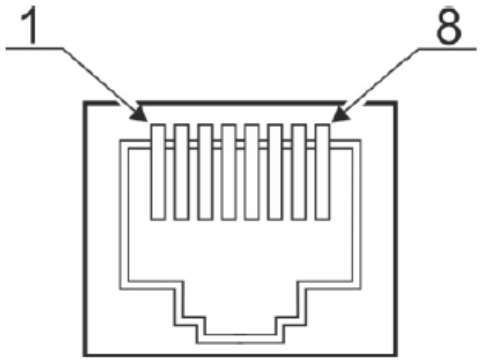
Pin	Description
1	Identification resistor (3K)
2	Analog voltage signal +
3	Analog voltage signal – (return)
4	Supply voltage 12-30 VDC
5	Supply voltage – (return)
6	Chassis



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) (1)
7	Relay 1 NO (normally open contact) (1)
8	Relay COMMON

(1) Optional relay



Model Code

Code Description	Code Option	Option Description
I. Base Model	BVT100	VersaTorr Wide Range Vacuum Gauge
II. Units	1	Torr
	2	mbar
	3	Pascal
III. Programmable 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
	8	DN25KF with light baffle
	9	DN25KF with heavy duty baffle
	A	VCR8F
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 / BVT Communicator (9 or 15 Pin D only)
	2	RS-485 / BVT Communicator (9 or 15 Pin D only)
	3	BVT Communicator (Hirschmann or FCC68 only)
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)
	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)
	P	0-5 VDC 100 Torr (Capacitance manometer emulation)
VIII. Customer Special Request	XXXX	Customer Special Request (Optional)

Accessories

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

Note: If a CSR affects any product description held within the PDC, the affected description character within that field will be replaced with an 'X' to denote the area of customization. If none of the product description character fields are affected by the CSR, no 'X' shall be denoted in the string, and the CSR number alone will define the special requirements.

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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.

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