BARTEC BENKE

Process Analyzer

Vapor Pressure Process Analyzer RVP–4

Credible Solutions for the Oil and Gas Industry

Vapor Pressure Process Analyzer RVP–4

To remain competitive, today's refiners must employ all optimization and product control techniques available. The use of online physical property analyzers is one of the key features to reach those objectives because they measure important quality properties in the process directly.

The vapor pressure is an indication of a liquid evaporation rate and relates to the tendency of volatile components to escape from the liquid. To assure safe storage and transportation of petroleum products, minimize environmental pollution and assure proper functioning of combustion engines it is important to measure the vapor pressure.

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Your partner for innovative system solutions.

The BARTEC BENKE specialists have many years of experience. They create system solutions that you can rely on: efficient and dependable for decades to come.

- ASTM compliant cylinder piston design with 4:1 expansion
- Suitable for high pressure applications (LPG)
- Suitable for high viscous samples (Crude Oil) without flushing cycles
- No maintenance approach
- Integral temperature control unit
- Network and fieldbus communication

APPLICATION

The BARTEC BENKE Vapor Pressure Process Analyzer RVP-4 measures the vapor pressure of various petroleum products. Due to its design it can be used for gasoline applications as well as for high pressure applications on natural gas liquids. It is also the best choice for applications for viscous samples such as crude oil without the necessity of implementing additional wash cycles. It is also possible to measure the vapor pressure at different temperatures e.g. True Vapor Pressure (TVP) for storage tank application.

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Special Features:

- **Rugged design of measuring cell**
- **High precision and maximized performance** due to optimized assembly of measuring cell
- **Minimized maintenance requirements** due to temperature control and insulating system without oil bath/pumps
- **Wide range of inlet temperatures.**
- **Also applicable for highly viscous samples**
- **Low sample consumption**
- **Re–cooling of peltier device** by either product or coolant
- **Available communication interfaces:**
  - Modbus/RTU, Modbus/TCP (bidirectional)
  - Remote access via Ethernet (VDSL or FOC is)
- **Integrated failure diagnosis and self monitoring**
- **Heat tracing if required**
- **Validation report for quality assurance**
- **Freely programmable digital and analog inputs**

Norms and Standards:

Compliant with:

- **ASTM D5191**
- **DIN EN ISO 13016–1**

Correlates with:

- **ASTM D4953 (DVP)**
- **ASTM D323 (RVP)**
- **ASTM D5482 (Mini Method Atmospheric)**
- **ASTM D6377 (VPCR)**
- **ASTM D1267 (LP Gas)**
- **ASTM D6897 (LPG Expansion)**

Make your decision for a strong partner!

Choose BARTEC GROUP also for:

- **Fast Loop Systems**
- **Sample Conditioning Systems**
- **Validation Systems**
- **Recovery Systems**
- **Chillers**
- **Air Conditioning Systems/HVAC**
- **Pre Commissioned Analyzer Shelters/ Turn–Key Solutions**

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EXPLOSION PROTECTION

Marking	ATEX: II 2 G IIC T4 Gb NEC 500: Class I, Div. 2, Groups B, C, D, T4 NEC 505: Class I, Zone 1, AEx IIB+H2 T4 CEC Sec. 18: Class I, Zone 1, Ex IIB+H2 T4 TR CU Certification available

TECHNICAL DATA

Technology	expansion with piston
Method	compliant with: ASTM D5191, DIN EN 13016-1 correlates with: ASTM D4953*, ASTM D323, ASTM D5482, ASTM D6377 (Crude Oil), ASTM D1267, ASTM D6897
Measuring range	fuel up to 1.6 bar (23 psi) LPG up to 16 bar (232 psi)
Repeatability	≤ DIN EN/ASTM fuel typ. 1.5 mbar (0.02 psi) LPG typ. 50 mbar (0.73 psi)
Reproducibility	≤ DIN EN/ASTM
Measuring cycle	discontinuous, cycle time 7 min typically, depends on sample composition
Product streams	2 x sample, 1 x validation (additional hardware required)
Measuring temperature	37.8°C (100°F), up to 60°C (140°F) optional
■ **Electrical data**	
Nominal voltage	230 VAC ± 10 %, 1 phase; 50 Hz; other ratings on request
Maximum power consumption	approx. 500 W
■ **Protection class**	IP 54 (NEMA 13)
■ **Ambient conditions**	
Ambient temperature	operation 5 to 40°C (41 to 104°F) storage 0 to 60°C (32 to 140°F)
Ambient humidity	operation 5 to 80 % relative humidity, non-corrosive storage 5 to 85 % relative humidity, non-corrosive

Sample

Quality	filtered 10 µm, moisture content max. 500 ppm (≤ 37 cSt at inlet temperature)
Properties	pour point 15 K below measuring temperature or cloud point temperature, for crude oil applications WAT needed
Consumption	approx. 2 to 10 l/h (depends on product) approx. 30 l/h for re-cooling of peltier device (not required if suitable coolant is available)
Pressure at inlet	min. 2 bar (29 psi) above measuring range standard: up to 8 bar (116 psi) optional: up to 18 bar (261 psi)
Temperature at inlet	
Standard	T_M**< 45°C: T_M**-40 K< T_{INLET}***< max. 45°C (113°F)
Optional	T_M**> 45°C: T_M**-30 K< T_{INLET}***< T_M**+5 K variation of temperature should not exceed 0.2 K/min

Utilities

■ **Instrument air**	
Consumption	
Purge	8 Nm³/h while purging (~12 min)
Operation	approx. 1 Nm³/h
Pressure at inlet	4.7 to 6 bar (68 to 87 psi)
Quality	humidity class 2 or better acc. to ISO 8573.1
■ **Coolant**	
Consumption	sample as coolant: 20 to 40 l/h or plant cooling water: 10 to 30 l/h for re-cooling of peltier device
Temperature	5 to 50°C (41 to 122°F), variation of coolant should not exceed 1.0 K/min
Pressure at inlet	2 to 7 bar (29 to 101.5 psi)
Quality	filtered 50 µm

Signal outputs and inputs

Analog outputs	vapor pressure (others on request)
Digital outputs	Alarm, Ready / Valid
Digital inputs	Stream Selection, Validation Request, Reset

Electrical data of signal outputs and inputs

Analog outputs	max. 8 (4 to 20 mA; 1000 Ω) active isolated on request
Digital outputs	24 VDC; max. 0.5 A
Digital inputs	high: 15 to 28 VDC / low: 0 to 4 VDC
Auxiliary power supply output	24 VDC; max. 0.8 A

Control unit

Central control unit	Industrial PC
Operating system	Windows Embedded Standard 7®
Control software	PACS

User interfaces

Display	TFT display with touch function 1024 x 768 pixel
Keyboard	virtual keyboard, controlled via TFT display with touch function

Connections

Tube fittings	Swagelok® 6 mm/12 mm/18 mm other fittings on request
Vent/Drain	open to atmosphere backpressure on request

Weight and dimensions

Weight	approx. 250 kg
Dimensions (W x H x D)	approx. 1191 x 1930 x 710 mm
Space requirements	right: 150 mm / left: 100 mm

Optional interfaces

Analog outputs	on request
MODBUS interface	MODBUS/RTU via RS485 or RS422 or FOC is, MODBUS/TCP via FOC is
Remote access	via Ethernet (VDSL or FOC is)

*Calculation of DVPE is standardized in ASTM D5191 / **T_M = Measuring Temperature / ***T_{INLET} = Sample Inlet Temperature

Important notice RVP-4 is subject to continuous product improvement, specifications are preliminary and may be subject to change without notice. If your technical data do not comply with existing data, please contact us for technical clarification.

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